Towards Algorithmic Experience

Redesigning Facebook’s News Feed

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**Sammanfattning**

Algoritmer har numera direkta konsekvenser på våra samhällen, de påverkar all vår dagliga verksamhet som användare, våra beslut och beteenden. Därför är det nödvändigt att från ett användarperspektiv identifiera och utveckla principer för hur design kan ta hänsyn till de konsekvenser som algoritmer har. I uppsatsen studeras särskilt sociala medieplattformar, som har i mycket formar våra informationskällor och flöden. I avhandlingen introduceras begreppet algoritmisk upplevelse, och avhandlingen utvecklar designprinciper för hur den algoritmiska upplevelsen kan utformas i sociala medier för mobiltelefon. Avhandlingen har en designmetodologisk ansats som stöds av gränssnittsanalys, dokumentanalys och workshoppar med användare. Den algoritmiska upplevelsen delas upp i fem olika huvudområden: transparent profilering, kontroll och korrigerings av användarprofiler, medvetenhet om algoritmiska effekter, och selektivt algoritmiskt minne. Sammantaget skapar dessa fem områden ett ramverk för kravställning och utvärdering av algoritmisk upplevelse i sociala medier.

**Abstract**

Algorithms currently have direct implications in our democracies and societies, but they also define mostly all our daily activities as users, defining our decisions and promoting different behaviors. In this context, it is necessary to define and think about how to design the different implications that these algorithms have from a user centered perspective, particularly in social media platforms that have such relevance in our information sources and flow. Therefore, the current thesis provides an introduction to the concept of algorithmic experience, trying to study how to implement it for social media services in cellphone devices. Using a Research through Design methodology supported by interface analysis, document analysis and user design workshops, the present paper provides results grouped in five different areas: algorithmic profiling transparency, algorithmic profiling management, algorithmic awareness, algorithmic user-control and selective algorithmic remembering. These five areas provide a framework capable of promoting requirements and guide the evaluation of algorithmic experience in social media contexts.
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1. Introduction

We are currently surrounded by algorithms (Willson, 2017). We appreciate how they ease our lives in many ways, deciding which the most efficient way to go is or selecting which are the most important news to follow. We also let them guide us: Diakopoulos express that Facebook’s News Feed is the main government and politics source for 61% of millennials (2016, p. 56). In the same way, algorithms could be used as propaganda weapons to change peoples’ believes and tendencies (Anderson & Horvath, 2017).

It can be argued that algorithms govern our societies through shaping the interrelation between human and non-human actors. Introna (2015) explains how algorithms are not just sequences of instructions, but create relations and new meanings of the objects they work with in situated contexts (2015, p. 20). The nature of algorithms is part of the socio-material dynamics in our society, they are not only technical entities (2015, p. 23). For example, algorithms are so involved in our societies that they even control a crucial aspect of our society: work (Dietvorst, Simmons, & Massey, 2015; Lee, Kusbit, Metsky, & Dabbish, 2015). These non-human actors create, enable, filter, or even deny work opportunities without any user centered perspective that could enable a better understanding of how they work and how they could be used in a better way.

But algorithms remain invisible, “inscrutable” (Introna, 2015, p. 25) without any possible user-centered design way of thinking. For example, Eslami et al. show in their study that the majority of the public does not know that their news feed is curated by an algorithm (2015, p. 153).

Algorithms also create negative effects on the user experience, sometimes in relation with their characteristics of not being completely impartial and how users take their suggestions after recognizing that “something” is acting. Bozdag describes the different levels of bias that algorithms introduce in social media (2013). Diakopoulos invites us to start questioning how algorithms are affecting our democratic systems (Diakopoulos, 2016, p. 56). Another example is pictured in a news article that explains how some algorithms enter into the commonly concept of uncanny valley (Thompson, 2017) when they appear “too human”.

Bucher created an useful collection of Facebook’s experiences as a way to understand how the algorithm shapes the use and acceptance of the platform (2016). The collection includes strange feelings of being classified by non-living tools, as well as the realization that algorithms are sometimes wrong (2016, p. 34). The study also includes uncanny moments that people have found in their normal activity, and annoyance when the algorithm cannot forget someone’s past history and insist on showing options that are no longer desired (2016, p. 35). Feelings about the algorithm being broken or even hate against it (2016, p. 36) were also described, including a decrease of the satisfaction when the algorithm create “cruel” connections (2016, p. 38) like reminding of diseased people. Furthermore, the users even explained a feeling of losing their friendships, being controlled or destroyed due the algorithm (2016, p. 39).

All of this examples point to a lack of a user centered design of algorithms, which also brings consequences to the systems and the services they try to cover. Eslami et al. explain that users who discover the algorithm management of the news feed react surprised and angered (2015, pp. 158–159). Other shown case is when users “were most upset when close friends and family were not shown in their news feed” (Eslami et al., 2015, p. 153). Adding to these ideas, even the concept of “algorithm aversion” has been studied from a psychological perspective (Dietvorst et al., 2015), showing cases in which people prefer the human actions, intervention or methods instead of the system service or algorithmic methods even when the tool produce a better job.

A possible way to improve these situations is raised by Hamilton et al, proposing the “design of algorithmic interfaces” as a research niche in which the debate between a seamful and technically transparent design to strike the inscrutability (Introna, 2015, p. 25) while the possible benefits of invisible algorithms could be studied and resolved (Hamilton, Karahalios, Sandvig, & Eslami, 2014, p. 634), this proposition is not enough. Besides the need of an “algorithmic interface”, Diakopoulos
express that the problem should also include the user experience, stating that the Human Computer Interaction field has a role to play here to address the algorithmic experience problems (2016, pp. 61–62). Relevant research questions should include a way to resolve how to show all the possible information related to algorithmic decisions in a pleasant way for a lot of varied users, without killing usability, worsening results, and without risking that the system can be corrupted or tricked by users.

Likewise, Lee and colleagues argue that it is necessary to do “new methodological research in HCI and interaction design on designing human-centered algorithmic management” (Lee et al., 2015, p. 1611). The authors express that building interfaces for algorithms involve different ways for determining requirements and ways for interaction than the current. Bucher’s also states that is crucial to study how people feel about algorithms, “... and while algorithms might not speak to individuals, they might speak through them” (Bucher, 2016, p. 42). Therefore, defining a way to understand these “algorithmic interfaces” includes not only the study of how these algorithms are nowadays invisible, but also how they are affecting the user experience and how to improve it. Furthermore, it is needed an approach to understand how these algorithms are being produced, which decisions are made to design them and how the context influence those decisions. It should also include how the user knowledge about the algorithm affect the interaction with the system (Hamilton et al., 2014) and what attitudes are emerging towards the algorithm (Glöss, McGregor, & Brown, 2016).

As an interesting fact, it is remarkable how this topic even has legal implications. Goodman and Flaxman explain that the new European regulation will include a new algorithmic design that should “...avoid discrimination and enable explanation” (Goodman & Flaxman, 2016, p. 1).

It is possible to look upon these issues as shaping the requirements on what can be called “algorithmic experience”. This concept could become a new research field in Human Computer Interaction dealing with the possible knowledge around algorithms, how we perceive them and how to design better experiences with them. It is crucial to start thinking about algorithms not only as working tools inside a system but also as technical features that deserve design attention from a user centered perspective. From a technical viewpoint, the expression even embraces any possible code or algorithms that could be related to the experience or service in question, in contexts where it is not only one but multiple algorithms are affecting it.

Therefore, this thesis is limited to the study of algorithmic experience in social media and in particular Facebook’s news feed as it appears in the cellphone app. It is divided in chapters for a better organization of the ideas. First, the Background chapter provides an exploration of the most recent and relevant academic work and theories around the topic. Second, the Theories chapter provides a description of the selected theories that conceptualize the research and the proposed research instruments. Then, the Methods chapter explains the methodology and gathering techniques applied for the resolution of the final Research Question. The chapter Methods application and main results delivers an explanation of the most relevant results gathered thanks to the selected methodology and data gathering techniques. The sixth chapter includes the results and analysis part. Finally, the conclusion chapter discusses the limitations of the study, the ethical dimensions related to algorithmic experience and an invitation to continue future research in this area.

With this research arises an important challenge: “how to make visible that which is invisible by design” (Schou & Farkas, 2016, p. 44). This research explains how through design this challenge could be addressed in Facebook’s news feed.

1.1. Delimitation

1.1.1. Service context

Between all the services and applications that are managed nowadays by algorithms, social media has gained a recently increased importance, particularly around the recent United States’ presidential elections (Bort, 2016; Perez, 2016) in which Barack Obama and Donald Trump got elected as the
president of that country. As explained in some contexts, social media played an important role to achieve that position. In this context, a debate about how Facebook creates its news feed has become one of the strongest reasons to explain the final results. Possible explanations related to concepts like filter bubbles (Bozdag & van den Hoven, 2015; Q. Liao & Fu, 2013; Resnick, Garrett, Kriplean, Munson, & Stroud, 2013) and echo chambers (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015; Bessi, 2016; Farrell, 2015; Flaxman, Sharad, & Rao, 2016; Garrett, 2009; Tufekci, 2015; Vaccari et al., 2016) have been introduced in mainstream media and has become an important aspect to take into account while using this kind of web services. Inside the social media services, Facebook is currently the leader of social media services on the web (statista.com, 2017), including (Chaffey, 2016a), including the most popular social network worldwide, the one showing the fastest growth, the most attractive for users and the one that dominates the social landscape.

As a result, for the current thesis, the first delimitation to research about algorithmic experience is established within social media services, in this case particularly Facebook and specifically, its news feed.

1.1.2. Platform context
Because algorithms should be studied in their material implementations (Dourish, 2016, pp. 5–6), it is also relevant to define the platform context on which this study is centered. For this delimitation, it is relevant to delineate popularity as an aspect to look for, because the majority of occurrences in relation to algorithms are found in the most used devices and platforms.

Following the previous delimitation, Facebook is currently used on several technological platforms that offer different interaction experiences for the users, mobile platforms being the most common one (Chaffey, 2016b). In this context, Facebook is most commonly used in smartphones with 80% of the usage in 2015 (or in a mixture used between mobile and desktop use, but always being desktop-only the least used case) (Chaffey, 2016b), in comparison with tablets that are only 47% worldwide.

Because of these reasons, the platform delimitation for the current thesis is defined by the consumption of Facebook on mobile platforms, particularly the ones related to smartphones.

In conclusion, guided by the popularity of the technological possibilities in relation to Facebook consumption, the present thesis is delimited in its technological context by the analysis of Facebook in smartphones devices. It is worth to notice though, that the present thesis only offers examples and design proposals for an Android environment due to lack of time and resources, but the final recommendations are perfectly capable of being implemented in IOS environments as well.

Having the service and platform delimitation it is possible to define a preliminary research question for the current thesis.

1.2. Preliminary Research question
Based on the motivation elaborated in the previous segments and taking into account the scope elaborated in the delimitation, a preliminary research question for the current study could be defined as follows:

Which design opportunities need to be implemented in Facebook’s news feed in order to improve the user experience with algorithms?

It is important to notice that this preliminary research question is not definitive. After an exploration of the state of the art and a description of the background that support this study, a final research question was stated to guide the current research. Therefore, the next chapter of this document guides into an exploration of the most relevant and recent research related to algorithms and their implications in user’s experience.
2. Background

Different academic backgrounds have provided useful input to the understanding and importance of studying the user experience provoked by algorithms. This chapter states specific segments to describe generally some of the most recent and relevant research that has brought up the concept of algorithmic experience.

Additionally, a Final Research question and design goals segment is included at the end of this chapter to explain a definitive Research Question for the current thesis.

2.1. Algorithmic culture

Algorithms have permeated our society in such a way that there are evidence about how they have modified our culture and practices. For example, Hallinan and Striphass directly express algorithmic culture as “provisionally, the use of computational processes to sort, classify, and hierarchize people, places, objects, and ideas, and also the habits of thought, conduct, and expression that arise in relationship to those processes” (2016, p. 119).

In relation, Gillespie provides an explanation of how algorithms not only manage culture, but also becomes culture (2016). The author explains that algorithms are not invisible since their effects sorting and recommending cultural products are evident in our lives (Gillespie, 2016, p. 2). Particularly, the selection of relevant contents made by the algorithms is addressed by the author as a technique to ensure the visibility and invisibility of certain contents (Gillespie, 2016, p. 3) in two dimensions: who is selected as relevant (popularity of a certain user, group or content) and when it is relevant (specifying when something is popular, recent or updated). The author also states that this algorithmic labor does not care at all about what it is being selected as relevant which is the specific content, material or believe being treated in the data (Gillespie, 2016, p. 4). Gillespie also explains trending as a not independent phenomenon from human intervention (2016, p. 8), being able to mean a lot of different ideological positions at the same time, but still presenting itself as the current materialization of popular attention or activity.

About the fact that trending algorithms become also cultural objects themselves, Gillespie explains that these algorithms become relevant not because they manage culturally related data, but because they become culturally meaningful when treated as sources for opinion shifting (2016, p. 12). The author concludes stating that “the work of algorithms is cultural, and algorithms are not free of culture themselves” (Gillespie, 2016, p. 17).

Introna also explains that algorithms are part of the socio-material dynamics in our society (2015, p. 23). Besides, Introna describe the design decisions of an algorithm as a complex process where not only the context affect the final results, but also the continuous changes and controls, making even impossible for the designers to track their life and behavior (2015, pp. 25–26).

Closely related, Geiger states that “Software is more than code” (2014, p. 346) and that it is important to study these non-human actors in their contexts as part of socio-cultural practices. Geiger explains that algorithms should be studied not only as instructions or invisible platforms which are always consistent and independent from the world, to evidence how much they even influence the force of law, they are agents being able to govern and regulate (2014, p. 348). In this context, Geiger also explains that those who has the power to decide what runs in a certain code, also has the power to regulate the governing dynamics that algorithms provoke (2014, p. 351).

Beer even relates to the filter bubbles in social media as a consequence of algorithmic sorting processes that are “likely to limit cultural experiences and social connections” (2017, p. 7). This effect creates problems of limiting people from external influences and enables them only to the same kind of information and interaction.
Another paper that states directly the intervention that algorithms make in our culture is from Hallinan and Stripas (2016). They explain how Netflix algorithm has redefined the way of audiovisual consumption, including: “…what culture mean, and what might it be becoming to mean, given the growing presence of algorithmic recommendation systems” (Hallinan & Striphas, 2016, p. 119). We are now “… in a world in which culture and computation are becoming less distinguishable from one another” (Hallinan & Striphas, 2016, p. 131).

### 2.2. Materiality of algorithms and their experience

The notion of algorithms as materials breaks with usual sense of seeing them just as technical tools and includes them as materials able to produce experiences in the users. Schou and Farkas referring to an analysis on how information is processed in Facebook, express that “As material environments enveloping our everyday life, media play a highly important part in conditioning our acquisition and evaluation of information” (2016, p. 38). Furthermore, they state that services like Facebook manipulate how information is presented, distributed and accessed:

“…the user operating on Facebook is, indeed, at a distinct disadvantage: a disadvantage that essentially has to do with the material constitution of the platform itself. What the user can and cannot come to know is conditioned by the material structure and potentials inscribed into the platform and its code” (Schou & Farkas, 2016, p. 46)

If these elements are more than just technical tools and become a material to build knowledge, then like other materials around us they should have a concrete feeling and experience to be studied for appropriate designing. Dourish describes how their material manifestations and effects are shaped by the “specific instantiation –as a running system, running in a particular place, on a particular computer, connected to a particular network, with a particular hardware configuration” (2016, p. 5). Even more, the author states the possibility that “our experience of algorithms can change as infrastructure changes” (Dourish, 2016, p. 6). Consequently, particular versions of the algorithm can be experienced in different implementations with particular capacities in relation to their material implementations.

All of these notions have created the idea of the experience involved in algorithmic materiality. At this point, it is imperative to ask: Which algorithms are we talking about? Do all algorithms need a designed experience? It is not possible yet to be exhaustive in a possible answer, but there are academic approximations that describe specific characteristics from specific algorithms that enter into it. Scholars continuously look upon algorithm studies as a new and yet open field for new knowledge, definitions and theories.

The Human Computer Interaction (HCI) field has been concerned with algorithms since its beginning. The way how humans interact with technology has always been brought by algorithms that in one way or another bring an experience to the user. In this sense, the concept of user experience has always included the algorithms that create a visual display, provides mechanisms to input data, shows the data in a variety of outputs, and other actions related with digital technologies. Even if algorithms have always been part of the work for HCI, certain algorithms have recently emerged that need particular attention. These algorithms could be called “experience worthy”. From a technical perspective, it is tempting to delimit these algorithms to those related to machine learning, or use other strategies to create a profiling dynamic between the system and the user. But the concept of algorithmic experience should be opened to all kinds of technologies (now and in the future) that affect the user experience through the decisions and interventions of non-human actors.

Continuing with Dourish work, he establishes a frame for this topic. The scholar explains that “algorithms and programs are different entities, both conceptually and technically” (Dourish, 2016, p. 2). From a sociological stance, he explains that programs are bigger than algorithms because they include algorithmic material, but at the same time algorithms are bigger than programs because they are free of the material limitations of the program implementation.

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Some researchers have provided some insights into which algorithms deserve user centered design perspective. For example, Willson describes what is called as “everyday algorithms” (2017). He explains that algorithms are increasingly being delegated with everyday tasks that are now being held through technologies, but in the same time, delegating activities to algorithms are also becoming an everyday practice (Willson, 2017, p. 146). Relevant characteristics of these algorithms is that they “operate semi-autonomously, without the need for interaction with, or knowledge of, human users or operators” (Willson, 2017, p. 139).

For these reasons, Willson states that when studying these algorithms we:

“...need to take into account the ways their designs and their actions interact with their human counterparts, their relations, systems and structures (social, technical, cultural and political). We also need to consider who designs and implements them and what intended and unintended outcomes result” (Willson, 2017, p. 141)

Another important highlight that Beer expresses about algorithms is their capacity to enable authority. The author also refers to their “...ability to take decisions without (or with little) human intervention that is at the heart of discussions about algorithms potential powers” (Beer, 2017, p. 3) Furthermore, the author explains the relevance of studying how algorithms define “organizational, institutional, commercial and governmental decision-making” (2017, p. 5). The scholar also claims that “…algorithms are deployed to shape decision making and behavior, and then these algorithmic processes are experienced and reacted to at the level of everyday experience” (Beer, 2017, p. 6).

Establishing trending as an important behavior to track in algorithms, Gillespie also claims that some algorithms create calculated publics defined as groups that have been measured before and that need a particular information that is relevant for them (2016, p. 15). The scholar defines these algorithms as particularly relevant, “their algorithm-ness becomes meaningful” (2016, p. 18). The author even mention the importance of teaching users how these algorithms work, when these technical tools commit abuses on people information, and how their politics for selecting what is important reflect in society and personal choices.

Gillespie also defines as “public relevance algorithms” those that produce and certify knowledge (2012, p. 168). In general terms, these mathematical procedures have specific presumptions to define “what knowledge is and how one should identify its most relevant components” (Gillespie, 2012, p. 168). In a way to generalize this knowledge, Gillespie establishes six dimensions to determine the actions that “public relevance algorithms” execute (2012, pp. 168–169):

1. Patterns of inclusion: algorithms that select information and present it as an index, exclude other information and have a procedure to create algorithm ready data.
2. Cycles of anticipation: algorithms that try to predict their users and create conclusions about them.
3. Evaluation of relevance: algorithms that determine what is relevant by a certain criteria, creating even political choices about correct and legitimate knowledge.
4. The promise of algorithm objectivity: algorithms that present themselves as impartial and exempt of human intervention in relation to the topics they manage.
5. Entanglement with practice: algorithms that impulse users to reshape their practices based on their use of the tool.

Even if Gillespie provide this six dimensions as ways in which algorithms have mostly a political relevance, the dimensions show particular contexts in which certain algorithms create a direct experience in their users. Again, it is worth to recall how Gillespie defines this six dimensions as a list that must “be taken as provisional, not exhaustive” (2012, p. 169), opening the chance of including even more cases in which algorithms have a particular relevance.

As discussed previously, an example in which this notion of algorithmic experience comes into focus is in social media contexts. As a particular example, Berg’s work uses the term algorithmic structure
“to describe how the processing of personal and interactional data affects the experienced relationship between self and others on Facebook” (2014, p. 2). For the researcher, the algorithm creates “an interactional environment that acts upon the individual” (Berg, 2014, p. 3), meaning that the algorithm not only acts in the social field but delimits it in a particular space.

Therefore, it is needed to stop thinking about algorithms as abstract entities working in the background, but as an integral part of a specific experience, so that the only possible way to improve the experience of a particular system or service is to focus the attention on the algorithmic experience and designing and managing this experience for the users.

2.3. Social media algorithms

The existence of algorithms creating filter bubbles and echo chambers in social media have been treated by several authors (Boutyline & Willer, 2016; Farrell, 2015; Flaxman et al., 2016; Garrett, 2009; Q. Liao & Fu, 2013; Nagulendra & Vassileva, 2014; Prakash, 2016; Resnick et al., 2013; Vaccari et al., 2016). In this context, it is interesting how Flaxman, Goel and Rao (2016) found that these services increase the ideological distance between people, but also promote a higher exposure of different ideological content (Flaxman et al., 2016, p. 318). A similar study was made for Twitter, showing that the platforms are not highly related with the political discussion, but instead by the structure of the offline political framework and particular habits of political discussion in social media (Vaccari et al., 2016). An other interesting approach has been taken by Bucher describing the experience created by Facebook’s algorithm (2016). The author’s results are quite negative about the algorithm (Bucher, 2016, pp. 34–39), promoting a discussion about how users perceive the platform and their use with the system (2016, pp. 39–42). The framework that Bucher propose to analyze these opinions is worth to use in the present thesis, and they are detailed in the Theories chapter of the present document.

Rader and Gray also present a description of user’s opinion with Facebook’s News Feed (2015). They first explain the feedback loop concept, defined as a characteristic of social media in which the user’s behavior (shares or likes) define what he/she also consumes, creating a loop in which the algorithm always presents the same items that the user would almost certainly interact with (Rader & Gray, 2015, p. 173,175). As a conclusion, the authors present a set of beliefs that users have around Facebook’s News Feed, which are used in the present research and described further in the Theories chapter of the present thesis.

Diakopoulos creates an interesting framework to understand how algorithms make decisions by prioritizing, classification, association and filtering (2016, pp. 57–58). These algorithmic activities are interesting to study in relation with the user experience they produce, so they are explained in a broader way in the Theories chapter of the present document.

