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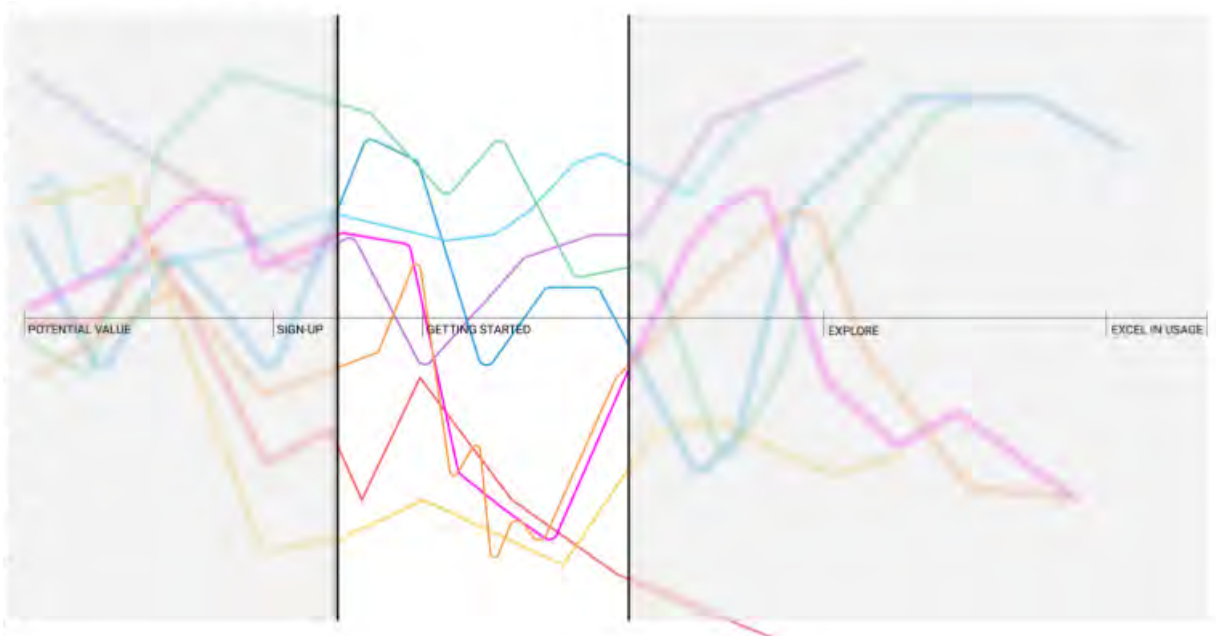

Designing the user onboarding process in analytics software

Taking an omnichannel perspective

Master's thesis in Interaction Design

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Abstract

This master thesis investigated what to consider when designing an onboarding process for analytics software to best assist first time users, looking at an omnichannel perspective. This work was done in collaboration with an industrial partner.

A design process which included activities with a clear purpose and outcome was used to reach a desired result. From a literature study a quality framework was produced which was used in benchmarking expert evaluation of several onboarding processes. A clear weak point of the onboarding process was identified and used as a starting point for further exploration. Two iterations of prototyping and remote user testing explored design solutions for how to best assist users in the onboarding process of an analytic software.

The design process yielded three main results. First, a quality framework of qualities for a successful user onboarding and omnichannel assistance. Second, recommendations for how to design an onboarding process in analytics software and third, a concept which was created as a proposed way of meeting the recommendations in a design solution.

Keywords: onboarding, omnichannel, analytics software, user assistance, user experience, interaction design, self-service software, first time users, user adoption, layered design.

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1 Introduction

There is a flurry of software and priorities that are competing of users' time and cognitive resources. This calls for the need to attract and captivate new users early in the usage of software which require effort and persistency to understand the interaction. In self-service software, which are part of the software as a service domain (SaaS), single users are the buyers and this type of software often includes a trial version from which users get to know the product by their own. The need to assist users to get value from the product as early as possible is therefore of importance.