Hamilton et al. explain the debate around how the invisibility of these algorithms are actually a success in one hand (algorithms have always attempted to be invisible), and how they should be more visible for the user on the other (Hamilton et al., 2014, p. 633). While the black boxing tendency protects intellectual property and produce less effort for the user, a seamful tendency could also improve the opportunities of new uses and experimentation (2014, p. 633).

Later, the authors call “design of algorithmic interfaces” as an opportunity in which this debate could be studied and resolved (Hamilton et al., 2014, p. 634). Some aspects pointed by the authors that should be tried in this context are the adaptability for a lot of different kinds of users, and security that creates a feeling of trust between the user and the system in terms of his/her interests as a center of the design. Also, they express some techniques that have to be evaluated to purse these studies like reverse engineering, exposing the algorithm with the proprietors, the context in which those algorithms emerged, how those algorithms are perceived by the users and others (2014, pp. 635–638).
In relation to algorithms in social media contexts, Bozdag states that these technical tools are biased not only for technical reasons, but also because of human actions (Bozdag, 2013). The overabundance of information nowadays create the need of creating tools that could filter and select the most important information for a particular user (Bozdag, 2013, pp. 210–213). For this need in particular, Bozdag explains that people predominantly believe in social networks for a filtered source of information from their closer contacts in which the systems creates a prediction of what the user needs and wants (2013, p. 211).

In Facebook’s case, the system register social actions to promote the information coming from the most active friends in the user’s list in terms of comments, likes, sharing and others related (Bozdag, 2013, p. 211). This personalization dynamic produce that the content shared by other friends with less social actions in the user’s list would not be seen in the news feed, making the system a controller of the incoming information, but also a controller of who the user can reach (2013, p. 211).

Moreover, the information that appears in the news feed is related to the value that other users with common tastes have provided to that information (Bozdag, 2013, p. 214). By statistic correlations, the system creates a list of users with similar tastes, and the interaction between them determines if that information appears in a particular news feed. In this case, a “sender/content creator” user cannot know if a “receiver/content consumer” user is actually receiving the message or not, and vice versa.

Bozdag also provides a synthetic model to understand the process in which filtering works in online services (2013, pp. 214–220). This model is divided in five stages that are useful for the current thesis in a way to understand how Facebook’s new feed apply them:

1. Collection and selection: This is the stage in which “algorithmic gatekeeping” starts (Bozdag, 2013, p. 215). In a social network for example, the system starts collecting the information about the user’s interaction with information and between them. In this case, the main bias exists when not all the information is digital (like the untraceable negative actions mentioned in the implicit personalization) preventing the algorithm to take that information into account. Also, some information that is digital is not tracked because of its technical nature, incompatible with the collection implementation.

2. Selection and prioritization: In this stage, the algorithm defines what is going to appear in the news feed and in which order. The bias exists when the algorithm designers implemented which data such add more or less value to a particular information and which data to include (Bozdag, 2013, p. 216). In this stage it is common to use popularity as a way of prioritization, giving fewer chances for those sources that are not that popular. Here it is also possible to have influence from external factors, trying to cheat the algorithm and creating false interactions. Another bias aspect is the service prioritization, being the most common to establish advertising with certain level of relevance as income providers, or giving their own services (or partners) more transcendence. #OccupyWallStreet example is a common situation occurred with Twitter (Bozdag, 2013, p. 216), giving more transcendence to something new or viral instead of repeating trends or slowly growing movements.

3. Deletion, withholding and disregarding: In this stage, a human intervenes. Even if the digital service claim that their solutions are not managed by humans, there are specific cases in which it is proven how specific teams of departments are in charge of curating or deleting content in social media, particularly when an offensive information appears or is denounced by other users (Bozdag, 2013, p. 217). Here, organizational influence plays an important role selecting what, how and when to filter specific information. An example of this is when Facebook had a team dedicated to curate news (Michael Nunez, 2016).

4. Localization, customization and channeling: In this case, the personalization algorithm acts as the protagonist trying to diminish the possible bias created by popularity measures and providing specific taste-related information (Bozdag, 2013, pp. 217–218). This selection also creates other kind of bias as stated above with the explicit and implicit ways of personalization. Cases like changing habits or tastes could affect an explicit personalization for a certain user. On the other hand, implicit personalization creates the “filter bubble effect”,
giving false impressions to the users about what is relevant and popular. Other aspects influence this personalization algorithm (Bozdag, 2013, pp. 218–220), like the location of the user that provides more information related to the place, audiences and how they popularize particular information, interpersonal networks that influence as an influential primary group the access of information and advertisers who are always interested to appear in the news feed.

5. **Display, repetition, prioritization and timing**: In this stage, the interface provides the bias. Deciding how the selected information is displayed is crucial to establish what is going to be consumed first or never (Bozdag, 2013, p. 220).

A first proposal to change this situation could prioritize an exacerbation of the explicit personalization of the system which is based on what the user provides to the system of his or her information or interests, providing the user with more controls, but this strategy could also fall into biases as explained by the author (Bozdag, 2013, p. 221). Furthermore, there are some intentions around tricking the system or promoting strategies to break it, but unfortunately these activities need a lot of effort from the user, it is not always technically possible and the systems sooner or later overtake them to reduce their effect (2013, p. 221). Also, these strategies require a certain technical knowledge from the user, which is not currently plausible for every kind of user.

To diminish the bias from this kind of algorithms, Bozdag suggests that a mixture between explicit and implicit personalization (2013, p. 221). It creates a dialogue between the user and the algorithm in which the system predicts what the user wants, but also create questions to verify if its results are correct and providing feedback to express under which assumptions the information is selected. Also, the author recommends promoting content diversity exposure launching a challenge to design more appealable strategies for users to consume socially challenging information.

### 2.4. Prototype based approaches for social media

Eslami et al. propose a research in which they used a system called FeedVis to demonstrate a group of 40 users how different is Facebook’s News Feed with and without the influence of the algorithmic adulteration (2015). The tool is able to present how much interaction the user has with a particular friend in his/her list (Eslami et al., 2015, pp. 155–156). Some of their results pointed that users react surprised and angered when they discover the algorithm activity, and also upset knowing that some of their closets friends and family did not appear in their news feed.

Agadagba creates an interesting description of several recent strategies (2016, pp. 11–16). For example, citing Munson et al. the author explains a browser plug-in created to aware the user of his/her reading tendencies and most common biases (Agadagba, 2016, p. 11,12). It works showing graphs about how much content have been consumed in terms of liberalism or conservatism. Unfortunately, the results showed that the tool did not actually change the user’s reading behavior, but by promoting visualization made the reader aware of what he/she reads.

Another browser add-on explained by Agadagba shows a media fingertip based on the user’s reading habits tracking (2016, p. 12). The tool pretends to summarize the user’s consumption in terms of informing how much other sources should be read. With a nice interface, the tool shows which are the most common media sources that the user read the most (Agadagba, 2016, p. 13).

Agadagba also discusses a smartphone app that brings people together taking into account their political differences in social media (2016, p. 15). This approach tries to break the effect of echo chamber and filter bubble in the real world, making an option for people to meet with different believes and points of view. The evaluation of the tool showed that people are actually willing to meet other people that think differently (Agadagba, 2016, p. 16).

Finally, another visualization tool proposed by Nagulendra and Vassileva shows what has been filtered away from the user (Agadagba, 2016, pp. 14–15). The tool analyses and shows which “friends” are inside or outside the users filter bubble in a particular social network (Nagulendra & Vassileva, 2014).
Their tool also allows breaking that filter bubble by including or excluding users from the common discussion.

2.5. Final Research question and design goals

After the previous description of the background and state of the art, it is possible to define a final research question to guide the current research. Based on the preliminary research question for the current study, the final research question could be defined as following:

*Which design opportunities need to be implemented in Facebook’s news feed in order to improve the algorithmic experience?*

As pointed out before in the introduction and taking into account the current background description, it is possible to elaborate a new concept of algorithmic experience which refers to the need of improving how the user feel and experience the social media platform in relation to the algorithmic behavior of trending, profiling and filtering in the news feed.

To solve the mentioned research question in a better way, the following design goals are defined providing more specific aspects to resolve:

1. Identify specific features that are needed in Facebook’s news feed in order to improve the algorithmic experience.
2. Describe the contexts in which those features are desired in Facebook’s news feed in order to improve the algorithmic experience.
3. Propose a way to interact with those features in Facebook’s news feed in order to improve the algorithmic experience.

After the Background and Final Research definition of the present chapter, it is possible to continue defining relevant theories that help to delimit and guide the current research. Next chapter explains the most relevant frameworks and concepts that delimit and guide the consecution of the proposed methodology for this research.
3. Theories

The present thesis uses certain theories to build the instruments used in the data collection. This chapter is divided into two main sections: the first one provides an explanation of the most relevant theories related to algorithms and the experience they produce in social media contexts, and the second one describes which frameworks are relevant to use in terms of how algorithms make decisions for the users and how they have implicit bias in their work.

3.1. Theories for algorithmic experience in social media

There has been recent research about how people experience algorithms, particularly in social media contexts like Facebook. This research brings different frameworks and concepts that help to direct the gathering information instruments during the methodology application.

Bucher describes certain reactions that people have around different uses and cases with Facebook’s algorithm (Bucher, 2016). The paper proposes a categorization based on affects as following:

1. Profiling identity: is related to the feeling of being classified and profiled (Bucher, 2016, p. 34). Includes also the inferences that the algorithm does based on that tracking which usually denotes stereotypical assumptions which relates the user with groups or needs that does not make the user feel correctly. An example of this experience is when a middle age woman is constantly bombarded with losing weight content when she is not really interested in those topics.

2. Whoa moments: strange sensations produced by the algorithm tendency to direct and discipline attention (Bucher, 2016, p. 35). These feelings are related to moments in which people realize they “have been found”. An example of this feeling is when the user is having coffee and Facebook’s ads shows a coffee brand at the same time.

3. Faulty prediction: occurs when the algorithm create false assumptions producing annoying experiences to the users in relation to their beliefs and interests (Bucher, 2016, pp. 35–36). Here it is included the incapacity of Facebook algorithm to forget the past, making unaligned inferences with the current situation of the user. Feelings about how bad the algorithm knows the users are present. When the users have this feeling, they tend to describe the system as broken or malfunctioning. For example, receiving conservative news posts because the user used to live in a conservative place before but now he or she is not interested in those contents.

4. Popularity game: the feeling of acting for catching the attention of the algorithm and getting its visibility (Bucher, 2016, pp. 36–37). It is also related to the feeling of not getting enough likes, comments or shares because of the algorithm. Tricks and strategies to get the algorithm attention or increase the popularity of the own profile also enters in this category, creating sometimes tiredness and struggling experiences with the algorithm.

5. Cruel connections: refers to the incapacity of algorithms to track and relate human feelings (Bucher, 2016, p. 38). Algorithms usually create recommendations without taking into account sensible or hard situations of the user. It is related to expressions like “they are just machines without feelings”, “been created by humans does not mean that they have humane way of working”. An example of these situations is when a user receive a reminder of his recently died daughter.

6. Ruined friendships: the feeling of curating not only content but also relationships (Bucher, 2016, p. 39). Includes the feeling that the algorithm creates around filtering friends, hiding some people from the friend list, making people forget other people and creating the sense of losing control of his/her own relationships.

This classification is used in the current thesis to guide any data technique that look to achieve the first and second design goals defined to propose features and contexts to improve the algorithmic experience. Mainly, these types of experiences are able to lead a discussion of design possibilities to...
improve the algorithmic experience in Facebook’s news feed, but also they define a chance to guide a search for specific solutions in previous research.

Rader and Gray have studied some common beliefs that people have around Facebook’s News Feed (2015). Some of their findings are worth to take into account in the present thesis (Rader & Gray, 2015, p. 178) and could be detailed as following:

1. Passive consumption: no active belief towards Facebook’s news feed particularly because they have not experienced anything special that made them think about the algorithm. The belief also portraits how the algorithm filters some information just because the system cannot show all of the posts;
2. Producer privacy: the belief of being excluded from other’s news feed because of an active decision of those users. This situation is made by the use of Facebook’s feature to hide certain users from the news feed. It is handled by the algorithm, hiding or showing certain information based on others unknown choices of hiding or showing information in particular news feed;
3. Consumer preferences: the belief of having to intervene with the algorithm telling it what you want to see and what you want to exclude using Facebook’s current options. If the user does not tell the system what they want, then the algorithm not shows them what they want;
4. Missed posts: the belief of giving the news feed algorithm the responsibility of hiding specific posts from friends that have been missed. This belief appears when their friends tell them about posts they do not know about;
5. Violating expectations: the suspicion that posts are being curated by discovering irregularities in the news feed like posts without a chronological order;
6. Speculating about the algorithm: the belief of an entity that prioritizes posts in the news feed. This entity is usually described as “Facebook”.

As the previous proposed theory, this classification also provides a way to lead a discussion of design possibilities to improve the algorithm experience in Facebook’s news feed. All of these categories and beliefs are taken into account in the current thesis to find features and contexts to improve the algorithmic experience.

3.2. Algorithmic decisions and their bias

The present thesis should be also guided by the knowledge gathered in research related to algorithms culture and their decision mechanisms. These research results provide valuable input to discover how these aspects are also experienced by the user.

For example, Diakopoulos explains four different actions made by these technical tools (2016, pp. 57–58):

1. Prioritizing: constitute bringing the attention to certain information in contrast to other, “...by definition prioritization is about discrimination” (Diakopoulos, 2016, p. 57). In this case, design decisions in relation to this action deserve careful consideration.
2. Classification: defined by including particular information with a particular class or group. This action could provide a biased result based on accuracy, false positives and false negatives, and the implications that this biased classification could create with the related stakeholders (Diakopoulos, 2016, p. 57)
3. Association: the action of relating particular information with other entities, creating different human interpretations. In this action, because the main strategy for relation is made by the statistical approach of correlation, people usually interpret these results as causation, creating misconceptions about what the system is relating (Diakopoulos, 2016, p. 58)
4. Filtering: the action of including or excluding information based on a certain criteria. An example for the social media context is moderation, a dynamic that could be related also with censorship (Diakopoulos, 2016, p. 58)
All of these actions are taken into account in the current thesis, particularly to the finding of design possibilities to improve them in Facebook’s News Feed in terms of the proposed designed goals.

Thinking about a better way to improve these four actions for the user, Diakopoulos also propose a discussion around transparency based on 50 journalist opinions about how algorithms should be in this terms (2016, pp. 59–61). The results are five categories that should be taking into account for designing the algorithmic experience:

1. Human involvement: to explain how, who and when a human have intervened in the design and results of the algorithm. These not only increase the awareness of how these algorithms work but also how important are those design decisions from the developer’s point of view.
2. Data: to show how the data is selected, defined or transformed and where the information has been taken to address that selection.
3. The model: to express how the algorithm model works. Which information takes to act and which behavior affect it as an input.
4. Inference: to state what kind of inferences the system is making to present certain type of results. It includes classifications and/or predictions.
5. Algorithmic presence: declare where the algorithm is working and where is not. This includes expressing which elements have been filtered and what other information is not accessible due to the effects of the algorithm.

These aspects are included as characteristics to be analyzed in the current version of Facebook’s news feed.

Another aspect to take into account in this research is bias. Bozdag describes how algorithms in online information intermediaries are biased even if they are just technical tools (2013). He states that “Humans not only affect the design of the algorithm, but they also manually influence the filtering process even when the algorithm is operational” (Bozdag, 2013, p. 209). This aspect is crucial for the present thesis to understand how the users could influence their own algorithm experience. The author explains that this personalization could be done by the system in two different ways (Bozdag, 2013, p. 213):

- Explicitly: When the user actively introduce his/her interests and data, introducing personal information or rating topics for example. This allows control and leading for the user, but creates a disadvantage when the user wants to maintain his/her privacy or when the user does not manage to express correctly his/her own interests.
- Implicitly: When the system is the one that determines what the user wants and his/her interests through techniques like data mining, machine learning or other technical possibilities. This way has the advantage of saving time and effort to the user and updating automatically while the user acts, but the main problem is that systems usually can only interpret actions as positive skipping the chance of learning when a user actually behaves negatively towards content.

For this thesis, both concepts are relevant to handle to check which options are currently available in Facebook’s news feed.

After defining the relevant theories and frameworks that are used in this research, the next chapter defines which methodology was applied to solve the final Research Question.
4. Methods

This chapter explains which methodological stance and strategy have been chosen to address the research problem. Also, it contains subsections describing the data collection techniques applied to gather enough information to analyze and propose a resolution for the proposed design goals.

Researching about algorithmic experience is not straightforward as the awareness of algorithms and how they influence our lives is not well comprehended yet. Also, research about this topic inside the Human Computer Interaction (HCI) field is quite new and there is no established methodology in the domain.

Due to these characteristics a qualitative approach was adopted. Blandford, Furniss and Makri explain that the qualitative approach “aim to describe and explain phenomena in a rich, often exploratory way” (2016, p. 2). The same authors define selecting the research strategies (2016, p. 2) as an important stage of a qualitative research for HCI.

Because of the previous characteristics, for this thesis and in relation to the specific requirements, the selected research strategy is Research through design (RtD). This strategy provides enough flexibility to produce knowledge about algorithmic experience in every stage of the research process, in contrast with other approaches that usually expect results only in the last phase. Because algorithmic experience is something that is not yet defined properly, it needs to be explored and built from any possible source that could be brought from the research process itself, studying, trying and fixing the design possibilities.

4.1. Research through Design

Gaver express that design usually work with complex problems that need to take into account the context and with no unique correct solutions (Gaver, 2012, p. 940). Gaver discusses how and why a design process guided by the Research through Design (RtD) methodology can resolve these kinds of problems, becoming a viable way to address the current research.

Some bases for the Research through Design (RtD) approach come from the learning sciences. Barab and Squire explain that “…cognition is not a thing located within the individual thinker but is a process that is distributed across the knower, the environment in which knowing occurs, and the activity in which the learner participate” (Barab & Squire, 2004). This is the essential ground on which Design-based Research emerges as research strategy, establishing that knowledge is not only in the final product, but also in the process and the products elaborated during the research process. Barab and Squire consider that Design-based research as a group of approaches that produce artifacts, theories and practices with the goal of producing knowledge around a design related topic (Barab & Squire, 2004).

Furthermore, Design-based Research tries to take into account the strange behavior of the real world (Barab & Squire, 2004). The challenge for Design-based Research is to build an understanding of the complex process of designing including all the possible variables that affects design (Barab & Squire, 2004) . This includes also users, who should not be treated as experiment subjects but as co-participants of the design process (Barab & Squire, 2004).

According to the same authors, there are three main characteristics of Design-based Research: the constant need or relating design proposals with existing theories, the possibility that the research process creates new theories and not only an evaluation of the used theories, and that some research questions could only be tested in the lab or in other possible different contexts than the original proposed (Barab & Squire, 2004).

Forlizzi, Zimmerman and Evenson propose a valuable way to evaluate a research process in Interaction Design Research. They propose that a knowledge contribution from design based research
can be evaluated in terms of its level of invention, relevance and extensibility (Forlizzi, Zimmerman, & Evenson, 2008, pp. 27, 28).

The evaluation model proposed by Forlizzi et al has implications for the methodology discussion in this thesis. First, the rationale behind the selection of methods should be articulated and the consistency while applying them maintained (2008, p. 27). The research should also detail the process taken to open the possibility of a possible replication in other similar scenarios. Second, an invention should be elaborated as a final result of any Interaction Design Research process (2008, p. 27). This invention should be described as clear as possible to facilitate future implementation or elaboration. Also, the description should address the possibility of improvements as new technology appears through time. Third, while validity is difficult to evaluate in Rtd, design based research must still strive for relevance (2008, pp. 27–28). Relevance is a way to express the validity in terms of why the recommended solution constitutes an improvement in the actual world, with the addressed problem and in the selected context (2008, p. 28), but it does not make claims about the solution as the best, or the only solution for the problem at hand. Fourth, extensibility means the possibility in adding or building further on the research results (2008, p. 28). This invites the HCI community to use the process outcomes to improve them or work in bigger or complementary projects.

As a final result of a RtD process, Löwgren creates an interesting description of how in between the desired duality between artifacts and theory in a research process, exists middle-level forms of knowledge (2013, pp. 31–33). He explains first that usually the main product of a design research is an artifact (or group of them) that expresses the knowledge gathered during the process, becoming a practical representation. On the other hand, there’s the theory created thanks to the research process, which is the most abstract way of representation of knowledge. In between of those extremes, he claims that there are also valuable forms of knowledge representations produced in the various levels or a research process in different kinds of contexts. These middle level outcomes are also valuable to understand and attend as relevant research results for creating important knowledge around the topic in discussion.

The author uses as an example of intermediated level knowledge the annotated portfolios as “…a collection of designs, re-presenting them in an appropriate medium, and combining the design representations with brief textual annotations” (Löwgren, 2013, p. 30) which is one of the most common mid-level forms of knowledge usually done in RtD (2013, p. 33). Also, the design methods and tools, design guidelines, patterns, concepts and experiential qualities are other forms of intermediate knowledge.

For this thesis, a RtD process has been implemented in which a set of initial design proposals were iterated in dialogue with potential users towards a final product. After the selection of RtD as a research strategy comes another important stage of the qualitative research process described by Blandford, Furniss and Makri: selecting the methods of collection and analysis (2016, p. 2). For this research, three techniques were applied to find out elements to solve the three design goals.

4.1.1. Semiotic Inspection Method

It is important to determine what algorithms show in their current physical manifestations (Dourish, 2016), basically the interfaces in which they express their results. This serves to elicit particular details such as the strategies that the algorithm provides for interacting with the users. For this, Semiotic inspection (De Souza & Leitão, 2009) offers the opportunity to elicit the communication strategy that a system service implements.

De Souza and Leitão have developed the Semiotic Engineering Process (SEP), a methodology for evaluating and gathering information from interfaces (2009). With the SEP, De Souza proposes a framework based on the idea that Human Computer Interaction could be exposed as a communication process between the designer and the user through a common medium (usually the graphic interface), using particular elements of communication theory like semiotics (2009, pp. 1–11).
The SEP framework proposes two methods for analyzing an interface: Semiotic Inspection Method (SIM) and Communicability Inspection Method (CIM) (De Souza & Leitão, 2009, pp. 23–25). Both provide useful insights about the analysis of a particular interface, but the CIM is more laboratory-centered and pretends to look how a group of users interact with a particular system to determine how the message is received (De Souza & Leitão, 2009, p. 34).

SIM “is an inspection method conceived to explore the designer’s deputy’s interactive discourse with an emphasis on its emission” (De Souza & Leitão, 2009, p. 26). It provides tools to deconstruct the system message for the user through inspection of an interface. In this case, the researcher has the duty of selecting important elements in the interface and analyzing relevant interactions.

Souza and Leitão define five stages that need to be done for the SIM method (2009, pp. 26–33). The first, second and third stages are defined as Analysis of the Metalinguistic Signs, Static Signs and Dynamic Signs. These stages are implemented in an iterative way to carefully deconstruct the designer message and which elements are being used for that goal (2009, p. 27). They constitute a segmented analysis that looks for graphic distribution and elements, the use of signs and space, the terms and common words, the interaction opportunities and related elements.

The fourth stage of the SIM method is a comparison between the different aspects of meta-communication. “The aim is to detect inconsistencies and/or consistent relationships and patterns between elements collected in segmented analysis” (De Souza & Leitão, 2009, p. 32). The fifth step is the final communication overarching analysis, in which the researcher judges the system’s communication strategy, identifying costs and elements that define the designer intended message to the user.

The main goal of SIM is to uncover the meta-communication template for an interface. The meta-communication template is exposed by De Souza and Leitão as:

“Here is my understanding of who you are, what I’ve learned you want or need to do, in which preferred ways, and why. This is the system that I have therefore designed for you, and this is the way you can or should use it in order to fulfill a range of purposes that fall within this vision.” (De Souza & Leitão, 2009, p. 16)

In this thesis it has been applied SIM to Facebook’s News Feed as a way to uncover the design goals underlying the current interface, and which are the implications of these decisions in terms of what it communicates. To achieve this goal, an instrument has been designed to guide the SIM process for Facebook’s News Feed that is detailed in Appendix #1. It includes a set of stages in accordance with the definition of the SIM process.

For the goals of this thesis, it is relevant to determine which strategies are currently used in Facebook’s News Feed, but it is also important to understand which elements are not communicated or hidden from the user. This second need could not be achieved using the SIM method only. To address this effect, other relevant theories to study Facebook’s news feed are included in a second section of the instrument. These theories are discussed further in the Results Chapter #5 of the present thesis, particularly the Semiotic Inspection Methods results segment.

Finally, it is worth to notice that this data collection technique does not have major ethical implications. In this case, Facebook’s interface is publicly available for analysis, and there is no need of formal procedures to grant the access the prototype to inspect its semiotic characteristics. Furthermore, this technique does not imply the need of having test users which could imply more complex ethical issues.

4.1.2. Document Analysis

There are already some scattered sources of information that provide valuable design opportunities to improve Facebook news feed experience. These sources may not be related to the specific concept or
scope of algorithmic experience, but portrait relevant design recommendations that deserve to be analyzed for this research. Therefore, besides an interface analysis, this research also needs the Document Analysis technique that could harvest these already existing recommendations for Facebook news feed with a set of analysis categories.

This technique is usually based on a preconceived set of categories of analysis to look for the needed knowledge in a certain preexisting data. Blandford, Furniss and Makri explain that usually this data is based on sources like web reviews of a particular application (2016, p. 47), but it could also include other sources like books, audios, videos, articles and other sort of materials. They also argue that is important for this technique to have a clear view of the implied limitations of every type of source (2016, p. 47), like the impossibility for data confirmation by the original author, or having the adequate justification to include or exclude a particular source from the analysis scope.

An instrument was also crafted to guide the Document Analysis. The implemented procedure is explained in detail and in the Results Chapter #5 of the present thesis, particularly the Document Analysis results segment.

Finally, this data collection technique does not imply major ethical implications. All the documents that are selected for the document analysis in this research are publicly available through Internet or thanks to Uppsala University library system, which were only used for academic purposes. It also does not imply the need of having testing users which could bring other ethical implications.

4.1.3. User-centered design workshops

This is a common technique in HCI and is a common method in participatory design (Karasti, 1997). Design workshops can be structured in many different ways, but typically include both semi-structured interviews (individual or within focus groups) with the main purpose to work towards a possible design solution in terms to gather opinions for improvement or changes. Closely related with a Research through Design (RtD) methodology, the technique is applied including the researcher as an active participant of the process. Also, it is usually guided by previous theories that create a set of concepts to guide the workshops and get specific information from the users.

The method has been implemented in two different ways. A first workshop was done to gather information in relation to the first and second design goals defined in the Final Research Question and design goals segment contained in Chapter #2. A group discussion was suitable in this case as it provided a better context to gather and elaborate a set of features and user preferences. A second feedback session (called from now on Second Design Workshop) was performed individually with selected users from the previous group. This allowed a better gathering of a wider range of individual preferences and responses in relation to the individual consumption of Facebook’s News Feed.

Combining the two approaches also served to create a complementary dynamic in which the disadvantages of a collaborative design workshop could be diminished by an individual feedback session and vice versa. For example, the first design workshop could have a disadvantage from its focus group nature: people could feel threatened to talk by other users who have a stronger behavior in the workshop, but the individual nature of the feedback session could allow them to express in a safer environment.

This data collection technique could have major ethical implications, mainly because it needs to have test users. In this case, to avoid ethical implications, all the users’ information has been guaranteed and protected their identity in all possible situations related to this research. To accomplish this goal, the users had an informed consent to agree on these aspects inside the research context. Also, only the researcher treated carefully all possible user’s personal information, starting from the recruitment process and finalizing in the results analysis. Furthermore, the results of this technique were described in terms of neutral and anonymous users, without using names or any possible way of personal identification. Finally, all possible instruments or documents that could relate to any user and his or her personal information have been destroyed after the research finalization.
4.1.4. Method implementation

Guided by the design goals defined in the Final Research Question and design goals segment contained in Chapter #2, table #1 explains the work organization and the order of activities that have been done.

<table>
<thead>
<tr>
<th>Activity number</th>
<th>Gathering information technique applied</th>
<th>Design goal to pursue with the activity</th>
<th>How the activity have been performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Semiotic Inspection Method</td>
<td>Identify specific features that are needed in Facebook’s news feed in order to improve the algorithmic experience.</td>
<td>Application of the method to the current news feed Facebook’s app interface on an Android device. Please check Appendix #1 and Semiotic Inspection Method results for a detailed description of how the method was applied.</td>
</tr>
<tr>
<td>#2</td>
<td>Document Analysis</td>
<td></td>
<td>Appendix #2</td>
</tr>
</tbody>
</table>
| #3              | First design workshop                   | • Identify specific features that are needed in Facebook’s news feed in order to improve the algorithmic experience  
• Describe the contexts in which those features are desired in Facebook’s news feed in order to improve the algorithmic experience | Focus group The guiding questions and the procedure is detailed in Appendix #3 |
| #4              | Design probes elaboration               |                                        | A set of design probes were elaborated to start an iterative design process with the users. |
| #5              | Second design workshop                  | • Describe the contexts in which those features are desired in Facebook’s news feed in order to improve the algorithmic experience  
• Propose a way to interact with those features in Facebook’s news feed in order to improve the algorithmic experience | Individual feedback sessions with the users to test the redesign of the design probes |

Table 1 Method implementation strategy.

One of the most relevant results from the proposed process is the design probes for the feedback session. These design probes express not only the related theory background, but also reflect a user-centered perspective to improve the algorithmic experience in Facebook’s news feed. They are relevant not only for the concrete design case of the Facebook news feed, but also constitute design opportunities to improve the algorithmic experience in various social media contexts as will be expressed in the Conclusions Chapter #7 of the present document.
5. Results

There are relevant results to explain after the application of the selected data collection techniques. This chapter is divided by each of the data collection techniques, each of them divided in their correspondent research categories.

5.1. Semiotic Inspection Method results

To prepare for the Semiotic Inspection Method (SIM) we must first delimit the user characterization and the scope of the study (De Souza & Leitão, 2009, p. 28). As the focus lies on the news feed, it is needed to delimit our perspective to users that spend time looking what their friends are doing and what they share with others. The delimitation of the inspection can be expressed as: “Which communication strategies are used in Facebook cellphone app’s news feed to guide the algorithmic experience when reading the posts?” This question already defines the computational artifact: Facebook’s cellphone app to be explored.

The analysis was done on a Samsung Galaxy S4 mini device. The used Facebook’s app version was the 114.0.0.20.70, with a last update for March 6, 2017. The language configuration used was English. Due to resource and time constraint, the analysis could not be implemented on multiple devices.

5.1.1. First stage: Analysis of Metalinguistic Signs

The SIM method describes the metalinguistic signs as:

“...interface signs, static, dynamic, or even metalinguistic (in recursive reference). Typically, they come in the form of help or error messages, warnings, clarification dialogs, tips, and the like. With metalinguistic signs, designers explicitly communicate to users the meanings encoded in the system and how they can be used.” (De Souza & Leitão, 2009, p. 19)

Following this definition, the inspection was elaborated with some explicit messages found. For example, the “What’s on your mind?” text, inviting in an indirect way the place where the user creates new posts. At the left side of this text there is the user’s profile photo, inviting to post something that is going to be identified as the user’s property. When the user taps on that text, a new window as Figure #1 is opened, containing again the same text “What’s on your mind?”, but this time blurred with a lighter color to provide the need of filling that out.

When the user taps the text “What’s on your mind?” in the new “creating post” window, the below options disappear and turn into icons only providing enough space for the post writing. A new color bar appears that turns your written text background in the selected color. This possibility could be learned just by trying and experimenting from the user. The space below provides an explicit text “Add photos and more” stating the possibility of adding a picture or other media elements. Below this new “creating post” window, there are also explicit elements to create a diverse type of content. The texts “Photo/Video”, “Go Live”, “Check In”, “Feeling/Activity”, “Slideshow” and “Tag Friends” clearly state the different configurations and options that are available to create a new post. For the current version, the “Go live” option has also a “NEW” text that expresses directly the novelty of that option.

![Figure 1 Create new post Window. Source: Own creation](image-url)
On the top of this new “creating post” window, the profile picture also appears inviting to post something that is going to be identified as the user’s creation. Next to it, at the right side is possible to find the user’s name and a “Public” text referring to the visibility of the post you want to create. Tapping this “Public” creates a new window that shows a list with text explicitly defining the possibility of creating a post for the general public, the user’s entire friends list, all the user’s friends with exceptions and more options like specific friends and only me as presented in Figure #2. There is also an option with the text “See all” that shows a new window offering to show the post only to a specific list regarding your groups. These privacy configurations could be relevant to make clear and explicit in every post presented in the news feed.

Coming back to the news feed, there is no metalinguistic sign that could express that the user needs to scroll down the app to continue reading the news feed. The main reason for it could be the well-known dynamic in the web version which would make this behavior intuitive, but that argument could be also used to determine other features that are currently expressed explicitly as useless like the post creation feature described previously. In the same way, there is no direct sign to refresh the news feed by scrolling up the app, which could have a direct impact on the algorithm experience due its relation with new elements and newer execution of the algorithmic function. Each post in the news feed has an explicit creator with a profile picture. If the post is not created by but related to one of your friends, the explanation appears on the top like “your friend was tagged in a photo”. Also, each post has a date and time textually expressed that relates the moment in which a post was created. If the post had been created the same time, the text only shows how much time has passed since its creation.

For every post, there is an explicit text for the options “like”, “comment” or “share the post”. Furthermore, there is no explicit sign to understand how the emotion feedback could be done, when currently is possible by a long press in the like option. Also an explicit text show how many times the post has been related to a particular mood or like, how many times had been commented and how many times the post has been shared. If the post is a video, it shows how many times the video has been reproduced with a “Views” text. When hitting the share button, there appear more metalinguistic signs presenting the options like “Share now”, “Write post” and “Send as a message”.

When a post is paid for advertisement, it shows a “Sponsored” text below the account name as seen in Figure #3. This text is too small and without a strong color to be found easily, which could be easily improved in terms of the algorithmic experience. Also, ads has a text on the top as “Suggested Video” or “Suggested Post” showing that this post is recommended by Facebook, but not from the usual activity on your friends list.

To identify the visibility of every post, there is a small icon that reflects if the post is shared globally, just to the friend list or to a specific group. This element could also be improved increasing the text size because this property could explain in a better way why and how a post is presented in the news feed, improving the algorithmic experience.

![Figure 2 Post visibility options. Source: Own creation](image1)

![Figure 3 Ad example. Source: Own creation](image2)
When a shared link uses the instant article technology of Facebook, below the name of the link is shown a small thunder icon to express the user when an article would not take so long to be read, using this instant article feature. Finally, when a friend shares something to a group in which the user is included, the post displays a header text saying something like “Shared a link to the group.”

5.1.2. Second stage: Analysis of Static Signs

The definition of static signs made by the authors state that:

“Static signs are interface signs whose meaning is interpreted independently of temporal and causal relations. In other words, the context of interpretation is limited to the elements that are present on the interface at a single moment in time. For example, layout structure is a static sign and so are menu options and toolbar buttons” (De Souza & Leitão, 2009, p. 19)

Facebook’s News Feed static signs include the “what’s on your mind?” text, which is a constant sign every time the user enters to the app and when the news feed is refreshed. The options that appear tapping this feature are always the same.

Another constant sign for every post are the profile picture, the name of the profile, when the post was created, which type of visibility has the post, the amount of likes or mood indicators, the amount of comments, and shares. Also the buttons “Like”, “Comment” or “Share” as could is shown in Figure #4.

The figure also shows that there is a constant down arrow sign for every post. This icon is not self-explained and the results of tapping it depends if the post is an ad or a regular information post. Some of the functions that appear there are to un-follow the post producer account, “save the link”, “hide the post”, to hide everything from that account, report it, turn on notifications for that post and copy the link for regular post. When the post is an ad the user has the options of saving the link, “Hide the ad”, “Why am I seeing this”, declaring the ad as useful, turn on notifications for that post and “Copy the link”. This feature is relevant for the algorithmic experience in the news feed because provide useful tools to manage the post, but it lacks easy and useful ways to understand why the post was selected for the user. These options could be improved also to provide a better algorithmic experience.

Other constant signs are the options that appear when tapping a share button in a post or the amount of views when the post is a video.

5.1.3. Third stage: Analysis of Dynamic Signs

About dynamic signs, the authors explain that:

“Dynamic signs are bound to temporal and causal aspects of the interface, namely, to interaction itself. They emerge with interaction and must be interpreted with reference to it. For example, when a user selects the option “save as . . .” of a menu “file,” systems typically exhibit a dialog window with a conversation about the file’s name, location, format, etc. The causal association between the menu selection and the dialog that follows it is a dynamic sign, one that can only be expressed over time”. (De Souza & Leitão, 2009, p. 19)
Some dynamics signs that were found in Facebook’s News Feed are defined with the “new post window” that appears when tapping the “What’s in your mind?” text. Also, the transformation of the icons below and the appearance of the background color selection when tapping to create a new post as shown in Figure #5. In that same window, the options appearance to define the visibility of the post when tapping the Public button with the world icon.

Other dynamic signs include the “post options” that appear when tapping the down arrow at the right side of the post, even when it is a regular or ad post. Also, the news feed refresh when scrolling up to the top and the appearance of the feedback when liking or selecting a mood when tapping the “Like” option for a few seconds, when commenting and when sharing a post. The usual dynamic feedback after using these features is turning the like or mood selection in a color depending on the selected option, the appeared comment and confirmation message when shared a particular post.

5.1.4. Forth stage: Comparison of the meta-communication results

The previous analysis indicates that Facebook’s News Feed interface is designed to promote a linear consumption of posts with little and small options for personalization. Major options for personalization are focused on the posts creation, which promotes the inclusion of different media and diverse content for the posts. The options for manipulating the news feed are limited, offering just options like hiding or understanding (in a complex way) why you have ads there.

As a general analysis, the news feed is designed to create new posts fast and easy, but present a very limited algorithmic experience. The main intention of Facebook’s interface design not intended for providing a way to understand how the news feed algorithm works, how the post are selected by the algorithm and which behavior from the user affect those results.

5.1.5. Fifth stage: Conclusions of the analysis and questions answered.

Using the semiotic template (De Souza & Leitão, 2009, p. 16), the conclusion of the Semiotic Inspection Method is that Facebook designers communicate the following perspective on their users:

“My understanding of you as a Facebook’s app news feed user is that you want to create fast and diverse posts with little interest on understanding how the news feed works or why you see the posts you see. I have created several options that are easy and fast to understand when creating new posts, and some small options to configure the shown posts. But as they are not that relevant for you, they are hard to find.”

Also, the answers to the questions brought by the authors (De Souza & Leitão, 2009, p. 26) are:

1. **What is the designer communicating?**

The designer is communicating an impulse for promoting the creation of varied, easy and fast posts while consuming others posts. Generally, the main intention is to promote posts creation with different media as picture, videos, and others, but there is no or less intention to expose the news feed algorithm effects or functioning.

2. **For who is the designer’s message addressed?**

The message is addressed to a diverse population from a demographic perspective. It is directed primarily to two different groups: fast and recurrent news feed readers and fast and recurrent posts
creators. There is no sign to direct a message about algorithmic priorities to people that do not know about algorithmic influence over the news.

3. What effect(s) does the designer expect his communication to cause?

The main goal with the proposed design is to promote a fast and efficient posts creation with multimedia variety. Besides this intention, the design is also meant to promote fast and simple news feed consumption with chances of interacting with it by comments or sentiment expression.

4. How is the designer signifying his communication?

The main way to propose this message is by the use of icons, colors and texts for the posts creation. The news feed consumption is addressed by the use of buttons and simple actions on the posts.

5. What expectations does the designer have about what users will want to communicate to the system?

The expectations the designer have about what the users would want to communicate to the system are divided in two options. First, the designer expects that the users are going to be always creating posts fast and easy, with a diverse multimedia content. On the other hand, the designer also expects that the user would always consume other posts in the news feed in a simple and fast way without caring or understanding how or why a particular post appear in the newsfeed.

In relation, there are little expectations regarding the possible user needs and appropriation of the algorithm behind the news feed. There are no or little expectations regarding what user would like to communicate to the system in terms of the algorithmic experience. The only available possibilities are limited to small options in relation to each of the posts and possible un-follow options, but there are no ways to understand why a post is appearing in the news feed, how a user could deselect particular content appearing in the news feed and how the user can participate actively in the depuration of the information to have better results.

5.1.6. Complementary theories for the SIM method

As mentioned in the Methods Chapter #4 of the present thesis, the SIM method can only provide an analysis of what is currently offered in Facebook’s app news feed interface, but offer less in terms of what is not present or what is lacking. Here are discussed other aspects of the interface that can be assessed through inspection.

5.1.6.1. Human involvement

One immediate observation is that there is no indication of when a post is produced by human involvement and when it is not. Even when Facebook have human groups dedicated to curate posts (Michael Nunez, 2016), or when posts are censored because they do not respect the “Facebook’s community rules”, there is no sign or way to determine if there is any kind of human involvement in the news feed.

5.1.6.2. Data selection, definition and transformation

There are few ways to exert control over what is going to appear on the news feed. As previously mentioned in the SIM method results, there is a way to understand why a particular ad is appearing. There is also a way to define which accounts the user want to follow and to hide a particular post.

Figure 6 Most Recent option.
Source: Own creation
It is possible to say that a post could be transformed by the like or mood expression, commenting, by sharing or by viewing when the post is the video. These options are also a possible indication that Facebook prioritize certain posts in the news feed by filtering or trending, but this may not be clear for all the users.

There also exists a way to manage the news feed, but this option is hidden away in the configuration options and separated from the news feed interface. There is an option that allows switching between the “Top News” and the “Most recent News” as shown in Figure #6. More intricate options are also included here, like controlling who the user wants to see first, un-follow people to hide their posts, reconnect with people the user have un-followed and discover Pages that match the users interests as shown in Figure #7.

These possibilities are limited and do not provide the entire definition of selection, definition and transformation that could be expected for the news feed’s algorithm. There is no way to select if a user would like to have other posts that are currently not shown, also there is no way to define or transform the current understanding that the algorithm has about a user.

5.1.6.3. Inferences made by the system

Besides the possibility to understand partially why an ad is being showed, presenting a category that the algorithm defines for the user, there is no other way to know or understand which inferences are made by the system.

5.1.6.4. Model of the algorithm, algorithmic presence, explicit and implicit personalization

There is no clear way for the user to know how the model of the algorithm behind the news feed is designed, where the algorithm is actively altering the news feed results and where it is not, when or how the system creates an explicit or implicit personalization. There is third party information in relation to some aspects of the algorithm, like some research described in the current thesis or other Facebook pages like their blog or news site.

5.1.7. Technique conclusions

As seen in the results, the most usual metalinguistic static and dynamic signs are defined by texts that explain how most of the features work. Another used sign is the profile picture and name that relates every post with the creator. The most relevant features are supported and reaffirmed by metalinguistic sings, concentrated in a majority amount in the post creation part, allowing a clear, fast a varied way of producing content for Facebook.

Furthermore, the majorities of metalinguistic signs for reading the news feed is established to features as like or express the mood, comment or share a specific post using both static and dynamic sings. Tapping these actions provide other metalinguistic signs to interact with the system.
It was found a lack of metalinguistic or signs for scrolling down to keep on reading the news feed or scrolling up to refresh it. Also, there are small, not relevant or weak metalinguistic, static and dynamic signs for other information that could be useful. Examples in this direction are the suggested or sponsored posts explanation, the date or time a post has been created or the down arrow that provides explanations for ads or un-follow each post. It is possible to include here the small option to change the visibility of a created post, being the default option the global visibility.

In relation to the algorithmic experience, the app offers some ways to achieve certain level of management for the news feed, but these options are located in a hard place for being found as seeing in Figure #9. These features provide options like managing which friends from the list do the user wants to see first, who the user want to un-follow, who do you want to reconnect with and recommended pages to follow. These features could offer other options regarding the algorithmic experience and could be located in an easier way, related to the news feed and their own way of interaction.

Generally speaking, the conclusions and answers brought by the SIM method reflects the main goal of the news feed interface: to promote posts creation in a fast and varied way, but not to provide consistent or open ways to define the news feed or to select what it shows. The only goal in relation to the news feed is a tendency to look how to interact with the posts, mainly by comments, like or mood selection and sharing. For example, there is no way to determine when a post is presented in the news feed by human involvement and not because of the algorithm. In relation and besides the ad option of presenting a category that the algorithm defines for the user, there is no other way to understand which inferences about the user are made by the system for presenting that ad. Furthermore, there is no way to understand the model of the algorithm, its presence and when or how the explicit or implicit personalization is being made.