Analytics software, sometimes manifested as SaaS self-service software, are used to understand large amounts of data and by interacting with such software users can visualize, analyze and act on the data. As this type of software is powerful and flexible, by including many options and features, they put high demand on the user when interacting with the software. Knowing what relevant analytical questions that can be asked and understanding the benefits of the software can be difficult for the user. A way of dealing with this threshold is by considering how to design the software onboarding process.

This project was executed by two master students at the master's program of Interaction Design & Technologies at Chalmers University of Technology, in collaboration with an analytics software company, with the intention of investigating the user onboarding process for a cloud based analytics software.

2 Background

Business intelligence (BI) is according to Watson and Wixom (2007) and Chaudhuri, Dayal and Narasayya (2011) a set of support technologies to get data in and out, to aid analysts, business leaders, CIOs and workers in the business. A product group in BI is analytics software and visual analytics, which turn data into interactive visual interfaces so decision makers can make reasonable assumptions to make the business more effective and innovative (Thomas & Cook, 2006; Watson & Wixom, 2007). Few (2009) states that analytics software has expanded the opportunity to a broader group of people, which are not in need of a wide variations of analytical tasks, to make sense of their data. This change to self-service analytics has created possibilities for people within an organization to quickly and easily join different data sets to generate customized analytics (Swanson 2016, SaS 2014).

As more organizations are turning to self-service analytics software (Swanson, 2016), each user is responsible to understand the interaction possibilities in the software to create analyses. With the support of a well-made user onboarding process, the user is less likely to misinterpret the software due to inconsistencies when transferring between touchpoints, bad visual presentations or lack of product value (Intercom, 2016; Hulick, 2014). According to Hulick (2014), only 40-60 percentage of first-time users will return a second time to the product and Murphy (2014) argues that the main reason why users drop out is due to issues in the user onboarding process. For the user, this mostly depends on the initial experience and understanding of what the product can contribute with (Resmini & Rosati, 2011) and according to Noel (n.d.) a well-designed user onboarding process can unlock the product's inherent value. Further, Hulick (2014) and Intercom (2016) state that a user is more likely to drop out for each new touchpoint the user interacts with, therefore the importance of a well-designed user onboarding is crucial.

Several authors highlight the importance of the user reaching value early in the onboarding process (Hulick, 2014; Murphy, 2014; Intercom, 2016). Some factors which are argued to be important when designing an onboarding process are; allowing users to achieve "quick wins" (Hulick, 2014), making use of relevant UI-patterns (Magnin, 2016) and give assistance in the form of displaying the software's capabilities to the user throughout the process (Welinske, 2011). Further, when adopting a new technology service the aspects of perceived usefulness, perceived ease of use and perceived risk are determinant factors (Zhu & Chang, 2014).

An increasing number of users interact and connect via different devices, channels and touchpoints and thus a consistent, context-optimized and seamless design solution needs to be established to create a personalized experience (Bluestone, 2015; Lanning & Griebler, 2015). Flaherty (2016) state that designers should look at the macro level of the user experience, which is omnichannel. Omnichannel can be achieved by designing an appropriate experience for each channel (e.g. email, website, mobile application) (Marrs, 2015), with focus on the transition between them. By doing this, the user has the potential to realize the full value of the product (Flaherty, 2016; Carroll & Guzman, 2015).

This report is conducted in collaboration with a leading analytic software company (which will be referred to as the Company). The Company offers a web based tool, called the Company Cloud, to create visualizations from users' data. By investigating the user onboarding process, including an omnichannel perspective, in the Company Cloud software, the Company wants to investigate how to introduce and assist new users when starting to use this service. This to put more focus on the individual self-service user looking to identify potential value in the product.

2.1 Intention

The purpose of this master thesis is to gain an understanding of the user onboarding experience in an analytics cloud based software. This to create design solutions and recommendations on how to improve the user onboarding experience, while taking an omnichannel perspective, for the defined target group (see section 2.1.3). An overall purpose, from an interaction designers' perspective, is thus to obtain knowledge of how to design a good and purposeful user onboarding experience and gather insights of how to best assist the user in this process.