### 5.2. Document Analysis results

For this thesis, the document analysis was based mostly in previous research approaches that provided valuable input to solve the first design goal. These approaches were mostly written articles and had the particularity that they expressed concrete recommendations to apply for social media platforms in relation to algorithmic experience. They were found thanks to the Uppsala University Library System during the background research process as a first round, but then later other documents were also found in a second round thanks to a manual tracking procedure of the most common or repeated sources used in the papers and documents selected for the background analysis. After having an initial set of documents, the researcher applied a process of selection from around 10 different documents to gather to most useful ones to solve the first design goal. The main criteria of selection was mostly based on looking for useful design features to apply in terms of algorithmic experience and to exclude those documents that really did not provide anything new or relevant. In the end, the selection resulted in a set of 7 seven different documents that were analyzed for the document analysis.

A detailed list of the selected documents and why they have been selected could be found in Table #2.
This summary was guided by a set of analytical categories found in the theories selected in Chapter #3 Theories and related to the proposed design goals that could be found in the segment called Final Research question and design goals in Chapter #2. Appendix #2 has a detailed description of the used guiding instrument. Below, it will be summarized the recurring findings in relation to algorithmic experience reported in the selected literature.

### 5.2.1. Algorithmic profiling, classification and association

According to Bucher, profiling identity refers to this feeling that the algorithm produces of being classified or profiled (2016, p. 34). It includes awareness of stereotypical assumptions made by the algorithm which relates the user to groups or needs that does not make the user feel appropriately. Related to this category, Diakopoulos also propose the classification definition as including particular information of a user with a particular class or group (2016, p. 57). Also, the same scholar propose the Association category that is defined as the action of relating particular information with other entities, causing people usually misinterpret the results as causation and creating miss conceptions about what the system is relating (Diakopoulos, 2016, p. 58).

A possible way to start the results in this analysis category is with an interesting aspect of the user’s news feed experience: the echo chamber effect. Garret explain how previous research presents that people tend to avoid challenging information for their own beliefs and appeal better to those news that are supporting their personal values (2009, pp. 265–266). This scholar’s research argues that people actually have certain inclination to challenging opinion sources, even expending a considerable time reading them (Garrett, 2009, p. 267). In that context, Garret’s research proposes two particular features to take into account about how people consume information in social media.

The first of them is in relation to the news content selection. In this case, Garret’s research shows that people apparently tend to select more information that are in favor of their political position in contrast with challenging contents (2009, p. 274). But at the same time, the results showed that people also do not exclude completely other political views. There is little evidence to confirm that people use the social media to create their own echo chambers (Garrett, 2009, p. 279). This research opens the possibility to apply a strategy to diminish the echo chamber effect.
For example, Liao and Fu found that people could change their information selecting behavior in many ways (2013). They noticed that high or lower involvement in a topic created different information choices with the presence of contextually relevant threat against the topic (Q. Liao & Fu, 2013, p. 2364). People with a higher of involvement with a particular topic tended to look for diverse sources, but people with lower involvement tend to stick on their own believes. Apparently, “high topic involvement promotes the tendency of critically scrutinizing the attitude inconsistent information” (Q. Liao & Fu, 2013, p. 2364). Therefore, the attitude towards the information change depending on how involved the user is towards a particular topic (2013, p. 2365).

Another finding in that research is when people are not involved in a topic and they find information that threatens their own belief, a serious attitude emerges in the users and they tend to look for factual arguments. On the other hand, when the threat is not perceived people tend to look for other kind of information as peer opinions (2013, p. 2366).

According to the authors, these aspects are important features to take into account (Q. Liao & Fu, 2013, p. 2367) to improve the algorithmic experience. A possible improvement could be presented to the user when the algorithm offers a group of information as relevant to the user. In this case the system could take into account how involved is the user with that information to offer later different views in relation to that topic. On the other hand, for people with low involvement in a certain topic, the social media service could offer related posts to the user to look for comments or information related pages. The authors summarize these ideas as:

“...the system (e.g., search engine, recommendation system) should provide adequate information about their [users] preferred choice while encourage the exposure to high quality information about the alternatives. On the other hand, the system should provide a balanced mix of alternative or competing views if it recognizes that the user is knowledgeable or frequently exposed to the domain or topic” (Q. Liao & Fu, 2013, p. 2366)

Liao and Fu also express that users highly related or motivated to know about a particular topic are more open to read and understand different opinions (Q. V. Liao & Fu, 2014, p. 194). The opposite happens in people with lower interests who tend to increase their filter bubble when faced to a variety of information. At this point then, it could be important to allow Facebook’s News Feed algorithm to have a way to know when a user is highly interested in a particular subject and then create a diversity of offers for contrasting contents. Regarding the technical possibilities for a feature like this one, the authors even provide literature and technical examples of how that goal could be achieved for the system (Q. V. Liao & Fu, 2014, p. 195).

More recommendations related to personalization are done by Prakash (2016). The authors states the personalization is usually done by cookies and that is why they should be avoided to burst the filter bubble (2016, p. 18323). For our purposes, Facebook’s news feed should show explicitly tell if they are using cookies, so the user could be aware of this strategy.

5.2.2. Whoa moments

Bucher explains that Whoa moments are weird experiences produced by the algorithm tendency to direct and discipline attention (2016, p. 35). These feelings are related to moments in which people realize that they “have been found”.

Related to this concept, the only possible feature to include in the design proposals is the one pointed out by Luckerson (2015). The author explains that the main issue around Facebook’s News Feed algorithm is that people does not realize about its existence, so this should be improved for a better algorithmic experience. A possible way to solve it could be a feature that expresses why the algorithm is presenting a particular post in the news feed. Some reasons for the selection in Facebook’s news feed are related to a previous user liking a page or sharing a content, possible interaction with the content from closest friends, or just because is an advertisement based on your location, age, interests or current time.
5.2.3. Popularity game for the algorithm and algorithmic priorities

The popularity game category is referred by Bucher as the feeling of acting for catching the attention of the algorithm and getting its visibility (2016, pp. 36–37). Here is included the feeling of not getting enough likes, comments or shares because of the algorithm. In relation, Diakopoulos define prioritizing as the algorithm action of bringing the attention to certain information in contrast to other information (2016, p. 57).

For this sub-category, Bucher explains particular elements that have a direct impact with how visible are certain people in a user’s news feed (2012). One of these elements is the news feed division between “Top news” and “Most Recent”, being the first one related with the algorithm activities and the second one just showing the most recent activity from the user’s friends (Bucher, 2012, p. 1167). In relation, the previous Semiotic Inspection Method showed how hard is to reach the “Most Recent” news feed, so this particularity needs to be improved in the design proposals.

Furthermore, Bucher continues explaining how the “Top news” works with the algorithm. The author states that there are three different factors that affect the algorithmic decision (Bucher, 2012, p. 1167):

1- Affinity which relates to how close is the relationship between the viewing user and the creator user in terms of private messages, checking the creator’s profile and others.
2- Weight which is a value assigned to the information from Facebook’s perspective. For example, a comment has more importance than a like.
3- Time decay that states how new is the post, giving priority to the most recent ones.

If these three variables are so important for the algorithm, they could be clearly presented for each post that appears in the news feed, so the user could understand clearly why something is shown in the “Top news” section. Being specific with the affinity variable, Luckerson explains that Facebook’s News Feed uses related aspects that also need to be presented clearly to the user as:

“...how often you like their [users] posts, write on their Timeline, click through their photos or talk with them on Messenger, Facebook’s chat service. The post-type is also a big factor, as Facebook hopes to show more links to people who click lots of links, more videos to people who watch lots of videos and so forth. The algorithm also assumes that content that has attracted a lot of engagement has wide appeal and will place it in more people’s feeds”(Luckerson, 2015)

5.2.4. Algorithm ruining friendships, algorithmic passive consumption, producer privacy and missed posts

Bucher define ruined friendships as the feeling about the algorithm as a relationships curator (Bucher, 2016, p. 39). Also includes the experience of the algorithm filtering friends and provoking a losing control of the user’s own relationships. In relation, Rader and Gray’s (2015, p. 178) category of producer privacy refers to the belief of being excluded from other users’ news feed by an active/personal decision, while missed posts expresses the belief of giving the news feed algorithm the responsibility of hiding specific posts from friends that have been missed. As a different category, Rader and Gray (2015, p. 178) define Passive consumption as a neutral belief towards Facebook’s News Feed.

To avoid the feeling of ruining friendships and missing posts, Luckerson expresses that Facebook’s News Feed currently has a tool that allows you to see first on your news feed the post generated by particular group of friends or pages, instead of waiting for the algorithm to make that decision (2015). In this case, the Semiotic Inspection Method showed that this option is hard to find, which could be an important feature to improve the algorithmic experience.

The categories of passive consumption and producer privacy did not have any possible feature to be developed.
5.2.5. Other findings outside the previous categories
A finding of the document analysis could be expressed outside the proposed sub-categories: human involvement which takes a relevant aspect of the algorithmic experience in social media.

As also showed in the SIM, Luckerson retakes the existing human involvement in Facebook’s News Feed to select or dismiss particular information from the algorithmic process (2015). In this case, it is important that every element that appears on the news feed should show if its human curated or not by a graphical element or similar solutions.

5.2.6. Sub-categories without results
Unfortunately, the following sub-categories resulted without any feature to work on: Faulty prediction, violating expectation, speculating about the algorithm, filtering, cruel connections and consumer preferences. The design workshops had some results in relation with them and are analyzed further in this document.

5.2.7. Technique conclusions
The document analysis provided worth inputs in relation to algorithmic experience in social media. For example, it appeared that social media services should have a way to identify those topics or contents in which a particular user is interested on. For those topics of interest, the service could offer different kinds of related contents, maybe from other filter bubbles not related to his or hers. On the other hand, when a user is not well informed with a topic, the system could offer posts in which a friend comments on that topic or related shares.

Another conclusion is that is needed an icon or other solution to graphically show why the algorithm is a particular post in the news feed. This could be solved by expressing that the post is being presented by an amount of likes or shares, because the closest friends had certain interaction or just because is an advertisement based on your location, age, interests or current time.

Another finding suggested that there should be some features to define clearly the difference between “Top news” and “Most recent” news feed to properly express the users which posts are algorithmically curated and which ones are not. Similarly, when a post is presented as a “Top New”, it should explain clearly what elements are taken into account to present that post like a constant liking on friend posts, constant interaction between timelines, constant visits to their timeline or photos, amount of photos or videos consumed, or chat activities.

Finally, it is concluded that it is important that every element that appears on the news feed should show if its human curated or not by a graphical element or similar solution.

5.3. First design workshop results
The first workshop focused on grasping user’s opinions on the algorithmic experience in Facebook’s news feed. The users selected for this workshop were contacted by Facebook and offered voluntarily to participate in the study. The participants had been promised an “algorithmic experience presentation” about

Figure 10 First Workshop setting. Source: Own creation.
how algorithms are used on daily basis and particularly in Facebook’s case, as an exchange of their time and service. The contents of the algorithmic presentation can be found in Appendix #4. A detailed description of the implemented activities during the first workshop is found in Table #3:

<table>
<thead>
<tr>
<th>Main segment</th>
<th>Estimated time</th>
<th>Held activities for the segment</th>
</tr>
</thead>
</table>
| Introduction to the workshop     | 10 min         | 1. Welcoming the users  
2. Gratitude expressed to the users for their time and service  
3. Presentation of the current protocol to the users.  
4. Informed consent form signature. (Appendix #5 contains a detailed description of the informed consent form)  
5. Introduction to algorithmic experience. The contents of the algorithmic presentation could be found in Appendix #4 |
| Data gathering                   | 50 min         | Workshop and focus group guided by a set of questions found in Appendix #3.                      |
| Recess                           | 10 min         | Coffee time and gathering                                                                      |
| Algorithmic experience presentation | 20 min        | Algorithmic experience presentation for the users. The contents of the algorithmic presentation could be found in Appendix #4 |
| Data gathering                   | 25 min         | Analysis Round of Facebook’s News Feed based on some findings of the document analysis and the SIM method. The contents of the algorithmic presentation could be found in Appendix #4 |
| Greetings and future invitation  | 5 min          | 1. Gratitude expressed to the users for their time and service  
2. Invitation and general instructions for second workshop. |

Table 3: First design workshop activities

The introduction to algorithmic experience used well known cases as Amazon, Uber and others, promoting an informed and critical position towards the major case of discussion: Facebook’s news feed. It was included for several reasons. First, the concept of algorithmic experience is so new that only few users had a related understanding of it. Second, the chance of talking before a little about the topic impulse the users to “break the ice” and to promote a feeling of security, diminishing any possible stress produced by feeling that they are the ones who are going to be evaluated, which in the end can affect the results. Third, the users always in the end of the workshop expressed their gratitude towards the new understanding and criticism they learned thanks to the activity because they felt that now they could have a dipper and more critical use of their technologies.

Another important aspect is the guiding questions list used during the Data gathering phase of the workshops. This list is a semi-structured instrument in a focus group dynamic. It was elaborated based on the theory selection for the current thesis, looking to achieve the proposed design goals with an algorithmic experience theory based strategy. Some of the theories were similar between them, so they were grouped to create a particular group of questions. Appendix #3 includes a detailed description of the used instrument containing all the guiding questions.

As a side note, it is worth to mention a small change was implemented during the current workshop in comparison to Appendix #3. At the beginning of the every data gathering phase in the workshops, the questions: “What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?” and “In which situations do you think those improvements are most useful?, Do you think there are specific moments in which you’d like to have those improvements?” are repeated for each category according to the guiding document on Appendix #3, so instead they were presented at the beginning of the session to have them always in mind for being answered after the presentation of every category. This small change promoted in the users the needed mind set to look for the answers for those questions in each of the presented cases. A better understanding about how this was change was managed and the general dynamic of every workshop could be found in the algorithmic presentation in Appendix #4.
Regarding the participants, all of them were selected as Facebook users. They were recruited using Facebook’s messenger and by invitation using Facebook’s groups. All of them expressed the needed knowledge about Facebook to consider themselves as users of this social media. All of them expressed also that they have different levels of relationship with Facebook and that they have used Facebook’s app before. They participated freely in the workshop and demonstrated a lot of interest of having more spaces to discuss and learn about this research. Most of them wanted to also participate in the design proposal for the second workshop.

In total, 11 participants attended three workshops. The first workshop was held with 5 participants, the second with 4 and the third one with 2 participants. This variety of participants allowed the workshops to be different with one another, providing different results in relation to the amount and kind of interaction between the participants. The main results gathered from them are described in the next sub-sections, based on the mentioned analysis categories in the guiding instrument. Some of them have been partially explained in the previous section of Document Analysis Results, so to avoid unnecessary repetition only the rest of the categories are briefly introduced in this segment. A better explanation of each of the sub-categories could be found in the Theories Chapter #3 of the present thesis.

For a better understanding, the results are expressed in the terms showed in table #4 to relate the users to each of their participations but maintaining their anonymity.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Number of participants</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>5</td>
<td>1. User A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. User B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. User C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. User D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. User E</td>
</tr>
<tr>
<td>#2</td>
<td>4</td>
<td>6. User F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. User G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. User H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. User I</td>
</tr>
<tr>
<td>#3</td>
<td>2</td>
<td>10. User J</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. User K</td>
</tr>
</tbody>
</table>

Table 4 First design workshop participant’s references

5.3.1. Profiling identity, classification and association

In these cases, almost all of the participants in the workshops have felt certain kind of classification and the majority expressed that they don’t agree about it. In the first workshop, User B expressed that he feels that Facebook classify him as Opera listener because he started having a lot of recommendations for Jazz events in his news feed. User B said also that maybe most of his friends likes Opera music, so Facebook also portraits him in a similar way. Users A and C expressed that they feel portrayed with a lot of beauty products just because of their friends follow this kind of contents related to make up, shoes or other related products.
In the second workshop, User G feels that Facebook is trying to look a wife for him. He said that Facebook is always recommending matching pages and related services. He also explained that he is treated like this kind of “single basement programmer” with no one around, because he also receives a lot of code related advertisement and services. User F said that she feels annoyed when being classified as a woman looking for dresses and make up. User I said he feels that Facebook classifies him as a “lefty” and he would like to read more things about other political views.

In the third workshop, User J feels that she is being profiled as a chef. She is always having food related posts or ads, and supermarkets services. She said that almost everything in her news feed is related to food and she would like to change that. She really doesn’t like to feel classified. On the other hand, the User K said the classification is useful to have useful information that need on your news feed. In her case, she also felt that Facebook only recommended her food related topics, but now she has tried to interact less with this topic and now her news feed shows her other kinds of information.

User D in the first workshop and User G in the second workshop expressed that they think that Facebook shares information with Google and other kind of services. This opinion was supported by the rest of the group and maybe here is needed a feature to express clearly when the news feed is also taking information from other sources than the proper application. User E in the first workshop said that this information gathering also works with cookies strategies, so maybe the same feature could also express when the system is using cookies to track the user’s preferences.

There are ambivalent feelings about the free nature of Facebook. In the first workshop User A expressed that because the service is free, this classification should be accepted and “is fine”. On the other hand, other User B expressed that he doesn’t like to be tracked or classified, but sometimes this is useful to receive the information you like. The second and third workshop showed similar opinions. This topic is a huge debate around algorithmic experience that could be explored deeply in another kind of research.

User E in the first workshop expressed that Facebook currently offer some ways to understand what Facebook thinks about you and ways to train the newsfeed algorithm, but these features are quite hard to find in the system. User H in the second workshop said that he uses a lot the features for selecting something that he doesn’t want to make the news feed less annoying. Now the service is getting better for him and he feels is more related to him and his interests. User H in the first workshop said in relation that could be nice to have these tools in a special place on the user’s profile to manage it in a better way. The rest of participants approved this solution and it could become another feature to add.

User G in the second workshop said that he really hates the algorithm. He feels that it makes everything annoying in Facebook and any movement is understood as absolute, but sometimes clicks or reproductions doesn’t mean that you want something forever or permanently. He says that Netflix has a better algorithm because they take other variables like time during the day, they don’t change everything by just one click, and they also remember past selections based on good conclusions about your behavior. In relation to the current options in Facebook’s news feed, he says they are confusing or ambiguous, they really don’t get if you just dislike something in that specific moment. User G continued expressing that the designers think about users like if they were “machines”, but we are human beings that have different feelings about things in different moments during the day. In this context, he expressed that strategies to guide the algorithm based on simple questions that really don’t grasps what do you want to express are not effective. This is an interesting finding that could be analyzed in terms of possible solutions and deserves a better study to look appropriate ways for explicit profiling.

The third workshop participants concluded that is important to promote the user conscience about how the algorithm works. They said that it is worth to explicitly show why something is appearing in the news feed and what interaction created that behavior in the newsfeed. User J said that is not only about saying if you like something or not, but they explain why the system is presenting a particular post
around a particular topic but also if she is consuming a lot in relation to one topic. She says that the system should show that the system is analyzing you and what are the strategies for that tracking, so in this way people could improve their conscience and could change their behavior. User K said it is relevant to prevent people to feel tricked or cheated.

5.3.2. Whoa moments

This has happened with some users in the first workshop. For example, User A expressed that when she looks for flights in the Internet, Facebook then starts creating flight ads in her newsfeed. Also, she expressed that since she is in Sweden, the ads are related with Swedish supermarkets and commercial stores. She said that she feels insecure and tracked because of these examples.

On the contrary, User C in the first workshop expressed that she likes to be tracked because then the app offers her better information. For example, she likes to be informed about what is going on in the city she lives now. What she mentioned is that maybe she would like to have this information in her own language, instead of the original language of the ad. Another user said that she would like to have the chance to select when she wants to be tracked, what she wants to be tracked and that the app expresses her clearly when the tracking is happening in a clear way. This could be another feature to add to the news feed.

User H in the second workshop says he always get surprised when his news feed says the current weather state of the place he is visiting. User G said it is annoying because they really know almost everything and he feels persecuted. User F said is scary when they suggest grading the restaurant or supermarket you have recently visited, so she uses the VPN to stop this tracking and trick the system. In this case, they suggested a feature to turn off the tracking. For example, when they tell the weather of a location there should be a way to tell Facebook they don’t want to allow a tracking. In the same way, there is needed a feature to re-establish the tracking if they want.

User H said he does not feel anything bad about tracking. He explains that he understands the tracking and it not affects him at all. He feels is useful for him and is convenient to receive something he likes in the place he need it. In this case, the common discussion concluded that it is important to relate the tracking to the specific context, time and place: being in the university would mean is better to receive thing in relation to education.

Around this topic, User K from the third workshop said that she has been tracked in terms of her visits in supermarkets, asking her to grade the place. In this context, User J needs to have an explanation of what is being tracked, how she is being tracked and what are those effects in the system, because she does not like to feel tracked, she really does not like to feel followed so at least she needs to be conscious about it. A way to solve it was proposed: having a post related to the ones for a birthday or memories that appear when you log in explaining tips or security suggestions. In that case, there are already security suggestions, but there haven’t being shown tracking explanations or other kind of information related to the algorithmic experience. This feature could be extremely useful to tackle that problem.

5.3.3. Faulty prediction, violating expectation, speculating about the algorithm and filtering

Bucher describes Faulty prediction as the feeling created by the algorithm when it creates false expectations producing annoying experiences to the users in relation to their beliefs and interests (Bucher, 2016, pp. 35–36). The author also includes here the incapacity of Facebook’s algorithm to forget the past, making unaligned inferences with the current situation of the user. These situations create ideas about how bad the algorithm knows the users or to describe the system as broken.

A related perspective is Rader and Gray’s categories of violating expectations and speculating about the algorithm (2015, p. 178). The perspective explains the belief of the posts curating by discovering
irregularities in the news feed like posts without a chronological order, or the belief of an entity that prioritizes posts in the news feed. This entity is usually described as “Facebook” or an algorithm.

Also, Diakopoulos presents a related filtering concept (2016, p. 58), the action of including or excluding information based on certain criteria. In social media context is usually expressed by moderation, a dynamic that could be related also with censorship

User A expressed in the first workshop that she has noticed people that she does not know in her newsfeed. Also information related to pages that she has not liked and these activities are annoying for her. User C feels that when she likes something, Facebook immediately includes you as interested in the page is sharing the information when she really just likes that specific information but not the entire page or post provider.

In the third workshop, User J said that sometimes she feels that Facebook suggests wrong places that she has not visited. The other user said that also has happened that Facebook asked her if she has been in a place that she has not visited at all.

Unfortunately, no solution where indicated to improve these situations, but something could be implied for them. It could be useful a feature to tell the system when one prediction is incorrect and a possible reason for it.

### 5.3.4. Popularity game and prioritizing

This category is much related with how users use their news feed. Some people in the workshops don’t use Facebook to post anything; they just like to see what others are posting as expressed by two users in the first workshop: like User A and User C. For them, there is no popularity need.

In the second workshop, the users commented that they have certain strategies. User G looks the time he will post to get more sights. In this case, he recommends that Facebook could give you some tips to understand which time is better to post or to save posts to be visible at a particular time.

User F in that workshop says that she would be interested to know which the reason for a particular post is presented in her news feed. Reasons explaining why she has something could help the system to agree or stop following or liking something to improve the algorithm. Also, she would like to see in which categories she is inserted to select or deselect them as she feels is better for her.

### 5.3.5. Cruel connections

Bucher explains this category as the incapacity of algorithms to track and relate human feelings (2016, p. 38). Algorithms usually don’t take into account sensible or hard situations of the user, creating a “they are just machines without feelings” opinion.

User B in the first workshop expressed that one of his friends died some years ago and he constantly receives every year a memory about him. That behavior hurts him and is annoying. He says that it should be a way to say in those pictures something to avoid them in the future. User C expressed that there should be an option to create some feedback like “don’t show me this anymore”. It could be a needed feature to include in the news feed. Another user suggested a “un-follow memories” option to avoid this kind of information in the future.

In the second workshop, User G explained that it is relative and depending on every person. He says that some people could feel nice when they remember a moment shared with someone that has died. In this case, he states that is difficult for computers to know when to show something about a diseased person. Some users expressed that there should be a way to turn it off and tell Facebook that you are not interested about it anymore.

User H said he doesn’t feel anything in relation to emotions with Facebook. “This is just a thing”, and he says that he doesn’t have any kind of hurtful feeling with the news feed.
5.3.6. Ruined friendships, passive consumption, producer privacy and missed posts

This category had different results among the consulted users. User C in the first workshop expressed that she feels like if she doesn’t have a lot of contact with her family because the newsfeed doesn’t show her what her family is doing. She misses a lot of things because she doesn’t enter to her profile every day. In this context, she suggests a way to prioritize certain people to appear in the newsfeed. It could be a feature to add to the newsfeed, but currently there is a tool to make it happen in Facebook.

User E in the first workshop expressed that could be useful to have a world trending newsfeed like in Twitter. This could be a feature to think about for the newsfeed but it is in a certain way currently managed by the hash tags.

User F in the second workshop expressed that she feels how she is missing what her friends are doing because of the prioritization of posts. In general the users expressed that it is important to understand how the algorithm is prioritizing.

User F also said that could be useful to have a division for your newsfeed in relation to closest friends and other one with not that close friends. She says that it could be nice to have posts about people that have not a lot of interaction with her. User I said in relation that he would like to have a way to check which friends are not active with you to see what they are doing.

5.3.7. Consumer preferences

The first workshop users expressed a need to find easily what Facebook thinks about them. About this, User E said that if people have an easier way to select what they want, they could create even worst filter bubbles in social media, so she suggests general topic instead of specific media: turning on or off political interests but not a specific newspaper for example.

Another interesting feature from the first workshop was proposed to have a bar or a percentage setting to select how much you would like to receive from a particular page or friend. Even if the proposal could be helpful, in general terms people could perceive that all friends and pages deserve the same importance so everything should appear in the newsfeed. This is why a feature like that needs more studies to understand how comfortable could it be for the user to define an “importance variable” for every friends or page in relation to the algorithm.

In the second workshop, User G said that he feels that Facebook needs his intervention all the time to work in favor of his interests. In his case, un-follow intentions are apparently not well understood by the system because his newsfeed keeps on showing him what he doesn’t like. For him, having a list of un-follow people could be useful but this is already implemented in the service which brings up the importance to make the feature clearer for the users.

5.3.8. Other findings outside the previous categories

No relevant results were gathered outside the proposed categories from the workshops. One user mentioned in the first workshop the problem of fake news in social media, but there were no explanation for possible solution from any of the participants.

5.4. Second design workshop results

After the results and data gathering of the previous steps, the second design workshop evaluated possible solutions for the discovered features and contexts. Table #3 summarizes the previous findings to look for a possible design solution for each of the issues. In relation to the defined first and second design goals described in the segment called Final Research question and design goals in Chapter #2, this table presents and understandable and systematic way to define the design opportunities to improve the algorithm experience in Facebook’s news feed. Table #5 also presents a list of possible
solutions to elaborate for the second workshop which end as the initially intended design probes for this thesis.

<table>
<thead>
<tr>
<th>#</th>
<th>Feature needed to be implemented (First design goal)</th>
<th>Data technique in which the feature has been found</th>
<th>Context in which the feature needs to be implemented (Second design goal)</th>
<th>Data technique in which the context for the feature has been found</th>
<th>Design opportunity to resolve the feature and context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is no way to understand how to refresh the news feed</td>
<td>SIM method</td>
<td>The newsfeed could be the appropriate context to implement the feature</td>
<td>No data technique showed the proposed context</td>
<td>Create a sign in Facebook’s news feed interface to indicate the user the refresh and reading possibilities in relation to the newsfeed</td>
</tr>
<tr>
<td>2</td>
<td>It is needed to improve the clearness of the current information of the posts like the sponsored nature, if it is completely generated as a recommendation, date and time and the possible options available for each post</td>
<td>SIM method, document analysis</td>
<td>Increasing the awareness of this information in each post could be the appropriate context</td>
<td>No data technique showed the proposed context</td>
<td>Increase the text size, support with graphics or change the text color to increase post information awareness</td>
</tr>
<tr>
<td>3</td>
<td>Relocate the current news feed management options to increase their use and understanding among the users</td>
<td>SIM method, First design workshop</td>
<td>The newsfeed will be the best context to locate these options because they relate to its management</td>
<td>First design workshop</td>
<td>Create a proposal to locate the current news feed management options in the news feed interface</td>
</tr>
<tr>
<td>4</td>
<td>It is needed to distinguish when a post is presented in the news feed due to human involvement and not by the algorithm</td>
<td>SIM method, document analysis</td>
<td>Every post that is created by human involvement should have a way to express this human activity</td>
<td>No data technique showed the proposed context</td>
<td>Create a symbol or graphic representation to distinguish when a post has been created due to human involvement and not by the algorithm</td>
</tr>
<tr>
<td>5</td>
<td>It is needed a way to express which inferences from the user the algorithm is taking to present a particular ad.</td>
<td>SIM method, document analysis and First Workshop</td>
<td>The profile could be a good place to propose the management of what Facebook knows about the user to propose ads</td>
<td>No data technique showed the proposed context</td>
<td>Create a proposal to locate Facebook’s ads inferences in the user’s profile interface</td>
</tr>
<tr>
<td>#</td>
<td>Feature needed to be implemented (First design goal)</td>
<td>Data technique in which the feature has been found</td>
<td>Context in which the feature needs to be implemented (Second design goal)</td>
<td>Data technique in which the context for the feature has been found</td>
<td>Design opportunity to resolve the feature and context</td>
</tr>
<tr>
<td>----</td>
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<td>---------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>It is needed a way to express which inferences from the user the algorithm is taking to present a particular post. This increases the algorithmic awareness/conscience and improves the understanding of the algorithmic model presenting which variable created the highest reason for presenting the post as top, or when explicit or explicit personalization is being made. The system should explain how much time a user spends in that category or topic. It is needed to clarify when the information is taken from other services like Google or by cookies.</td>
<td>SIM method, document analysis and First Workshop</td>
<td>Each post could have a way to understand which is the reason why it is shown in the Top News Feed</td>
<td>No data technique showed the proposed context</td>
<td>Create a proposal for post algorithmic selection explanation in each of the posts, showing the main reason for its presentation as top like amount of likes, amount of chat interactions, amount of time consuming that information, or information gathered from other sources third party sources like Google or cookies</td>
</tr>
<tr>
<td>7</td>
<td>Based on the system’s inferences about a user, it could be possible to offer other sources of information with different ideological stands</td>
<td>Document analysis</td>
<td>Could be in the area below every post when a user selects an information to read</td>
<td>No data technique showed the proposed context</td>
<td>Based on prototype examples, design a proposal for other information sources that possess a different perspective of the information</td>
</tr>
<tr>
<td>8</td>
<td>Based on the system’s inferences about a user, if the user is not involved a lot in the topic, could be possible to offer other friends interaction with the topic, like posts or comments</td>
<td>Document analysis</td>
<td>Could be in the area below every post when a user selects an information to read</td>
<td>No data technique showed the proposed context</td>
<td>Based on prototype examples, design a proposal for other peer information sources in relation to the information</td>
</tr>
<tr>
<td>#</td>
<td>Feature needed to be implemented (First design goal)</td>
<td>Data technique in which the feature has been found</td>
<td>Context in which the feature needs to be implemented (Second design goal)</td>
<td>Data technique in which the context for the feature has been found</td>
<td>Design opportunity to resolve the feature and context</td>
</tr>
<tr>
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<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>It is needed to distinguish clearly the difference between the “Top news” and “Most Recent” news feed</td>
<td>Document analysis, First design workshop</td>
<td>The news feed could be a place to locate and make a difference for the ‘Most recent’ news feed</td>
<td>No data technique showed the proposed context</td>
<td>Create a proposal to relocate the ‘Most recent’ news feed option closer to the ‘Top news’</td>
</tr>
<tr>
<td>10</td>
<td>It is needed initial explanatory posts when logging in to improve the algorithm awareness and explain tracking systems</td>
<td>First design workshop</td>
<td>The same news feed could create initial posts that will be read by the users when logging in</td>
<td>First design workshop</td>
<td>Create examples of algorithmic awareness, tracking and use of the news feed aids or tips when logging in</td>
</tr>
<tr>
<td>11</td>
<td>Location based posts should have an option to turn on or off the tracking</td>
<td>First design workshop</td>
<td>The same post should have an option to clarify if the user wants to stop this tracking and an explanation to find where to turn it on again</td>
<td>No data technique showed the proposed context</td>
<td>Create an example of an option to turn off the location based posting and how to turn it on again</td>
</tr>
<tr>
<td>12</td>
<td>There should be a way to tell when news feed’s predictions are wrong</td>
<td>First design workshop</td>
<td>The same post should have an option to express if the prediction is incorrect and a way to tell why</td>
<td>No data technique showed the proposed context</td>
<td>Create an example of an option to tell a false or incorrect prediction</td>
</tr>
<tr>
<td>13</td>
<td>It is needed a way to un-follow memories and stop memories from a particular person or page</td>
<td>First design workshop</td>
<td>The same memory could have a way to tell that the user wants to stop that memory or other memories related to that person</td>
<td>No data technique showed the proposed context</td>
<td>Create an example of an option to stop memories of a particular person or page</td>
</tr>
</tbody>
</table>
Feature needed to be implemented (First design goal) | Data technique in which the feature has been found | Context in which the feature needs to be implemented (Second design goal) | Data technique in which the context for the feature has been found | Design opportunity to resolve the feature and context
---|---|---|---|---
14 | It is needed a way to notice when an user does not have enough interaction with a list of users to improve their news feed appearance | First design workshop | Creating an option in the newsfeed management current options could be a solution | No data technique showed the proposed context | Create a list of friends that does not have enough interaction to appear in the news feed with recommendations to increase their chances

Table 5 Summary of the algorithmic experience findings in relation to Facebook’s news feed

Due the length of the table, every solution was assigned with a number in each of the table’s rows for a better identification when mentioned. Also, it is worth to mention how certain features has been confirmed by triangulated results between the Document analysis, the SIM method and the First design workshop techniques. It is also relevant to point out that some contexts were not gathered or answered by any of the applied techniques. To solve this situation, the researcher elaborated approximate possible solutions in relation with the same results and the delimitations of the present thesis to provide possible design probes for the evaluation. This could be explained as a limitation of the proposed methodology and is explained in the Conclusions chapter of the present document.

To evaluate these solutions, the second workshop was implemented with 8 participants from the same users that participated in the first workshop. In this case, the evaluation had been individual, in contrast with the collective or focus group dynamic implemented for the first workshop. This decision has been made based on the almost completely individualistic consumption nature that the news feed has, especially in terms of app use. The steps elaborated in the evaluation were the following:

1. Welcoming the user
2. Gratitude expressed to the user for their time and service
3. Presentation of the current steps to the users.
4. Informed consent form signature. (Appendix #8 contains a detailed description of the informed consent form used in the second workshop)
5. Brief explanation of the current thesis state and what is going to be the dynamic for today.
6. Evaluation dynamic starts. Each solution had the following process:
   6.a. Visual presentation of the solution. Brief explanation of the context and recurrent behavior in that solution
   6.b. First set of questions: Do you notice any change in this solution in comparison with the current news feed interface? What is it? What do you think it is for?
   6.c. Presentation of the change in the interface or solution. Presentation of the reasons for that solution.
   6.d. Description of the possible changes the users has suggested in previous evaluations.
   6.e. Second set of questions: What do you think about this solution? Do you think it could be improved? Would you like to have it in the real app? What can be changed is this solution for its improvement?
7. Gratitude expressed to the user for their time and service
8. Delivery of a small candy or gift for the user
As can be seen in the step 6.d, the evaluation dynamic was incremental, being able to include previous opinions and suggestions from other users made by the researcher that could support or contradict what the current user is expressing. This means that the previous users’ opinions (if any) had implications in the presentation of the current solution, bringing possibilities to accomplish better design results. For example, this strategy brought a chance to evaluate and analyze the opinion of the users in relation with previous comments, which could improve or change the current user’s opinions, behavior always important to notice for a better design result. Another opportunity with this decision is to gather even more justifications for a user’s position in case they have a different opinion about the proposal. For this step, previous users were treated only as “a previous user suggested...” to maintain the confidentiality of the participants and avoid any kind of personal relation. As done on the previous first workshop, the results expressed by the 8 users are organized by assigned user identifications to maintain their privacy as: User A, User B, User C, User D, User E, User F, User G, User H.

Being the main results exposed in the previous table, the design probes to evaluate in the second design workshop are the ones derived from the possible solutions in the last column called “Design opportunity to resolve the feature and context”. Some of the opportunities where merged between them for their relationship and closeness, so this aspect is detailed in the next segments for each of the case.

Furthermore, the proposed design probes are only images based to communicate the possible new feature or change in Facebook’s app to improve the algorithmic experience as can be seen in the following segments and in Appendix #7. In this chapter and in contrast with the design probes presented in Appendix #7, the design probes possess a red frame or remarking for a better explanation of the proposed solution in the present document, which means that during the evaluation sessions the solutions did not have the red remarking.

### 5.4.1. Sign to indicate how to refresh the newsfeed

Feature needed and design opportunity #1 is guided by the SIM analysis, which brought a lack of a direct metalinguistic sign to understand how to refresh the news feed. Therefore, it is necessary to create a sign in Facebook’s news feed interface to indicate the user how to “refresh” or update the posts generated by the algorithm without the usual scrolling up until the beginning of the news feed is reached. In terms of the algorithmic experience, this feature could facilitate the consumption of the algorithm services for selecting new relevant posts. The feature also promotes an easier revision and understanding of the algorithm work from the user perspective, offering a way to “active” it or “turning it on”.

In the current version of Facebook’s app, it is possible to refresh the news feed contents just by pressing the existing news feed icon, so maybe this feature could be modified graphically just by adding an indication that the button could be pressed to update the news feed. Consequently, the proposed solution consists in adding an icon of “two looping arrows” that are following one another in a circled design, usually related in the web context for refreshing or updating functions. This solution can be seen in Figure #12.

In terms of the users testing workshop, this solution had an important limitation. The majority of the users did not find the solution and some of them did not even understand completely the new idea. The result was formally expressed by User A, User B, User F and User H stating that the “refreshing”
arrows are not easy to find. In general, the users stated that the mayor problem is in relation with the “refresh” icon, which is not well perceived or understood. For example, User B and User G said that it looks like a camera because the arrows are too small. User D also alleged that it is not easily perceived or understood what it is for. User H said that the current version is not easy to understand and the idea is not easily perceived.

In other kind of opinions, User E stated that he likes the functionality, but it should not be there because that icon is not a bottom but a tab, so it should be respected as a tab. He explains that maybe that’s the reason why people don’t find it or don’t use it in the current version of the app. In that case, he thinks that this function should be somewhere else or in a different position, but he understands the space limitations in a mobile platform which impulses to put the function on top of the tap.

As a general conclusion for this feature, the solution needs to be improved with a different design approach. These problems would be solved in a different version presented in the Analysis chapter of this document, which includes a different graphical solution for the refreshment and a different position for the tool.

Besides the graphical and position limitations, the users really liked the idea behind the solution because they did not know previously that the button had this functionality. For example, User B said that the feature is useful to avoid the scroll up until the top of the news feed for the update. User D expressed that she would like to have that feature and save time when refreshing the news feed to look for new posts. This is an interesting idea in terms of algorithmic experience in social media, which states the need of having an easy and accessible way to “activate” the algorithm services and have an updated version of its functions, as many times as the user wants or needs. This idea is an important conclusion that is supported for the theory and literature selected for the present thesis and is also guided by the used methodology, so it would be described in the Analysis Chapter #6 of the present thesis.

Furthermore, User D suggested a relevant feature that was not analyzed before: she does not like to lose the previous order of the posts when the news feed is updated, so maybe the updating should be only for the new posts but not to reorder or recreate the entire list. User F also mentioned that she would like to see what was posted before the “refreshment” to maintain the previous order of elements and continue her reading order. This is other interesting finding brought thanks to the openness of the second workshop dynamic: a need to maintain a logical order for the user in terms of the algorithm results. In our Facebook’s news feed case, meaning to update the posts filtering results but having always the same order, or simply “reactivating” the algorithmic calculations for just new incoming posts, but leaving the previous algorithmically curated posts in their current order and positions in the news feed. As a conclusion in terms of algorithmic experience, users tend to express that they like to have the feeling of order and coherence in the algorithm results, aspect that could be described also in the further Analysis Chapter #6.

5.4.2. Increase current post information awareness and proposal for post algorithmic selection explanation

In this case, the SIM method and document analysis brought needed features #2 and #6 which were treated together due their relationship and proximity in terms of the apparent post modifications needed to accomplish them. First, the methods identified the possible solution #2 as a requirement to increase the current post information awareness in relation to its date, time, sponsored nature, and possible options to manage the understanding of the post selection. This could be solved by increasing the text size of the current provided information and supporting with graphic elements, which was applied in the design proposal for the user testing.
Besides this need, there is another finding #6 brought by the three applied data gathering methods which demonstrated a need to improve the posts selection awareness in relation to the algorithmic results. A way to solve that aspect is by creating a new feature to display an explanation for the algorithmic selection in each of the posts. The feature shows some of the main reasons that provoked the algorithm to show a particular post in the user’s news feed like amount of likes, amount of chat interactions, or amount of time consuming that information, including other reasons only managed by Facebook. Therefore, in this case the users also tested the new feature and the information they provide.

For these solutions, the proposal could be splitted in two different cases for a better understanding: the “normal post” and the “sponsored post”. For these purposes, the normal post is a post created by liked pages or friends and the sponsored post is usual advertisement displayed by Facebook. This separation is important to maintain because both post have a different nature, which means different algorithmic explanation in each of the situations. As illustrating examples, Figure #13 shows the design proposal to increase the post information awareness by increasing the text size in relation to the sponsored nature, the time and visibility state. This change pretends to improve the algorithmic experience various aspects. First it could provide more noticeable information for the user to distinguish between an advertisement and a regular post. Also, for regular post cases the user could notice easier how old a particular post is, providing a chance for the user to compare between posts to notice that the news feed is not defined by a chronological order or by novelty as the main way for post selection and distribution. Likewise, increasing the awareness of the visibility feature could promote a better understanding of why a post is visible in my news feed in terms of visibility configuration.

Furthermore, in both proposals could also be seen a change in the upper right part of the post consisted by a “Why…” text and a mechanical nut icon. This proposal is consistent with the continuous use of icons and text for metalinguistic signs in Facebook’s app news feed style. This change propose to replace the current “down arrow” icon, a feature that shows more information in relation to the post and other options. When tapped, the idea is to provide more information for the user to understand in a better why that post is appearing in his/her news feed, in both regular post and ad post cases. The feature is implemented as an optional “second layer” view to maintain possibility of an elective feature, only visible when the user really wants to have an enlightenment of the post and the algorithmic decision behind its selection.

Figure 13 Increase awareness solution for advertisement and regular posts
In the case of a regular post, the proposal shows information in relation of the algorithm decision that promoted the appearance of the particular post in the news feed. Figure #14 shows the explanation that is based on the interaction that the user had provided to the system in relation the particular page or post like times visiting that page, amounts of comments, amount of friends that liked also that post, and others. This explanation also provides the chance to tap the blue links to check the specific information that the algorithm used to make the decision. For example, tapping the 15 times the user has opened links in relation to the Facebook page shows a second window with a list of information like date, time and link opened. The current options for managing the posts like saving, copying the link, avoiding that post or turning on the notifications are maintained.

A similar strategy was made to solve the sponsored or advertisement cases. Figure #15 shows the justification for that ad appearance and a more direct way to manage your ad preferences, a feature that is currently offered by Facebook but is hard to find. It is worth to notice that this information is also already offered by Facebook’s app when clicking the “down arrow” icon, but provided as a third level information after clicking on an option called “Why I’m seeing this ad?” which takes a lot of clicks to reach. Looking to improve the algorithmic experience and prioritizing these already available explanations, the solution brings the information immediately after tapping on the new “Why…” option to promote the algorithm understanding for ads. Likewise, the regular options already offered by Facebook’s app like Save post, Hide ad, This ad is useful and others are maintained there for the user.

Regarding the users testing, the “Why…” text and the mechanical nut icon where easily perceived by the users. On the other hand, not all the users found the incremented size for the “Sponsored” text, time and visibility. For example, User A did found the “Why…” and mechanical nut but he did not express anything in relation with the incremented text. A similar result had User B who did not find the text augmentation but found easily the “Why…” feature.

In relation, User A expressed that the “Why…” solution is understood from the beginning and it is useful so he can comprehend his own behavior in the social network and the implications of that behavior what is offered in his news feed. User B and User E said that they liked the solution for similar reasons.