2.1.1 Goals

- Gain knowledge of important factors for how to design a purposeful user onboarding process.
- Understand the current situation regarding the onboarding process in different self-service software and identify the most significant issues in the user experience.
- Give general recommendations when designing the user onboarding process in analytics software, considering an omnichannel user experience and how to best assist the user in this process.
- Present specific recommendations when designing the user onboarding process in the Company software, considering an omnichannel user experience. This to provide guidance in how to best assist the intended target user group when onboarding the product.
- Produce design solutions for specific design problems in the user onboarding process, with the purpose of exemplifying recommendations.

2.1.2 Research question

In this project, the following research questions are intended to be answered in order to reach the previously mentioned purpose.

"In order to best assist users, what should be considered when designing the user onboarding process for analytics software?"

"How can taking an omnichannel perspective benefit the design of the user onboarding process?"

2.1.3 Target user group

The intended target user group for this project includes beginner users who have no prior knowledge about the Company Cloud software but has experience in Microsoft Excel or similar spreadsheet software. The users have some understanding in regard to performing analysis but the main focus is to create basic analyses and share them with co-workers for further investigation. The time spend in front of the analytic software is often short, mainly because it is not the user's primary workload. However, the user needs to see the value in the product as quickly as possible to pursue the effort to learn how to use it.

Throughout this project a persona, named Asad (see figure 2.1), is used to represent users in the target user group. Asad is one of several personas that has been developed and used internally at the Company. Each persona represents a different user, which gets in contact with the software in one or another way.

Asad - the accidental analyst

Asad, the accidental analyst (see figure 2.1), usually spends an hour every now and then on analysis and the reason for this is that he needs more insight in the data to make reliable predictions and to share the findings with other. Asad has nobody around to ask about analytics but due to his familiarity in excel he can cope with the basic functionality to perform the task. Further, Asad wants to see instant value, to pursue new software.

Figure 2.1. Asad, the accidental analyst. The persona which is used in this project.

2.1.4 Product focus

The focus for the report is towards the Company Cloud based software and new users of this software. The main reason for this focus is that the Company puts emphasis on a self-service approach for users where the Company Cloud software has considerable influence. The software can also reach out to a broader audience due to increased web access. Further, the software is one of the first touchpoints for many potential users where Asad the persona is

one of these. The Company Cloud software will here on be referred to as the Company software.

2.1.5 Delimitations

The project focused on a defined section of the whole user onboarding process as taking a fully holistic view was not feasible. Focus was primarily put on the usage of the software, meaning parts such as finding the product and sign up were not considered. The exact focus on the user onboarding process was determined in the benchmarking stage of the project.

- The project primarily focused on the specific target user group (see section 2.1.3).
- Focus was on the Company cloud software (see section 2.1.4).
- As the software evolved during the course of the project, any new features were not taken into account.

2.1.6 Ethical issues

Collaborating with a company when conducting master thesis work might include having to deal with sensitive data. Considerations of possible implications regarding this should be made, such as not being able to reveal specific information (e.g. future product plans). Handling of personal information when user testing is of importance. Possible conflict between desired outcome from academic and company side might arise and should be considered carefully.

3 Theory

The theory presented in the following section is presenting the most relevant theory for this project. A fair amount of the relevant theory for this project consist of commercial texts, much due to the novelty of the area of user onboarding and the different channel perspectives. Theory in regard to domain- as well as context-specific areas are also covered to describe the foundation for the project.

3.1 Information visualization

According to Spence (2007), information visualization is data in any form which is represented in a picture and that is interpreted by a human being. Information visualization means allowing for information to be derived from data, and thus an "Ah ha!"- reaction is often caused in a person who makes a useful discovery in the process of viewing graphically encoded data and creating a mental model of it.

Few (2009) describes information visualization as "viewing and interacting with visual representation of information to explore and make sense of it.". Few highlights the important characteristic of amplifying cognition that information visualization provides. By assisting memory and representing data which allows for easy interpretation information visualization extends our ability to think about information.

3.2 Business intelligence

Business intelligence (BI) is a widely used term to describe analytic applications and has become a big part in driving business effectiveness and innovation forward (Watson & Wixom, 2007). According to Chaudhuri, Dayal and Narasayya (2011) and Watson and Wixom (2007), BI is a collection of different support technologies to getting data in and getting data out, to aid CIOs, business leaders, analysts and workers in the business. Shollo (2013) further explains BI as, "a process in which internal and external data are gathered, integrated, analyzed and transformed into information which is then turned into knowledge used in decision-making.". With the support of these different technologies, it's now possible to deliver decision making based on minute old data (Watson & Wixom, 2007).