In terms of improvement, User E said that he would really like to have this kind of information in every post just to satisfy his curiosity, but he stated that the way to express the details should be treated carefully because people could freak out when they realize how much Facebook knows about them which in the end could provoke bad experiences. User G also pointed that the why may not be completely necessary, maybe a tree points (…) icon or options icon would be enough.
As a general conclusion, all the users expressed a huge advantage of having this new “Why...” function to understand better the algorithm and their behavior, and all approved the importance for increasing the text size for time, sponsored nature or visibility. All of the users accepted the need for understanding the main algorithmic reasons for showing each particular post. This is definitely a new understanding of algorithmic experience in social media, supported by the three applied data gathering methods and the selected theory, aspect that is examined as a main conclusion in the Analysis chapter of the present thesis.

5.4.3. Proposal for current news feed management options in the news feed interface

The SIM method and the First design workshop provided the needed feature #3. They found that is needed to locate the current news feed management options in the news feed interface. Mainly, these options are currently hard to find and particularly relevant for the users to improve their algorithmic experience and their news feed management. Therefore, this solution includes a new news feed icon with a mechanical nut in the upper part of the newsfeed. This new feature opens the current news feed offered possibilities. Figure #16 provides an example of how the solution could be handled and positioned in the news feed interface. In this new position, the users find an easier way to access, explore and use these management options. An example of these options that are currently offered in Facebook’s app is Figure #17 which is going to be displayed after tapping the new News Feed Management icon.

As happened in the first solution for the user testing, this proposal had some graphical limitations. In general, the strategy to add a small design or mechanical nut inside the current news feed icon is easily perceived. For example, User A did not find out the new function and he proposed to have a different graphic. User B also expressed that she did not understand the icon and said that the mechanical nut should be alone or bigger because it is not perceived. User C said it was a synchronization icon as the first one, proving that the new icon was not understood by her. User F said that is needed to improve the graphic because it is not clear and User H expressed that is better to make the icon a little bigger. User G said it look like second news feed so maybe the position is not correct and is hard to understand, “usually settings are not there so maybe they need another position”.

Another possible improvement pointed out by User E is that adding this option in the main menu is not completely necessary, so he suggests using a second layer to the current news feed icon which could be activated with a longer press, showing this news feed managing option. Similarly, User C said that the solution is useful but it would not be always used, so he suggest to put it a little bit more hidde like in a second layer but not always present in the main menu because he does not feel this feature would be used all the time, so it doves deserve to be always visible. User D also pointed that the feature is too high up in relation to the other features, so it should be somewhere else like in a second layer option. These recommendations are a good solution in which the
refresh and “Most recent” news feed option could be also added, so it is used for the final design.

Besides the previous problems, all the users expressed again the need for having the news feed preferences options closer and easier to be found. User B said that she really likes to have it there at hand so she can use it more frequently because the current position in the app is almost unreachable. In this terms, could be understood that users want some way to manage the algorithm behavior in their news feed, which is an interesting conclusion that is explained in the Analysis chapter of the current paper.

5.4.4. Graphic representation for human involvement

The SIM method and the document analysis provided the needed feature #4, consisting in a the need for creating a symbol or graphic representation to distinguish when a post has been created or altered due to human involvement and not by the algorithm. To solve this problem, it is proposed to create a new “human involvement post” in which Facebook clearly states that a post has been manually curated. Figure #18 shows an example of how the posts could look like and what the service could offer. In this case, a similar “Why…” feature to the one previously presented could be provided to understand why the particular post has been deleted or censored, to satisfy users’ curiosity and to promote their prevention in terms of using the platform.

In terms of the second workshop, this solution was easily found and attracted a lot of attention. In general, all the users approved and noticed how important is to determine when there is human intervention in spaces in which the algorithm should have been present. This is an interesting finding supported by the theory selection and the SIM method in terms of algorithmic experience: it is relevant to make clear when the algorithm results are altered by human intervention to avoid user’s false expectations or betrayal feelings.

Some improvement suggestions for the solution are in relation to the profile picture that should be the Facebook logo instead of the man/woman design as suggested by User H. Another and interesting proposal was expressed by User D stating that the solution could have a different design approach with a blurred post that has the message on the top, instead of the proposed design that looks like if someone has added a new post which is not the actual case. A possible limitation with this suggestion is that it does not express if someone actively added a new element in the algorithm results. For example, User A stated that it is important to notice when the human intervention is not only censoring or erasing posts, but also including posts which are not suggested by the algorithm calculations, like political news or others. Because in Facebook’s case there is no previous signs that human intervention act by adding posts to users news feeds, in terms of the present solution the previous suggestion of the blurred post could be perfectly applicable. In terms algorithmic experience in social media, the cases and presentation of human intervention is definitely a topic that deserves some explanation in the further Analysis Chapter #6 of this paper.

It is important to notice also that all the users in general were intrigued about what is could be expressed when the “Why…” bottom is pressed. For example, User D said: “I definitely will hit the Why button”. User F said also that she likes the idea of knowing if a post was erased by someone but she does like to expose the person who was censored, so this should be carefully made. During the tests, users were presented some examples like violence or pornography cases, but information in relation with how explicit the content could be interesting to attend in another research in terms of looking for the users’ privacy or interaction in relation to content curators or censorship. Therefore, these aspects were not measured in this case.
5.4.5. Proposal to locate Facebook’s ads inferences in the user’s profile interface

The three data collecting methods established a lack of understanding of what Facebook believes about the users. This could be particularly pictured in terms of how Facebook currently manage showing ads and sponsored posts. This lack of knowledge created the design proposal #5 expressed in Figure #19, which shows a way in which is added a new “Ad preferences option” to the user’s profile, which pretends to provide a more accessible chance to manage the information. The solution tries to bring a more intuitive way to find the user’s ad configurations and interests as a “self-management” feature in the user’s profile page.

When this new feature is clicked, it could be offered ad preferences windows offered currently in Facebook’s app. Figure #20 presents a visualization of these options, which allows an understanding of what inferences the system has done about the user to propose certain ads. These options also provide a way for the user to tell the system if those inferences are correct or there are other inferences that could be useful to add.

Besides this solution, a different way to materialize what the system has inferred about the user could be to “print” these inferences. Taking as an inspiration the research made by Isbister and colleagues (Isbister, Höök, Sharp, & Jarmo, 2006) producing an affective evaluation tool, it could be valuable to provide different 3D designs that could be printed by the users for different needs. For example, these designs could be produced in different sizes to use as desk decorations or wearable materials for earrings, pulses or necklaces. Furthermore, the design possibilities could be as direct as a political stance or just subjective/abstract representations that only a particular user could understand.

In general terms, this material proposal could improve the algorithmic experience because it turns the algorithm knowledge or personalization strategies into something material that is possible to see, touch and provide meaning. For example, these proposals could help a user as a reminder to change or reaffirm a particular behavior in social media, so the algorithm could

Figure 19 Ad preferences solution in User's profile

Figure 20 Current ad preferences options

Figure 21 Printed system inferences examples
continue or change its results. Also, these examples could help as a chance to create real interactions or exchanges in daily basics, like friends noticing that others have a particular design creating a community sense, or fixing different designs to create a bigger one in a puzzle dynamic exchanging pieces between friends or even strangers. Likewise, the designs could be collectable, encouraging users to use more the social media service or providing a way to also exchange and manifest the social network in the physical world.

Regarding the users tests, the first design proposal in the user’s profile page was easily noticed by all the users in general. Particularly, all of them expressed that the solution was good; the icon proposed was accurate and easily understood. Also, they stated that this kind of options should be definitely in the user’s profiles configuration because they are related to the user’s “image” and their own presentation to the system. For example, User B said that this new position is useful and it is even better to have the ad preferences here because it is clearer than the mechanical nut option in previous proposals. User D also said that “It makes so much sense to have this feature in the profile management” because is related to her tastes and preferences. User E said that the solution actually works well for Facebook because people would improve their interests and real profiling for better ads results and offering, aspect that would improve Facebook business in the end. In relation, User F reaffirmed the idea stating: “Because it is our profile, not Facebook’s profile”. These expressions and ideas could be relevant in terms of algorithmic experience, because they tell that people feel as their own the group of knowledge and inferences a system do about them, and they also feel the need to manage and configure them in a proper way. This finding is worth to mention in the further Analysis Chapter #6 of this document.

On the other hand, the materialization of the algorithm understanding with 3D printed figures was well received by the users. User A for example proposed a possibility of making printings in a puzzle dynamic so he could exchange or share with others his own figures, providing also a context in which a digital map could help to locate other people who has the missing pieces or figures to complete the entire design, or even to find out people who has a contrary design which could provide encounter and exchange possibilities with different opinions and points of view. In relation, User C said he likes much the concept, but he suggests having some motivation so people could feel the need for printing the figures, like the need of meeting other people in Facebook to get other designs or meeting people outside to find other figures in case of a puzzle.

Discussing with User B appeared the concept of “breaking the forth wall”, a commonly used concept for other media like comics or movies, but in this case relates to the algorithmic behavior and its possible consequences in the physical world. She expressed that the solution is interesting, new and she really like the chance for collecting the printed figures as prices, which could be an attractive new feature for Facebook. In relation, User D expressed that she really likes the idea and that “this is a way to have quality time on Facebook but outside of the computer”. User F says that she likes this materialization idea because we use a lot of time in the virtual world and the proposal promotes the real touch or the real dialogue in the material world. She likes the idea of expanding Facebook to create real connections in the real world. User H also expressed that could be nice to print other options as smartphone stands or small house/cooking tools which are also useful for the users. This new concept could be extended in the Analysis Chapter #6 of the present thesis.

On the other hand, Users E and G said that they do not see the reason for this materialization solution. User E stated that he understands the scientific importance of studying related possibilities, but from the business perspective he does not see the sense. For example, he says that it could be too youthful or related to youngsters behavior, so he suggest better like an achievements or virtual medals in Facebook’s profile to maintain the users in the platform. Similarly, User H also suggested providing goals or medals in the user’s profile as a way to express what Facebook believe about you.

In this case, several opinions expressed specific possibilities for Facebook in relation to this solution, but generally all of the users liked the proposal and they pictured themselves using these kinds of possibilities in the future.
5.4.6. Proposal for other information sources that possess a different perspective of the information presented in a post and proposal for other peer information sources in relation to the information presented in a post

Needed features #7 and #8 are brought thanks to the Document analysis as the need of having a way to offer the user different views and positions in terms of a particular topic or tendency, or to offer the user the chance to know more about a certain topic that is not yet completely examined. It is important to notice that currently is technically possible to (at least) gather enough information to determine if a particular user is “right or left” politically driven by his or her choices in social media, or if a particular post or information is inside or outside somebody’s filter bubble. Also, is thinkable to determine how much a user is involved in a position in relation to a particular topic or debate by analyzing in a quantitative way key terms in links that are shared or posts that are liked. Related solutions and proposal could be seen in Agadagba’s work (2016, pp. 11–16).

Having those technical possibilities, it is conceivable to determine (at least in an approximate way) if a particular post or information is close or differentiated from other in terms of ideologies or affinity groups and to propose a design for the user to recommend other information sources that possess a different perspective in relation to a particular post. It is also possible to propose a design to offer other peer information sources in relation to a specific information that the user is reading, based on how much a user is involved in that topic or not.

Examples in this case could be designed departing from a similar feature that is currently offered in Facebook’s app. This feature offers the chance to recommend other posts in relation to the same page or author that the user has already read. Based on this feature, Figure #22 offers two different cases: the one on the left shows an alternative post or information in relation to the post recently consumed and the one on the right a case in which is offered a similar content but in relation to someone in the friend list. At this point, it is important to remember what the Document analysis brought in terms to diminish the effect of echo chambers and filter bubbles: when a user is involved in a topic it is possible to offer him/her different points of views, but when a user is not involved with a topic it is possible to offer the user related interactions in his/her peer group or friend list (Q. Liao & Fu, 2013; Q. V. Liao & Fu, 2014).

In terms of the second workshop results, this solution was also easily found by the users and had one of the highest acceptances. In general terms, the users really liked to idea to have alternative opportunities in relation to specific topics and also to have the chance of knowing their friends opinions. For example, User A said “this is the idea that I have liked the most by now”, User B expressed that “I love it” and User C stated “I like it very much”. User F said that the solution is useful because she do not have currently the chance to know what her friends think about specific topics, so the feature helps her to do it in an easier way. Therefore, users in general expressed that the solution was acceptable in this way with some small recommendations.
User D said that she does not get which part of the solution is clickable, so maybe it could be better to add buttons or a clickable sign like down arrow or an expandable area to make it clearer. User H expressed that she would use it depending on the source, so maybe it is important that Facebook should care about using serious and well known sources in this solution because it could even prevent her to go to Google to look for more information, enabling her to stay more time in Facebook instead.

A specific result was made by User B, because she says that looking at her friend’s comments is not that useful for her than the other possibility for reading different opinions in a certain topic. In relation, User G said that she does not find the solution useful but she considers it interesting and she would need to try it some days to have a final opinion.

As a general conclusion, this proposal provides an interesting chance to explore in social media to improve the algorithmic experience. It could be needed some technological advances to determine how to offer the users a way to get out of their filter bubbles if they want to, or to know peers opinions in relation to what the users believe. This is another interesting conclusion that should be mentioned in the Analysis Chapter #6.

5.4.7. Proposal to relocate and differentiate the “Most recent” news feed option and the “Top news” option

The Document analysis and First Design Workshop proposed the needed feature #9. This one is related to relocate the “Most recent” news feed option closer to the current news feed so it can be easily accessed and differentiated. This change could increase the chance for the users to choose between a news feed curated algorithmically or just the most recent posts, improving the algorithm experience in terms of choosing between using the algorithm and not using it.

As Figure #23 shows, this solution could be offered close to the usual news feed to improve its accessibility. It consists in a news feed with a clock icon that offers the chance to visit a different news feed called currently “Most recent” in Facebook’s app.

In terms of the second workshop results, this solution was easily found by the users and provided interesting findings. For example, User A said the design is well understood and it is useful. User B got it at the first glance and understood that this new feature was for visiting the “Most recent news feed”.

In this case, the design solution was so effective that it should be replicated for the “refreshing” or updating news feed feature and the news feed’s preferences solutions to improve their perception. This possibility was supported by User B and User H when they argued that the way of presenting the clock is way clearer that the solution of having small icons for the mechanical nut and the “refreshing” inside the current news feed icon. This is a good suggestion that had been implemented to improve those cases. User E also expressed that he likes the option but it should be added again in the long tap dynamic in the news feed in a second layer availability as he suggested previously.

In general terms, the users expressed the need for avoiding the algorithmic service now and then. User G expressed it as a way to “turn off” the algorithm which is needed some times. This is an interesting understanding of the algorithmic experience that could be detailed also in the Analysis Chapter #6 of the present thesis. User G also said that she really likes the “Most recent” news feed because she tends to follow news in Facebook and she wants to keep on checking the new events about a particular topic. In her Figure 23 Most recent news feed proposal
5.4.8. Examples of algorithmic awareness, tracking and use of the news feed
aids or tips when logging in

Needed feature #10 was brought by one of the main concerns exposed in the first design workshop, which was the limited knowledge that users handle in relation to the algorithm in Facebook’s news feed. In this case, it is possible to create some design solutions to improve the algorithmic awareness, tracking understanding and use of the news feed aids or tips when the user logs in. These tips or aids could be presented as initial posts in the news feed, similar to other strategies that Facebook has already implemented as memories, birthday reminders or privacy settings. Figure #24 shows two examples of how this solution could look like.

Figure 14 Examples for algorithmic awareness

This solution was also easily found by the users and had a high acceptance. In general, users really appreciated having the chance to understand better how the algorithm works and to have the opportunity to change their behavior based on the presented tips. User C said “I like to feel that Facebook talks to me in this way”, so he can understand better how to use the application. User D also said that she likes the idea because then she realize how less she knows about how Facebook works and then she could improve her knowledge. User F says that she likes the idea because she feels in control of the system thanks to the recommendations. She also feels that with this tips Facebook cares about her because she feels important and she becomes the one in power to manage the system accordingly.

As a suggestion, User H said this proposal is appropriate to make different and varied tips so they are not repeated. She says that they should be also sporadic, like once per week to avoid user’s tiredness. She also said that the share button is not necessary because she does not feel such an important thing to share and everyone is receiving the same information. This final aspect had been taken into account for the final design proposals.

On the other hand, User B said that this solution is not useful for her and she does not find it useful because she feels that she knows the tips already thanks to the previous workshop, but maybe other people who do not know a lot about algorithmic experience could find it more interesting. In relation, user E said that he does not like the tips dynamic. He says that he feels that Facebook is telling him what to do. In this case, he understands the feature so he would not completely avoid the idea but it needs to be carefully crafted to avoid people feel directed or blamed about their bad way of using the platform. Also, it could also admit that the algorithm is not good enough, which could be a bad image for the service or the company.

As a general conclusion, it is relevant to notice how all the users felt the need to understand how the system works in terms of the algorithm to have a better experience. Even taking into account the negative answers about the solution, it is noticeable how the solution just need to express the recommendations in a way in which users do not feel directed or imposed, but still the tips are worth to have. This result deserves also a space in the further Analysis Chapter #6 of the present thesis.
5.4.9. Example of an option to turn off the location based posting and how to turn it on again and an example of an option to tell a false or incorrect prediction

The First design workshop showed the needed features #11 and #12. They express the need to have an option to turn off the location based posting and a way to tell a false or incorrect prediction. As the proposals where expressed in relation to the algorithm prediction of the user’s position, a possible solution to solve this problem is shown in Figure #25. Based on Facebook’s usual dynamics of memories and privacy settings, it could be offered a way to clearly state that the system is tracking the user, a way to turn that option off and a way to tell if the prediction was incorrect. These tools could provide a better algorithmic experience by enabling a more transparent tracking and providing a way in which the users could stop it is desired or even improve the tool by providing feedback when the prediction is wrong.

Following a Facebook’s memory style, the tracking is presented with graphics and texts that allow the user to understand clearly the feature. Also, three different options are offered to allow the tracking, stop it or telling a fail prediction.

Generally speaking, users really appreciated the new features to avoid the tracking and to express when there is a failure. User B said that she really likes to turn off the tracking system because she does not know how to do it right now.

One improvement suggestion was expressed by User D to have a reminder when you want to continue having the tracking system so she does not see the option again. Another improvement was made by User H suggesting a GPS design instead of the actual design because maybe the picture does not truly express the tracking system.

Generally speaking, this solution provided an important finding: people need to feel control of the tracking system in terms of turning it off when they want or telling when is failing. To improve the algorithm experience in these terms means that the algorithm should be clear about what is it tracking and to offer the option to turn it off. This is much related to the previous finding of “turning off” the algorithm, but also includes the chance of telling the system that the predictions were wrong. This interesting discussion has been added also in the Analysis chapter of the present document.

5.4.10. Example of an option to stop memories of a particular person or page

Proposed solution and needed feature #13 was analyzed in the First design workshop and is in relation to Facebook’s memories and avoiding cruel connections. As stated by the theories and literature in the present thesis (Bucher, 2016, p. 38), cruel connections could become a big problem in terms of algorithmic experience. In this case, Figure #26 provides an example of two new options that uses the current memories feature in Facebook’s
news feed. The first one provide the chance to evade the particular memory that Facebook is presenting to appear again in the future, and a second option to avoid more memories related to the particular person, page or owner of that memory in the future.

Following Facebook’s style of using iconic and texts as metalinguistic signs, the proposal provide two new options below the memory. One option possesses a hand icon that stops that memory to appear in the feature again and second option with a restriction or denied icon to stop more memories in the feature from that user.

Likewise, people easily found the new features in the user testing sessions. Also, users really appreciated having the chance to stop the memories in relation to a specific photo or specific person. In this case, people need to have the chance to tell the system when is needed to “forget” something. For example, User B said it is useful to avoid previous boyfriends or passed away people.

One possible improvement for the design was made also by User B who said that the hand should be filled instead of the current icon. She also said that she would like to have the new options as a secondary layer similar to the current “down” arrow on the posts, because she feels that these new options are not commonly used. She feels that usually those memories are not that bad so these options could be easily provided in a harder way to reach so they do not need to be always visible. User D also said that the texts could be improved to show instead “Don’t show this again” instead of stop because it sounds a little harsh. Also, she would have an “X” icon instead of the hand. Both suggestions were taken into account for the final design proposals.

In general terms, is worth to mention how users really look for these kinds of options. Apparently, users need to have the chance to tell the system when, what and how to forget to provide better results in the future, which is an interesting aspect to discuss in the Analysis Chapter #6 of this document.

5.4.11. List of friends with low interaction

Finally, the First design workshop also exposed a needed feature and possible solution #14. It is based on the creation of a list of friends that does not have enough interaction to appear in the news feed, with recommendations to increase their chances of appearing in the user’s news feed by visiting their profile or other strategies. Figure #27 provides an example of that new list, following the usual Facebook’s graphic style.

This solution was the most easily understood by the users. In general, all the users expressed that the list is relevant for them but they would add other options besides only having the low interaction friends list. For example, User G said that it really makes a lot of sense. User B said she would like to add the un-follow option and the un-friend option because she likes to erase those people with who you usually ad but later you do not contact anymore. User D, User E and User H also supported the option for deleting friends in case you want to do an easier clean up but User H would also add a way to know when was the last time that you contacted or interacted with them, so she can know when she needs to re-contact someone that she cares about. Additionally, User E and User H said that it would be nice to add the Messenger button to chat with them as well.

In general terms, users need this kind of solutions to know which elements in their network have little or no influence in terms of the algorithmic experience. Reason for the need vary between an easily depuration of their social network to increasing the influence of these friends in their news feed by augmenting the interaction with them. Another interesting finding in terms of algorithmic experience is also portrayed here and deserves a space in the next Analysis Chapter #6.
6. Analysis
The results for this research falls in two main categories: first a list of features to improve the algorithmic experience in Facebook’s news feed and then an interaction design proposal for those features. Also, this chapter will contain results gathered related to a more general topic for algorithmic experience.

6.1. Features and their contexts needed to improve algorithmic experience in Facebook’s news feed
Features and their contexts needed to improve the algorithmic experience in Facebook’s news feed could be analyzed in five different general areas according to their nature as following: algorithmic profiling transparency, algorithmic profiling management, algorithmic awareness, algorithmic user-control and selective algorithmic remembering.

6.1.1. Algorithmic profiling transparency
Algorithmic profiling transparency shows the user what the algorithm knows about him or her and an explanation of why the algorithm present particular results based on that profiling. The profiling dynamic should be transparent and easy to access for the user, so that the transparency is related to the filtering, trending or profiling results produced by the algorithm.

This can further be divided into internal and external dimension sources. The internal dimension sources are those mechanisms inside the social media system that define the user profiling and that affect in one way or other the algorithmic results offered to that user. In this case it is important to make visible the elements that the system is tracking about the user, so people could be aware of the profiling.

This group of features was considered beneficial in the SIM, document analysis and both design workshops. For example, in our study case the users expressed the need to show clearly why the news feed is showing specific posts for a particular user.

A specific way to promote the internal profiling transparency is the possibility of “printing” the algorithmic user profiling as physical manifestations. During the second workshop, one user described this opportunity with an interesting term: “breaking the fourth wall”, an expression supported by other users, while they expressed the option as a possibility for “quality Facebook time outside the computer”, or having a “real world expression” of the algorithm capable of being expressed, shared and shoed publicly.

Another aspect related to the internal dimension of algorithmic profiling transparency is related to two of its main consequences: echo chambers and filter bubbles. In this case, the social media system could make transparent which is its understanding of the user by offering different views.

The design workshops and Document Analysis showed interest from users to have alternative opinions in relation with the topics they read in social media. During the second workshop, this topic was treated with two features that offered alternative views. The feature testing provoked positive responses among the users, but also some of them expressed that the solution needed to be crafted carefully to avoid people stop using the social media service by producing bad experiences.

As stated by the design workshops, the internal dimension similarly includes stating clearly which elements of the social network are almost not taken into account to produce the algorithmic results. The second workshop brought the need from users to have a way to identify “low interaction” friends for Facebook’s news feed. Users expressed the need to determine which people have little or no influence in the algorithmic results for the news feed, so they can erase them or increase their interaction with them.
The first design workshop mainly provided insights into the external dimension of algorithmic profiling transparency. It is important to make clear if the system is using external or “third party” services information to understand or create the user classification. An example of this aspect is to explain clearly when Facebook’s news feed is using other tabs, Google’s searches information, or YouTube’s interactions to select specific posts for a particular user. The use of cookies to track the user’s preferences should also be clear, an aspect that is currently solved in Facebook’s web page platform.

6.1.2. Algorithmic profiling management

Besides the needed transparency in the algorithmic profiling mechanisms, it is also needed to have a way for the user to corroborate and manage the profiling made by the algorithm. This aspect increases the algorithmic experience in social media services because the users feel empowered and capable of managing what the system thinks about them and the implications in the algorithm results. Algorithmic profiling management should contain the general ideas of what Facebook’s algorithm offer in the news feed based on the profiling knowledge. Also, the user should be able of correcting, refining this knowledge or adding new information for a better algorithmic service.

The best discovered context to accomplish this corroborate and management is the user’s profile. According to user’s opinion, Facebook’s profiling is their property. Users feel that their algorithmic profiling is part of themselves, and the implicit personalization also need to be tuned, modified or adjusted because is also “public” or a visible part of themselves.

Therefore, the algorithmic profiling management should be easily accessible from the user’s profile page using an interface that could offer the chance of arranging and managing the system’s inferences about a user.

6.1.3. Algorithmic user-control

There are five different cases discovered in this study about algorithmic user-control that deserve to be explained separately.

The first case of algorithmic user-control implies the chance of turning on or off the algorithmic results without mayor service detriment. This is pictured in our study case with the current available options for handling the news feed with the dichotomy between the “Top news and Most Recent” options. The “Top news” news feed updating is Facebook’s way to turn on or reactivate the algorithm. The “Most Recent” newsfeed is a way to turn off the algorithmic influence in the newsfeed. Therefore, it is important to have a clear, easy and accessible way to active or “refresh” the algorithm results any time the user needs an updated filtering or renewal of the algorithmic calculations. Depending of the social media service, this renewal could be defined by the most updated algorithm results in terms of trending, filtering or recommending.

An interesting finding regarding this updating or turning on the algorithm feature is that users could need a feeling of “order” and “coherence”. For example, it means that after reactivating the algorithm for a new or updated news feed, the users expect to have new posts on the top but maintaining the previous ones in the same order down in the news feed list. This is understandable in terms of order because people like to have an understandable and intuitive sequence of posts to produce a mind checklist of those posts that they have already checked in contrast with the new appearing posts. But also this need could be understood as coherence, because the users expect to have similar results from the algorithm which (in theory) is selecting and curating posts from an almost similar pool of information before and after the algorithm “reactivation”. This need of order and coherence could be examined in further studies so they could define and extended understanding of their importance and implications for algorithmic experience in social media services in terms of algorithm discernment.

The second case of algorithmic user-control is related with the “Most recent” news feed or turning off the algorithm. There are some situations in which users just want to see what is recently happening
without any filtering or personalization from the algorithm. Therefore, for social media services could be valuable to add a mode in which there is no algorithmic function or intervention in the results. This idea could have some detractors because it means to hide a function that signified time, efforts and resources, but should also be noticed as a relevant aspect to take always into account when you understand algorithmic experience from the user perspective: algorithmic experience also means not having the algorithm when the user does not want it. In this case, algorithms trending, profiling or filtering should not be the only possible option for user to consume information in the platform.

The third case of algorithmic user-control includes to provide the user the chance for turning on or off the ways in which the profiling algorithm is being feed. This includes sensors and other tracking strategies, mostly defined by positioning tracking studied in the current thesis. For example, there should be a way for Facebook’s news feed to set on or off the location, context or time based tracking for the users, or other ways of tracking. It is important to prevent uncanny experiences and to provide a way for the users to choose if they want this kind of service or not.

The fourth case of algorithmic user-control implies a way to tell the algorithm when a faulty prediction is made. In this case, an option to tell the system that the prediction is wrong could help developers to have a report of possible failures but also brings the users a chance to feel empowered and state something that is wrong to the system to promote better services.

The fifth case of algorithmic user-control is to know clearly when there is human intervention in those places where only the algorithm is expected. The current research brought an interesting discussion about human intervention in algorithmic “spaces”. Algorithmic spaces are those spaces inside a system’s interface in which the algorithm is going to present its results in terms of filtering, personalizing or trending. There is an implicit contract that have to be respected between the users and the service providers in the algorithmic spaces: there will be only algorithm curated results and any other possibility will be expressed clearly in a certain way in which users could notice that a particular result was eliminated or added thanks to a human decision. Therefore, to improve the algorithmic experience, there is a need to provide a way to express when these algorithmic spaces are influenced or altered by human intervention. In this case, the system should be transparent when there are humans filtering, censoring or adding results when the service is intended to be only defined by the algorithm.

6.1.4. Algorithmic awareness

This is about letting the user to know how the system works, how the user profiling is being made and how the user could change its behavior for better results. All of this knowledge should be carefully presented to the user avoiding certain inherited hazards like putting in risk the system by providing possible tricks for cheating it, present clearly the business secrets and making the user feel directed or impelled to act in a certain way.

A possibility to solve this is having tips or recommendations for the users in terms of the algorithms. Initial posts telling the users how the news feed works, what kind of behavior influence the algorithms and what information is being tracked could be a good solution for Facebook’s news feed. These initial posts could contain tips with information related with recommended times to post, use of multimedia that is more appealing for the algorithm like videos, photos or hash tags, promoting the exchange with low interaction friends, and others.

This algorithmic awareness proposal could be extended to all the social media services in general. With a careful crafting to avoid possible bad feelings from the users, people could feel that the service cares about them and explain them how the filtering, profiling and trending mechanisms work and affect their results in the platform.

6.1.5. Selective algorithmic remembering

It means to allow the users to select certain information to be forgotten in the social media services. Information in this case could be easily pictured in Facebook’s memories, but it could also be related
to the user profiling in which the system initially defines the user in a way, but then the user feels or needs to be defined in a different way because his or her situations have changed.

For Facebook’s case it was needed to define a way to un-follow memories in the newsfeed because they could provide a bad experience when they present diseased people or hurtful remembrances. In this context, a way to improve algorithmic experience by selective algorithmic remembering is providing the users the chance of telling the system to forget specific memories or people so they do not appear anymore in the news feed. Other social media services could have other kind of information that should be presented to the user as available to be erased or “forgettable” to improve the algorithmic experience by remembering selectivity, like previous likes or pages followed system inferences in tastes or preferences, and even previous information directly provided by the users like previous living places or pictures.

6.2. Interaction design proposal to improve the algorithmic experience for the social media in smartphone devices

The third design goal proposed defined an interaction proposal for those features and contexts meant to improve the algorithmic experience. Taking into account the five groups of features presented in the previous segment and being guided by the second design workshop results, the following designs are the final proposals to improve the algorithmic experience in a social media service like Facebook in its mobile app version:

First, Figure #28 shows an improvement in terms of profiling management and algorithmic discernment. This proposal is guided by the suggestions made during the second workshop: with a long press in the news feed icon, it appears a floating space with three options, something similar to the current mood selection in the like bottom. These three options follow a graphical strategy as the previous icon for selecting to turn off the algorithm or the “Most Recent” news feed, but also including the news feed “refreshment” option to reactive the algorithm results and the news feed configuration options to manage and configure the specific results of the news feed. In this way, the way for reactivating, turn in off the algorithm and managing the algorithmic results in the news feed are accessible and easy to use for the users, improving the algorithmic experience of the platform.

Besides that solution, Figure #29 and #30 shows the final solution to improve the profiling transparency in regular and sponsored posts. First, Figure 29 shows the regular post case in which, instead of the “Why…” and mechanical nut strategy as suggested in the second workshop, the idea now is to show a “?” icon to tell the users that the option is going to show them more information about the post. It also assembles the idea of questioning why the user has that particular post in their news feed. Also, the style to offer the information related to quantities has been refined following Facebook’s
current style for clickable information, instead of the use of the blue background.

Figure #30 shows a similar improvement with the “?” icon in the sponsored post case. In this scenario, the rest of the information prevails with the same interaction strategy as suggested by the results from the second design workshop.

The next solution improvement has been elaborated based on the current knowledge about Facebook’s service. Until now, there is no evidence that Facebook could have altered the algorithmic results of their user’s news feed attempting to include certain information in favor, besides their usual advertisement business. Therefore, is possible to provide only an example of algorithmic intervention but deleting information from user’s news feed like censoring posts, looking to improve the algorithmic discernment experience.

Figure #31 provides an example guided by the second design workshop results, in which is used the blur metaphor to imply that a particular post was supposed to appear normally in the user’s news feed but it has been censored because of a community standard infringement. In this case, the suggestion of adding Facebook’s logo instead of human figures was implemented. On the other hand, the use of the “?” is also included in case the user wants to know more about what happened in relation to that post. In this case, the way of presenting that information is going to be skipped as it was did before because it is outside the current thesis scope.

As exposed in the previous segments, the solution of adding an option in the user’s profile a new icon to manage the ads preferences in Facebook stays without any changes thanks to the positive comments towards it. In this case, the solution already improves the Profiling transparency, corroboration and management aspects for the algorithmic experience.

In the same way, the proposal to offer alternative views or related peer comments do not have mayor changes. Some comments from the users provide just minor changes that do not affect the general idea of interaction but still provide an improvement in terms of profiling transparency.

Furthermore, the solution proving tips had a high acceptance in the second design workshop that could need any improvement to include in this segment. For that example, the algorithmic experience was also improved following the need to improve the algorithmic consciousness by tips or use recommendations to the users.

In relation with the feature for telling the system if the user wants to turn off the tracking system or when a false prediction happens, a minor adding could be implemented with a check box to tell make the system remember if the user does not want to turn the tracking system and avoid unnecessary
repetitions. As exposed in the second workshop results, the solution already improves the algorithmic experience in terms of algorithmic discernment.

Another solution that needed interaction improvement was the memories feature to avoid future repetitions of memories or avoid completely memories from a specific person. In this case, Figure #32 follows the second design workshop results to relocate the forgetting options as a second layer feature that appears only by clicking the small down arrow locates in the upper right corner of the memory. The final solution also changes the used icons as suggested and the text style to make it less intrusive. In this case, the interaction is better to improve the algorithmic experience in terms of remembering selectivity.

Finally, the second design workshop brought the need to add a way to unfriend people from the low interaction friends list. Figure #33 offers an example in which next to each person is now offered a button to open messenger and chat with the person to increase the interaction, or the option to unfriend that person in case the user desires that. Besides these new buttons, there is a text explaining for how long the user has not had any kind of contact to offer the user more information about why the person is appearing in the list. In this case, the solution improves in a better way the profiling transparency aspect to improve the algorithmic experience.

Taking into account all the previous descriptions, the answer to the third design proposal in relation to an interaction design proposal to improve algorithmic experience in mobile devices is finally explained.

6.3. Design opportunities to improve algorithmic experience in social media services

It is possible to have a general answer for the general research question after having the answers for the three proposed design goals. The design opportunities to improve algorithmic experience in Facebook’s news feed are mainly guided by the five groups of features and contexts portrayed in the previous segments. To have a better idea of how is possible to achieve a better algorithmic experience, Figure #34 presents a graphical representation of how the five groups of features and contexts work as a valuable framework to guide and even evaluate the algorithmic experience in a social media context.
As it was mentioned before, these five areas do not pretend to be exhaustive and are always open for future modification in case further research provides more findings. In the meantime, would be nice to check if more research consolidate and repeat similar findings as the selected theory for the present thesis.

The figure synthesize how the five groups are in the end general areas in which designers could guide their thinking and imagination to provide valuable algorithmic experience in social media services and particularly in our study case: Facebook’s news feed. These five areas are not independent or exclusive by themselves, but work in a complementary and sometimes even blurry lined dynamic to achieve better results in this kind of platforms. When designing technological features for a specific area, the designer will feel sometimes that he or she is also accomplishing an improvement in another or even more areas. In the same way, depending on the nature and use of a particular design proposal, the final result could affect positively or even negatively one or more of the algorithmic experience areas.

These five areas could also work as relevant or minimum aspects to evaluate algorithmic experience in current social media platforms. They could provide a suitable theoretical layer in which questions could be elaborated for user interviews, variables for lab experiments or analysis categories for focus groups or more design workshops.

Figure 34 Five areas of algorithmic experience in social media
In conclusion, based on the selected theories, the implemented data collection methods and the obtained results, the main answer to the proposed research question: “Which design opportunities need to be implemented in Facebook’s news feed in order to improve the algorithmic experience?” would be to design solutions guided by the five general areas of algorithmic experience in Facebook’s news feed as presented in the previous segment of this document. It is worth to mention that the proposed solutions also work for smartphone devices displays as needed for the general research question.

6.4. Algorithmic experience analysis

6.4.1. The “new lenses”

Algorithmic experience is a new way to analyze most of the systems that we encounter on daily basis. During the entire research process, the users expressed that being exposed to this new concept created a new way for them to analyze the technologies they use and to understand how they work. In general, people know almost nothing about how this kind of algorithms produce their results, what kind of variables they manage, how they measure or take those variables, and what kind of implications those variables have in terms of trending, filtering and profiling for users.

Furthermore, users during the study usually did not realize that their behavior is constantly being tracked and the implications it has in the algorithmic results. In this way, when faced with the algorithmic experience concept, people started to realize how they behave in digital platforms and start changing their way of acting for better results, in accordance to their interests.

Consequently, the algorithmic experience concept works as a set of “new lenses” for users to have a different way of seeing, understanding and using digital technologies. Likewise, the new concept also works for social media designers.

The research foundation of algorithmic experience in social media and its five areas provide a new framework in which new aspects of user experience are explored and discovered, which in the end provide valuable requirements that maybe were not possible to find without the framework. This reality was confirmed thanks to the final design proposal in comparison with the current version of Facebook’s app. Also, this fact could be easily confirmed just by analyzing the current social media services available in the market and confronting them with the proposed algorithmic experience framework and its five areas.

6.4.2. Algorithmic experience pushing towards other technological needs

A noticeable aspect during the research constantly appeared when the users were asked for possible features, contexts and design improvements in relation to algorithmic experience. Apparently, the concept provides also new boundaries that are hard to understand or to recognize with the current technological possibilities offered in the market.

One clear example in this direction was defined by the proposal of analyzing when a user is well informed about a certain topic and selecting alternative opinions about it. In this case, some consulted users that had machine learning knowledge questioned how possible are these kind of services with current technologies. Another example was the 3D printing proposal in relation to the system user profiling, an alternative that was innovative for the users but still hard to picture in a closer reality.

In both cases, is noticeable how the algorithmic experience concept and its five dimensions provided new features and requirements that push forward to the creation of new or different technologies to accomplish them.
6.4.3. The importance of teaching and forming a critical thinking towards algorithms

Users felt concerned and marveled about how little they knew about algorithms and their implication on in their lives during both design workshops. Sometimes the users handled fearful sentiments towards the current technologies that we use, and some of them even expressed their need to stop using them so they can maintain their privacy and other related values.

Thankfully, after the understanding of the algorithmic experience concept and the exploration of its five dimensions, users felt again appealed to use their technologies and dismissed their fears. But also, they produced a critical view of the technologies they used, expressing a desire to have more user centered alternatives in relation to algorithms. They now feel that technologies should care about what they feel towards algorithms and what requirements they have to improve their experience with algorithms.

Consequently, this teaching and critical thinking in users was effectively guided by the algorithmic experience concept. It is worth to mention how users get to understand the concept, start realizing how they could improve technologies thanks to that understanding and promotes a critical evaluation. Algorithmic experience in this case also provides a pedagogical tool worth to take into account in contexts in which is necessary to understand most of our daily digital services.
7. Conclusions

Algorithmic experience constitutes a new way to analyze and describe design requirements in systems that possess algorithms in charge of profiling, trending and filtering information for the users, decisions that affect daily life and even societies. The current thesis suggests five areas to take into account for achieving a better user experience in Facebook’s news feed in mobile devices, but they also could promote a more general solution for social media.

First, algorithmic profiling transparency is an important aspect that provides the users the chance of noticing how the system is managing his or her behavior to provide a certain algorithmic results in any social media service. In any social media platform, profiling transparency allows the users to understand what the system knows about them, how it works and how the offered results are related to that profiling. It also includes two different dimensions that currently found in any social media application: an inner dimension to explain the user the implicit profiling mechanism based on the user’s behavior with the system, and an external dimension to make transparent what the system is gathering through other kind of mechanisms like browser tracking or third party/allied companies services.

Second, algorithmic profiling management area bring the users the chance of tuning, learning and refining the user’s profiling activities of any social media service. Users in one hand can verify and portrait easily how the social media system works and what kind of variables is the system measuring from their behavior. On the other hand, designers open the chance of having another way to refine the implicit personalization by an explicit strategy, achieving the desired balance between them (Bozdag, 2013, p. 213).

Third, algorithmic user-control brings the user an amount of power over social media services. This area provides various possibilities such as: the freedom of choosing when the user wants to have the algorithmic results and/or a list of results without algorithmic intervention, to activate or deactivate the tracking strategies that feed the user profiling or the algorithm results, to tell the system when an algorithmic prediction is wrong, and to notice when the algorithmic results possess human intervention.

Fourth, algorithmic awareness is a way to increase in social media services users’ knowledge about the algorithm existence, how it works and how the user’s behavior affects the results from this non-human actor. This area even possesses a didactical challenge to tell the user enough information so he or she can build an algorithmic conscience, but in the same time without exposing the social media platform to possible user’s tricks or attacks.

Finally, the selective algorithmic remembering opens the chance for the user to tell the social media service to forget, avoiding related future implications for the algorithmic results. In this case, the user could decide to tell the system to forget certain aspects of the profiling, including past performed actions or demographic information, to avoid their influence in the algorithmic results.

7.1. Limitations of the present thesis

A major shortcoming of this thesis is that most of the contexts in which users wanted to have the proposed features to improve the algorithmic experience remained unclear throughout the data collection process. The proposed data gathering methods were not sufficient to elicit specific moments during the day, or places inside the app, or specific instances of the social media use in which the suggested features would be desired or beneficial.

In consequence, as can be seen in both design workshops results, these were proposed by the researcher and the results would need further verification.

One possible way to avoid this limitation could have been to employ stronger participatory dynamics for the design proposal after the first design workshop such as the use of hard low-fi prototypes in
which each user could locate and play around with the features inside a puzzle-like Facebook’s app interface within an open discussion context. This strategy was not applied from the beginning due to the lack of research related to algorithmic experience, so a more exploratory/introductory approach was taken based on interface and document analysis.

The previous reality also drives to a second limitation of the present research: the amount of users consulted for both design workshops. Users repeatedly expressed similar opinions when the design workshops were implemented, so a saturation argument was applied to stop the repetition of results because it is likely that bringing more users would not give new information. On the other hand, sometimes minor disagreements appeared during the workshops, but the nature and background of those opinions were not conflicting enough to really impulse a higher number of users.

7.2. Ethical implications in terms of algorithmic experience

While background literature brought up the importance of reverse engineering and the need to understand how specific algorithms work in main platforms such as Twitter, Netflix or Facebook, the presented research did not bring in reverse engineering methods for two main reasons.

First, algorithmic experience is more closely related to user’s feelings and experiences than on how the actual algorithm works. While technically speaking the algorithms provoke certain experiences, it is perfectly possible to design solutions that improve the algorithmic experience without affecting current algorithmic solutions.

Second, a technical approach to address the current research could reduce the need of the human perspective to improve the user experience. Therefore, the main strategy employed in this thesis was to facilitate the human experience, striving for a more user centered perspective.

But this strategy brings another important ethical implication: how much of the intimate and personal information of the users is needed to make algorithmic choices visible. The designed tools showed that is not necessary to expose personal social media accounts to achieve algorithmic experience solutions. The presented design proposals do look for the specific algorithmic results that users have in their platforms, maintaining their privacy while still increasing their interest in algorithmic experience topic.

In particular, it was not needed to ask for any kind of access to personal Facebook accounts or related private information. Users expressed that they felt invaded or exposed to others or even the researcher in relation to their private information or accounts.

7.3. Future research

The present research opens several new questions to be elaborated in future research. For example, it could be valuable to apply similar techniques to other social media platforms like LinkedIn, Twitter or Instagram to see if similar solution strategies can be applied in other social media. Potentially, the solutions generalize also to other kind of digital platforms. Some examples of algorithmic experience worthy research include Google maps, which has an algorithm that defines the better route sometimes without even telling the user why or how it makes that decision. Cases like Uber, Amazon Mechanical Turk or Airbnb may be even more important to scrutinize from this perspective, as they influence work distribution and job opportunities. Another pertinent domain related to the increasing use of algorithms to take decisions in health related scenarios, in which algorithms are taking decisions like what to do when a patient has certain symptoms or which patients are worth to visit by health professionals.