According to Chaudhuri et al. (2011), BI has seen a growth in relation to declining cost of storing and obtaining large amount of data, as well as with the possibility to deliver a fully functional web based BI solution (Watson & Wixom, 2007). Chaudhuri et al. (2011) states that as of today, it's difficult to find a business without a BI technology as support. However, Gartner (2008) argues that a common reason for failure in BI is the lack of user adoption and states "If we build it, they will come.". An important factor in succeeding with reaching users is to help them understand the value of reviewing reports and integrate it into their workflow, something which is often put aside due to lack of time.

3.2.1 Analytics software

Visual analytics, or analytics software, can be described as "the science of analytical reasoning facilitated by interactive visual interfaces." (Thomas & Cook, 2006). As visual analytics tools are used to derive meaning from big amounts of data, often dynamic and ambiguous, the need for using such tools exist in many different fields.

Few (2009) describes that analytics software expands the analytical opportunities for a wider target group than just expert analysts, allowing for people who might not be in need of performing a wide variation of analytical tasks to make sense by their data. This as specialized applications can be built which are customized to specific needs. For example, regarding possible interactions and which data is required providing users with the means for sense making.

Spreadsheets, tools for ad hoc queries, and dashboards are common front-end applications in analytics software (Chaudhuri, Dayal & Narasayya, 2011). A dashboard displays important information on a single screen, allowing for quick and easy monitoring of the information (Few, 2005). By implementing dashboards in BI software, which aid decision makers, large amounts of data can be visualized and interpreted more easily.

3.3 Cloud computing

As an evolutionary step, the term cloud computing has evolved through several different initiatives in the last years (Imhoff & White, 2011). Cloud computing can be seen as an "umbrella"-term, delivering many different on-demand services, instead of products, that needs to be reliable, scalable and available in the distributed environments (Dibie & Hang, 2012; Rimal, Jukan, Katsaros & Goeleven, 2011). According to Kepes (2011), cloud computing is rapidly growing and reasons for this could be that it removes the barriers of physical location (Huth & Cebula, 2011). Rimal et al. (2011) argue that, cloud computing has created a paradigm shift when it comes to business and IT infrastructure. Data storage, services and computing power are outsourced, making it available for enterprises and customers to obtain network storage space and computer resources remotely (Imhoff & White, 2011; Rimal et al., 2011). This paradigm shift, has enabled the user to be less dependent on the IT organization, and become more self-reliant (Imhoff & White, 2011). This is particularly important to increase the number of data being analyzed, as only twelve percentage of business data, is being analyzed (Gualtieri & Yuhanna, 2014).

3.3.1 Services in cloud computing

There are many different on-demand services that fit in the cloud computing environment. According to Huth and Cebula (2011), Dibie and Hang (2012) and Kepes (2011), the three main applications are:

- Infrastructure as a Service
- Platform as a Service
- Software as a Service

Infrastructure as a Service (IaaS) deals mainly with computational infrastructure, where a business completely outsources resource and storage, often hardware and software, to a subscriber. This state is at the top level, given the subscriber all the outsourced components, however the business still has the responsibility to running, housing and maintaining it. Platform as a Service (PaaS) is one level below of IaaS. In a PaaS set up, a business gives access to a computing platform, so subscribers can code, develop and deploy applications quickly and efficiently over the internet. Software as a Service (SaaS) is cloud based, where subscribers access both the resource and the application online. This makes it easier to have the same software on many different devices, due to access via the web and that everything is stored in the cloud. The SaaS setup is designed for end-users and is often purchased by a monthly fee.

3.3.1.1 SaaS

In SaaS, an external vendor is providing all the software applications so enterprises or organizations can subscribe to these over the internet, without having to deal with installations, deployment and maintenance locally (Clair, 2008; Kumar, 2014). According to Goyal (2013), SaaS is becoming more popular and with an annual growth during the last years of 43 percentage it is redefining the software industry. Subscribers to SaaS benefit from significant cost reduction due to "pay as you go"-models and the elimination of maintenance costs, simplified operations, global access via internet and off site deployment (Clair, 2008; Kumar, 2014).

Dubey and Wagle (2007) argue for two major factors that have made it possible for enterprises and organizations to take full advantage of a SaaS setup; the drop of bandwidth cost and subscribers frustration towards buying and upgrading software licenses. Clair (2008) argues that SaaS provides quick roll-outs of software and upgrading the software is occurring without any disruptions. With the drop in bandwidth costs, the enterprises and organizations can afford to purchase the level of internet connectivity they need to make the applications perform smoothly (Dubey & Wagle, 2007). Further, according to Kumar (2014), with the introduction of Web 2.0 and HTML5 standards, graphically rich applications via the internet and a SaaS setup can run without hiccups at 60 frames per second.

3.3.2 Self service

According to Swanson (2016), more organizations are turning to self-service analytic software to establish a strong data driven culture in organizations. By turning to self-service analytics, people within the organization have the possibility to combine discordant data sets to create customized analytics quicker and easier in relation to traditional BI solutions (SAS, 2014; Swanson, 2016). SAS (2014) explains it as "self-service analytics framework eliminates the back-and-forth conversation between the user and the IT department that is the cause of so much misunderstanding – and overhead.". Self-service also enables more well-timed decisions due to that self-service closes the gap when it comes to deliver the data, independent of who needs it or when they need it. Furthermore, by creating a stronger data driven culture, with the aid of self-service analytic software, the users can create sophisticated analytics that will work in a proactive manner, when decisions are to be made.

3.4 User experience

User experience (UX) is a broad concept and "...encompasses all aspects of the end-user's interaction with the company, its services, and its products" (Nielsen & Norman, 2013). Nielsen and Norman argue that achieving good UX requires meeting the needs of the customer rather than giving them what they claim to want. It should be distinguished from being just about usability or the user interface. According to Law et al. (2009) the UX term is, by both practitioners and people in academia, viewed as something "dynamic, context-dependent and subjective, which stems from a broad range of potential benefits users may derive from a product.". Furthermore, it is seen as something which needs to be integrated in HCI practices. Cooper et al. (2014) depict the term user experience as an attempt at trying to gather the collaborative use of different design and usability disciplines in order to create services and systems. Cooper et al. argue that it is a worthy goal to achieve, but points out the importance of not confusing it as covering the core of specific disciplines, such as interaction design.

3.5 Interaction design

Moggridge (2007) provides one narrow and one broad definition of what interaction design is. The narrow states; "the design of the subjective and qualitative aspects of everything that is both digital and interactive." and the broader "the design of everything that is both digital and interactive.". The broader one takes into account all the interactions which are made possible by digital technology. According to Moggridge, people who come in contact with interactive technology tend to think of design in this broader term as they view the experience as a whole without considering individual elements within the design.

Cooper et al. (2014) discuss the interaction design practice as the designing of "interactive digital products, environments, systems, and services". Further, it is highlighted that the power of interaction design lies in "giving technology users a memorable, effective, easy, and rewarding experience as they work, play, and communicate." Interaction design concerns itself with designing behavior of complex interactive systems. By designing the workings of how to interact with digital products, people's experiences are affected.

Kolko (2011) describes interaction design as a creative process being about people and highlights the usage over time as a way of distinguishing from other design disciplines, such as graphical design. According to Kolko practicing interaction design is about understanding hidden relations and thus turn information into meaningful data. This is achieved by creating visualizations which serves the purpose of deeper understanding of connections between ideas.

3.6 Onboarding

The term onboarding originates from organizational theory where it is widely used and refers to the steps taken by an organization to facilitate and socialize newcomer adjustment (Klein, Polin & Leigh Sutton, 2015). The field of user experience and interaction design has adopted this term, where it is described as being in its infancy (Federov, n.d.) driven forward by a few people. However, in the context of user experience the concept is instead referred to

as user onboarding and a clear definition, in terms of what is included and how far the process of onboarding the user stretches, does not yet exist.