Another interesting research is the algorithmic uncanny valley, or algorithmic aversion. Both concepts appeared constantly during the research background search and could be interesting to address in a Human-Computer Interaction context.
Finally, it could be interesting to continue the study of algorithmic experience in more futuristic contexts. Contexts like virtual reality, augmented reality, mixed reality and human-robot interaction are exploring ways to use user profiling and personalization strategies to provide different experiences.

For example, in Virtual, Mixed or Augmented Reality games could be perfectly possible to design algorithms capable of tracking the user to provide interactive story lines or virtual worlds, which will need to apply also algorithmic experience knowledge to provoke better results. Examples for Human-Robot Interaction are closely related with robots that could have a particular profiling technique to perform certain actions, gestures or feedback, looking to provide a better algorithmic experience to their human counterpart while doing their main goals.

In conclusion, there is a lot to do in terms of algorithmic experience. Here, a challenge continues: referring to algorithms, Schou and Farkas invite to think about “how to make visible that which is invisible by design” (2016, p. 44). Algorithms are almost everywhere and the challenge is big, but so the opportunities to design better technologies for mankind and a better future for everyone.
8. References


9. Appendices

9.1. Appendix #1 Semiotic Inspection Method implementation

First, the SIM method application:

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<thead>
<tr>
<th>SIM stage or theory</th>
<th>Description and purpose of the stage</th>
<th>Facebook’s News Feed results</th>
</tr>
</thead>
<tbody>
<tr>
<td>First stage: Analysis of Metalinguistic Sings</td>
<td>Description and analysis of the metalinguistic signs used in the interface</td>
<td></td>
</tr>
<tr>
<td>Second stage: Analysis of Static Sings</td>
<td>Description and analysis of the static signs used in the interface</td>
<td></td>
</tr>
<tr>
<td>Third stage: Analysis of Dynamic Sings</td>
<td>Description and analysis of the dynamic signs used in the interface</td>
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</tr>
<tr>
<td>Forth stage: Comparison of the meta-communication results</td>
<td>Comparisons of the results to detect inconsistencies or consistencies in the relationships, patterns and elements.</td>
<td></td>
</tr>
<tr>
<td>Fifth stage: Conclusions of the analysis</td>
<td>Conclusions about the communication strategy and the designer’s intended message</td>
<td></td>
</tr>
</tbody>
</table>

Guiding questions to be answered after the SIM process according to the authors (De Souza & Leitão, 2009, p. 26):

1. What is the designer communicating?
2. To who is the designer’s message addressed?
3. What effect(s) does the designer expect his communication to cause?
4. How is the designer signifying his communication?
5. What expectations does the designer have about what users will want to communicate to the system?
6. How, where, when, and why does the designer expect users to engage in communication with the system?

Besides the previous part of the instrument, some theories were selected to work as analysis categories to create an addition to the SIM process. This decision has been made based on the importance of the selected theories to be analyzed in the current news feed’s interface. For those reasons, the second part of the present instrument is as following:
<table>
<thead>
<tr>
<th>Analysis category</th>
<th>Results in Facebook’s interface</th>
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<tbody>
<tr>
<td>Human involvement: to explain how, who and when a human have intervened in the design and results of the algorithm. (Diakopoulos, 2016, pp. 59–61)</td>
<td></td>
</tr>
<tr>
<td>Data: to show how the data is selected, defined or transformed and where the information has been taken to address that selection. (Diakopoulos, 2016, pp. 59–61)</td>
<td></td>
</tr>
<tr>
<td>The model: to express how the algorithm model works. Which information takes to act and which behavior affect it as an input. (Diakopoulos, 2016, pp. 59–61)</td>
<td></td>
</tr>
<tr>
<td>Inference: to state what kind of inferences the system is making to present certain type of results. (Diakopoulos, 2016, pp. 59–61)</td>
<td></td>
</tr>
<tr>
<td>Algorithmic presence: declare where the algorithm is working and where is not. (Diakopoulos, 2016, pp. 59–61)</td>
<td></td>
</tr>
<tr>
<td>Explicit personalization: When the user actively introduce his/her interests and data, introducing personal information or rating topics (Bozdag, 2013, p. 213)</td>
<td></td>
</tr>
<tr>
<td>Implicit personalization: When the system is the one that determines what the user wants and his/her interests through techniques like data mining, machine learning or other technical possibilities (Bozdag, 2013, p. 213)</td>
<td></td>
</tr>
</tbody>
</table>
### 9.2. Appendix #2 Materials and process for Document Analysis

The resultant categories and the final guiding instrument were as following:

<table>
<thead>
<tr>
<th>Theories related</th>
<th>Design goal to achieve</th>
<th>Elements to fill up from the document analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Profiling identity (Bucher, 2016, p. 34)</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
<tr>
<td>2. Classification, Association (Diakopoulos, 2016, p. 57).</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
<tr>
<td>3. Whoa moments (Bucher, 2016, p. 35).</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>4. Faulty prediction: (Bucher, 2016, pp. 35–36).</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>5. Violating expectations, Speculating about the algorithm (Rader &amp; Gray, 2015, p. 178)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Filtering (Diakopoulos, 2016, p. 58)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theories related</td>
<td>Design goal to achieve</td>
<td>Elements to fill up from the document analysis</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>7. Popularity game: (Bucher, 2016, pp. 36–37), 8. Prioritizing (Diakopoulos, 2016, p. 57)</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>9. Cruel connections (Bucher, 2016, p. 38).</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>10. Ruined friendships (Bucher, 2016, p. 39). 11. Passive consumption, Producer privacy, missed posts (Rader &amp; Gray, 2015, p. 178)</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>12. Consumer preferences (Rader &amp; Gray, 2015, p. 178)</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
</tr>
<tr>
<td>13. Other findings outside the previous categories</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
<tr>
<td>Theories related</td>
<td>Design goal to achieve</td>
<td>Elements to fill up from the document analysis</td>
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</tr>
<tr>
<td></td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
</tbody>
</table>
### 9.3. Appendix #3 Guiding questions and procedure for workshop #1

<table>
<thead>
<tr>
<th>Theories related</th>
<th>Design goal to achieve</th>
<th>Resultant questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Profiling</td>
<td>Identify specific features that are needed in social media services to produce a more</td>
<td>1. Have you ever felt that Facebook’s News Feed classify or profile your identity in any way? Do you think it uses stereotypes for those classifications? Have you noticed if this classification in your news feed has external consequences? Something in the real world?</td>
</tr>
<tr>
<td>identity</td>
<td>user-centered algorithmic experience in smartphone devices.</td>
<td>2. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?</td>
</tr>
<tr>
<td>(Bucher, 2016, p.</td>
<td>34)</td>
<td>3. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td>2. Classification</td>
<td>Identify specific features that are needed in social media services to produce a more</td>
<td>4. Have you ever felt that Facebook’s News Feed track you in any way? For example, has the news feed identified what you’re doing, where you are, where are you going or how do you feel, or tried to do it?</td>
</tr>
<tr>
<td>Association</td>
<td>user-centered algorithmic experience in smartphone devices.</td>
<td>5. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?</td>
</tr>
<tr>
<td>(Diakopoulos, 2016, p.</td>
<td>Describe the contexts in which those features are desired in social media services to</td>
<td>6. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td>57).</td>
<td>produce a more user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
<tr>
<td>3. Whoa</td>
<td>Identify specific features that are needed in social media services to produce a more</td>
<td>7. Have you felt in anytime that the tracking or classification process is incorrect or not precise? Have you felt in any time that the system is broken or malfunctioning? Have you ever noticed irregularities in your or somebody’s news feed? Which ones?</td>
</tr>
<tr>
<td>moments</td>
<td>user-centered algorithmic experience in smartphone devices.</td>
<td>8. Have you ever felt that Facebook’s News Feed does not forget your past in relation to previous places were you lived, previous friends, relationships, producing this lack of precision?</td>
</tr>
<tr>
<td>(Bucher, 2016, p.</td>
<td>Describe the contexts in which those features are desired in social media services to</td>
<td>9. Have you ever felt that your news feed is defined by someone of Facebook? Do you think Facebook prioritize certain posts?</td>
</tr>
<tr>
<td>35).</td>
<td>produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>10. What would you change in Facebook’s News Feed to improve <strong>these feelings</strong> and become more beneficial for you?</td>
</tr>
<tr>
<td>4. Faulty</td>
<td>Identify specific features that are needed in social media services to produce a more</td>
<td></td>
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<tr>
<td>prediction</td>
<td>user-centered algorithmic experience in smartphone devices.</td>
<td></td>
</tr>
<tr>
<td>(Bucher, 2016, pp.</td>
<td>35–36).</td>
<td></td>
</tr>
<tr>
<td>5. Violating</td>
<td></td>
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<tr>
<td>expectations</td>
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<tr>
<td>Speculating about</td>
<td></td>
<td></td>
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<tr>
<td>the algorithm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Rader &amp; Gray, 2015, p.</td>
<td>178)</td>
<td></td>
</tr>
<tr>
<td>6. Filtering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Diakopoulos, 2016, p.</td>
<td>58)</td>
<td></td>
</tr>
<tr>
<td>Theories related</td>
<td>Design goal to achieve</td>
<td>Resultant questions</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>7. Popularity game: (Bucher, 2016, pp. 36–37). 8. Prioritizing (Diakopoulos, 2016, p. 57)</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>11. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td>9. Cruel connections (Bucher, 2016, p. 38).</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>12. Have you ever felt that you need to compete with the news feed to get attention because you do not receive enough likes, comments or shares? Have you ever tried tricks to improve this situation? What do you think about those tricks and how do you feel after them? 13. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you in these terms?</td>
</tr>
<tr>
<td>10. Ruined friendships (Bucher, 2016, p. 39). 11. Passive consumption, Producer privacy, missed posts (Rader &amp; Gray, 2015, p. 178)</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>14. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td></td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>15. Have you ever felt that Facebook’s News Feed reminds you something that is hurtful for you? Something from the past in relation to difficult situations or people that are not still with us? Have you ever felt that Facebook’s News Feed is just a machine without human feelings? 16. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?</td>
</tr>
<tr>
<td></td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>17. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td></td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>18. Have you ever felt that Facebook’s News Feed ruin your relationships by not presenting you what others do? Have you felt it hides friends from you, affecting your relationship with them? Have you ever felt that Facebook’s News Feed makes you forget some friends? Have you felt that Facebook’s News Feed makes you lose control of your relationships? 19. Have you felt that Facebook’s News Feed exclude you from other’s news feed? Do you know if someone hides you from their news feed? 20. Do you feel that Facebook’s prioritizes certain posts or information in contrast with other information? Do you know why Facebook’s News Feed filters some information? 21. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?</td>
</tr>
<tr>
<td>Theories related</td>
<td>Design goal to achieve</td>
<td>Resultant questions</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>12. Consumer preferences (Rader &amp; Gray, 2015, p. 178)</td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>22. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td>13. Other findings outside the previous categories</td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>23. Have you felt that you need to intervene with Facebook’s News Feed to tell it what you want to see and what not? 24. What would you change in Facebook’s News Feed to improve this feeling and become more beneficial for you?</td>
</tr>
<tr>
<td></td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>25. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
<tr>
<td></td>
<td>Identify specific features that are needed in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>26. Do you think there are other situations related to Facebook’s News Feed to portray in this discussion? 27. What would you change in Facebook’s News Feed to improve those situations and become more beneficial for you?</td>
</tr>
<tr>
<td></td>
<td>Describe the contexts in which those features are desired in social media services to produce a more user-centered algorithmic experience in smartphone devices.</td>
<td>28. In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?</td>
</tr>
</tbody>
</table>
9.4. Appendix #4 Algorithmic presentation contents

The following presentation was offered during the first workshop (see Appendix #3, Methods Chapter #4, Results Chapter #5) as an exchange for user’s time as service. This presentation was strictly limited by the contents of the following slides and planned, prepared and executed by this thesis researcher. The presentation also helped as a guide for the entire workshop process in relation to the description provided in the Results Chapter #6 of the present thesis. The order of the screens are from left to right and then from top to bottom.
Case #1 (5 minutes)

- Have you ever felt that Facebook’s newsfeed classify or profile your identity in any way? Do you think it uses stereotypes for those classifications? Have you noticed if this classification in your newsfeed has external consequences? Something in the real world?
- Discussion...

Answers for case #1

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?

Case #2 (5 minutes)

- Have you ever felt that Facebook’s newsfeed track you in any way? For example, has the newsfeed identified what you’re doing, where you are, where are you going or how do you feel, or tried to do it?
- Discussion...

Answers for case #2

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?

Case #3 (10 minutes)

- Have you felt in any time that the tracking or classification process is incorrect or not precise? Have you felt in any time that the system is broken or malfunctioning? Have you ever noticed irregularities in your or somebody’s newsfeed? Which ones?
- Have you ever felt that Facebook’s newsfeed does not forget your past in relation to previous places were you lived, previous friends, relationships, producing this lack of precision?
- Have you ever felt that your newsfeed is curated/filtered by someone in Facebook? Do you think Facebook prioritize certain posts?
- Discussion...

Answers for case #3

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?
Case #4 (5 minutes)

- Have you ever felt that you need to compete with the newsfeed to get attention because you do not receive enough likes, comments or shares? Have you ever tried tricks to improve this situation? What do you think about those tricks and how do you feel after them?
- Discussion...

Answers for case #4

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?

Case #5 (5 minutes)

- Have you ever felt that Facebook’s newsfeed reminds you something that is hurtful for you? Something from the past in relation to difficult situations or people that are not still with us? Have you ever felt that Facebook’s newsfeed is just a machine without human feelings?
- Discussion...

Answers for case #5

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?

Case #6 (10 minutes)

- Have you ever felt that Facebook’s newsfeed ruin your relationships by not presenting what others do? Have you felt it hides friends from you, affecting your relationship with them? Have you ever felt that Facebook’s newsfeed makes you forget some friends? Have you felt that Facebook’s newsfeed makes you lose control of your relationships?
- Have you felt that Facebook’s newsfeed exclude you from other’s newsfeed? Do you know if someone hides you from their newsfeed?
- Do you feel that Facebook’s prioritizes certain posts or information in contrast with other information? Do you know why Facebook’s newsfeed filters some information?
- Discussion...

Answers for case #6

- What would you change in Facebook’s newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you’d like to have those improvements?
Case #7 (5 minutes)

- Have you felt that you need to intervene with Facebook's newsfeed to tell it what do you want to see and what not?
- Discussion...

Answers for case #7

- What would you change in Facebook's newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you'd like to have those improvements?

Case #8 (5 minutes)

- Do you think there are other situations related to Facebook's newsfeed to portray in this discussion?
- Discussion...

Answers for case #8

- What would you change in Facebook's newsfeed to improve this feeling and become more beneficial for you?
- In which situations do you think those improvements are most useful? Do you think there are specific moments in which you'd like to have those improvements?

Fika time (5 minutes)

- Enjoy!

Algorithmic experience presentation

Some important features to be changed in Facebook app's newsfeed:
1- Should have a way to identify those topics or contents in which a particular user is very interested on
2- For those topics of interest, the service could offer different kinds of related contents, maybe from other filter bubbles not very related to him or her
Features to be changed

3. When a user is not very related with a topic the system could offer posts in which a friend comments on that topic or related shares.
4. It is needed to quantify and present visually how much time a user spends on a particular topic or shared content.
5. A mixture between the time expended feature and the previous one could offer a chance to provide different topics to read about or different opinions.
6. It is needed an icon or other solution to graphically express when something appeared in the newsfeed is algorithmically generated.
7. This is not related to all the posts in the newsfeed, but those posts that are completely presented by a decision of the algorithm and not shared, commented or posted by other friends or humans in the social network. These posts could be mostly related to advertisement, but other cases like recommended sources or pages should also have this feature.

Features to be changed

8. This feature should also have a way to express why the algorithm is recommending that particular posts, by like or sharing, because the closest friends had certain interaction or just because is an advertisement based in your location, age, interests or current time.
9. There should be some features to define clearly the difference between ‘Top news’ and ‘Most recent’ newsfeed to properly express the user which posts are algorithmically curated and which are not.
10. In relation to the ‘Most recent category’, it should be clearly expressed when this newsfeed is also generated with the closest friends only or without algorithmic intervention.

Algorithmic experience presentation

13. Facebook already have some tools to manage your friendships in the newsfeed but should be important to try them with some users to look how effective they are.
14. It is needed to show the sources of particular information. This feature should offer the user a way to express the algorithm if he or she wishes to receive shared information in the newsfeed in relation to a particular source.
15. It will be important that every element that appears on the newsfeed should show its human curated or not by a graphical element or something similar.

14. Should be created when a post is presented as a ‘Top news’ because of affinity or weight in relation to the calculation made by the algorithm. In this case, the reason that created the highest weight for the algorithm could be presented.
15. In relation to the affinity variable, it should be also defined the proper reason of the relevance, like a constant liking on friend posts, constant interaction between timelines, constant visits to their timeline or photos, amount of photos or videos consumed, or chat activities.

Some current tricks in Facebook’s app

- For trying...
- Newsfeed management...

Let’s try out (10 minutes)

- Now you can go and check this tricks
- Also analyze the features that I propose: Do you think they are necessary? When, where, how would you like them?

- Thank you very much!
- If you find more tricks or suggestions, please let me know!
- Invitation for a second workshop
Appendix #5 Informed consent form for Workshop #1

Informed consent Workshop #1

Uppsala University
Informatics and Media department
Human Computer Interaction Master Program

Thesis: Hello news feed, towards a definition of user-centered algorithmic experience and a proposal for social media services

Student in charge: Oscar Luis Alvarado Rodríguez

Today we are going to perform a workshop to investigate the algorithmic experience of Facebook’s News Feed. My name is Oscar Alvarado and I am organizing this workshop as part of my thesis “Hello news feed, towards a definition of user-centered algorithmic experience and a proposal for social media services” at the department of Informatics and Media department of Uppsala University. The ultimate goal is to propose design elements that could improve the algorithmic experience of Facebook.

The workshop will take approximately 2 hours.

During this workshop we will not:

1. Use your personal information like names, personal number or related. The age will be the only information that is going to be used for research purposes. Contact information like email will be asked also in case is needed in the future.
2. Use your personal Facebook account information, nor show or use your personal news feed at any moment of the workshop.
3. Publish any of the photographs or recorded material in a way that could allow personal identification

I understand that:

1. The workshop will take 2 hours long
2. The Workshop is recorded by audio and some photographs could be taken
3. Photographs or any recorded material will be used only anonymously by blurring faces or audio distortion
4. What I do or say during the workshop could be cited anonymously in the thesis or any other academic material related to the thesis
5. I can leave the workshop at any time
6. I can retract consent at any time

Thank you very much for your time.

Your signature accepting all the information presented in this document:

________________________________________________________________________ Date: ____________________

Student in charge’s signature accepting and pledging all the information presented in this document:

________________________________________________________________________ Date: ____________________
Today we are going to perform a workshop to investigate the algorithmic experience of Facebook’s News Feed. My name is Oscar Alvarado and I am organizing this workshop as part of my thesis “Hello news feed, towards a definition of user-centered algorithmic experience and a proposal for social media services” at the department of Informatics and Media department of Uppsala University. The ultimate goal is to propose design elements that could improve the algorithmic experience of Facebook.

The workshop will take approximately 1 hour.

During this workshop we will not:

1. Use your personal information like names, personal number or related. The age will be the only information that is going to be used for research purposes. Contact information like email will be asked also in case is needed in the future.
2. Use your personal Facebook account information, nor show or use your personal news feed at any moment of the workshop.
3. Publish any of the photographs or recorded material in a way that could allow personal identification
   I understand that:
1. The workshop will take 1 hours long
2. The Workshop is recorded by audio and some photographs could be taken
3. Photographs or any recorded material will be used only anonymously by blurring faces or audio distortion
4. What I do or say during the workshop could be cited anonymously in the thesis or any other academic material related to the thesis
5. I can leave the workshop at any time
6. I can retract consent at any time

Thank you very much for your time.

Your signature accepting all the information presented in this document:
_______________________________________________________ Date: ______________________

Student in charge’s signature accepting and pledging all the information presented in this document:
_______________________________________________________ Date: ______________________
9.7. Appendix #7 Presentation used for Workshop #2

The following presentation was offered during the second design workshop (see Methods Chapter #4, Results Chapter #5) to guide every session. This presentation was strictly limited by the contents of the following slides and planned, prepared and executed by this thesis researcher. The order of the screens are from left to right and then from top to bottom.

**Agenda**
- Welcoming the user
- Gratitude expressed to the user for their time and service
- Informed consent form signature
- Brief explanation of the current thesis state and what is going to be the dynamic for today
- Evaluation dynamic starts. Each solution had the following process
  - Gratitude expressed to the user for their time and service
  - Small candy or gift for the user

---

**Second design workshop**
Oscar Alvarado

---

**Informed consent signing**

---

**Brief explanation of the current state of the thesis**

---

**Workshop process**
1. Presentation of some solutions for algorithmic experience in Facebook's app news feed
2. First analysis: Do you notice any change in this solution in comparison with the current news feed interface? What is it? What do you think it is for?
3. Explanation of the solution
4. Description of previous changes suggested by other users
5. Second analysis: What do you think about this solution? Do you think it could be improved? Would you like to have it in the real app? What can be changed is this solution for its improvement?

---

**Ready? Questions?**
- Let's start...
Solution #1 (5 minutes)

- Do you notice any change in this solution in comparison with the current news feed interface? What is it? What do you think it is for?

Solution #2 (5 minutes)

- Explanation
- Description of previous suggestions
- What do you think about this solution? Do you think it could be improved? Would you like to have it in the real app? What can be changed is this solution for its improvement?
Solution #5 (5 minutes)

- Do you notice any change in this solution in comparison with the current news feed interface? What is it? What do you think it is for?

Solution #6 (5 minutes)

- Explanation
- Description of previous suggestions
- What do you think about this solution? Do you think it could be improved? Would you like to have it in the real app? What can be changed in this solution for its improvement?
Solution #11 (5 minutes)

- Do you notice any change in this solution in comparison with the current news feed interface? What is it? What do you think it is for?

Thank you very much!

If you find more tricks or suggestions, please let me know!

Small gift for you