Some view the onboarding process as being that of turning a first time customer to a returning one (Singer, 2011) and others simply as the process of getting started, where users can be helped to overcome problems when starting from zero (Crumlish & Malone, 2009). Others put emphasis of users quickly understanding the value of the product (Hulick, 2014; Magnin, n.d.a) and describe this as the user reaching the "aha! moment". Further, Magnin (n.d.a) defines onboarding as "the practice of making your product or service as easy as possible for new customers to get value from." and Hulick (2014) as "the process of increasing the likelihood that new users become successful when adopting your product.".

A common reason for a failing onboarding process is that it is often diffuse where the responsibility lies for onboarding and that the responsibility is located somewhere between marketing and product departments (Hulick, 2014). The relation to marketing that onboarding has is displayed by Murphy (2014) who instead refers to the user onboarding process as "customer onboarding" and in many ways explain the process in a similar way as Hulick (2014) but also relates it to marketing and sales concepts. Marketing departments are said to often have the responsibility for getting users only to sign up, and product department to create new features and ongoing engagement for those who are already engaged with the product (Hulick, 2014). This problem in organizational structure might be reflected in the onboarding experience, in for example that users might get lost due to inconsistencies when going from one touchpoint to another, or that the visual style is not kept throughout the experience (Intercom, 2016). Intercom also supports the notion of onboarding as being a collaborative effort between different departments or roles where a holistic approach should be taken in order to not missing out on important aspects. A way of dealing with this issue of diffuse responsibility is by creating roles specifically responsible for the user onboarding (Magnin, n.d.b).

3.6.1 Reaching value

Considering a generic customer journey map, Hulick (2014) describes a user to be more likely to drop out for each continuing step, highlighting the importance of planning the onboarding journey the user needs to take. To understand where the users are, knowing their capabilities and where they want to go when taking on a new service are key in order to design a, for the user, eased and successful dedicated onboarding (Intercom, 2016). A designer's task is therefore to as carefully as possible plan the easiest path for the user and removing barriers in reaching value insight. Factors in succeeding with this type of design problem, Hulick (2014) argues, is to start out by taking the perspective of the uninitiated user, identity the user intent and retrace their pathway into the product. Further, one needs to identify where the user's flow is interrupted and whether the interruption is represented as either points of friction or points of disconnect. Points of friction are moments when a user is interrupted in the flow by for example confusion, and points of disconnect are moments where the user's flow for any reason heads in another direction than the progression of the onboarding process. Murphy (2014) describes it similarly, as identifying the desired outcome for the customers and their initial success and break down the journey into milestones which are to be reached along the way.

The lack of resources put on the onboarding process and not viewing it as a vital part of the product is ironic according to Intercom (2016). Due to that it is the only part of the product every user will engage with which also has the potential of converting sign-ups to long-lasting users. Magnin (n.d.a) state some benefits of successful onboarding as; decreasing drop-off after sign up, increasing free to paid conversions, speeding up trial to paid period, improving user engagement, reducing churn/non-renewals and increasing retention. Hulick (2014) describes onboarding as being successful when users come back and actively engage with the product.

An important notion which is argued from several sources (Murphy, 2014; Hulick, 2014) is the importance of distinguishing between the value or success for the product and that of the user, where the important one in a designer's perspective being that of the user. Taking this stance means to not view the progression in an onboarding process as simply clearing the different steps in a workflow of a product, leading to the misconception that it is meaningful for the user. Rather, the significance lies in knowing how the steps in the process functions as a means for the user to reach insight of value (Hulick, 2014). Both Hulick (2014) and Sierra (2009) argues for putting focus on earning users engagement and "making them better people". Hulick explains it as the user onboarding should be defined by the improvement you provide in the user's life. A way to do this is to think of the user onboarding in terms of how the software makes a user's life more successful. This as people essentially use a product in order to "improve their life" in some way (Hulick, 2014).

3.6.2 User assistance and UI-patterns

According to Welinske (2011), user assistance improves the experience by offering help to the user when working with software. This can take the form of describing the user interface with the help of wizards, "help me" guides, tutorials, printed manuals or PDF:s and overlay text. Focus lies much on helping the user with their needs by displaying the software capabilities. Hughes (2007) argues that, user assistance is woven into the software or application, and therefore is a part of the user experience (Welinske, 2011). Further, user assistance is dependent on testing the design solution before and after it is implemented due to if the right adjustment to the design user interface text is made it can reduce the needs of complex user assistance.

A way for designers to assist the user in reaching value when onboarding a new product is to use UI-patterns (Magnin, 2016). Onboarding related UI-patterns can be divided in three categories; annotated which are overlaid commentary used to target attention to specific items, embedded which are commingled with a product's experience to provide broad contextual guidance and dedicated which are isolated and used to build motivation or acquire data (Kim, n.d.). Magnin (2016) describes nine UI-patterns to be the most common ones when designing a user onboarding experience. Those UI-patterns are; welcome messages, product tours, progress bars, coach marks, deferred account creation, persona-based user onboarding, checklists, hotspots, action-driven tooltips. Choice of patterns should be done carefully considering what product one is designing for, where for example a dedicated pattern can serve well for a product where data loading is required (Kim, n.d.). It is pointed out that not all users are the same and UI-patterns should thus be seen only as a vehicle for delivering value insight to the user. Hulick (2014) further highlights the significance of not viewing what he calls UI-techniques, such as coach marks or UI-tours, as being the same as onboarding. The use of such techniques can even be an indicator that the

onboarding experience is an afterthought placed to redeem poor understanding of an already bad user interface. This when considering that UI techniques, when used poorly, have the potential of diverting and interrupting the user in the onboarding path and thus counteract their purpose. Thus, they should be used taking into mind the specific context of the product. Hulick (2014) advocates for teaching through action when introducing the user, as a powerful method, in order to engage them actively with how to use the product. This, in contrast to just teaching through memorization by for example relabeling buttons in tooltips.

3.6.3 Quick Wins

In designing the journey to successful user onboarding the concept of quick wins, also referred to small wins (Amabile & Kramer, 2011; Choi, n.d.), can be used (Hulick, 2014). A quick win, according to Frost (n.d.), is an achievement or result in the user onboarding process that can be reached relatively easily and quickly. This boost the sense of accomplishment and makes the user feel good as well as provides the user with valuable information. Choi (n.d.) argues that quick wins build up and maintain the user motivation to continue the user onboarding process. Amabile and Kramer (2011) continues and states that "Of all the things that can boost emotions, motivation, and perceptions during a workday, the single most important is making progress in meaningful work. And the more frequently people experience that sense of progress, the more likely they are to be creatively productive in the long run.". Further, by providing quick wins to reach goals with positive outcome for the user, it helps the user to drive forward and succeed to become better (Hulick, 2014).

3.6.4 User adoption

A common way of evaluating user adoption of a technology service is by looking at the notions of perceived usefulness, perceived ease of use, perceived risk and social influence (Zhu & Chang, 2014).

3.6.4.1 Perceived usefulness

The term perceived usefulness is according to Wang et al. (2013) described as "the degree to which technology is perceived as providing benefits in performing certain activities.". Zhu and Chang (2014) argue that perceived usefulness is aimed at the user, particularly how a technology system would enhance the user's job performance.

3.6.4.2 Perceived ease of use

Wang et al. (2013) and Zhu and Chang (2014) defines perceived ease of use as to what extent technology is easy to understand and use. According to Zimmermann and Nerdinger (2012), perceived ease of use also involves the user expectations that the target system is free of effort. Perceived ease of use indirectly influence usage, with significantly positive effect, on the perceived usefulness and attitude toward behavior (Zhu & Chang, 2014).

3.6.4.3 Perceived risk

According to Zhu and Chang (2014), perceived risk is a consumer's perception in relation to uncertainty and unfavorable consequences, when buying a service or product. The harder it is to define a product or service, from a user perspective, the more the perceived risk

increases. Zhu and Chang argue that perceived risk generates negative impact on intention and attitude toward user adoption.

3.6.4.4 Social influence

The social context influence consumers intention and attitude toward the adaptation of new high-technology innovations. The social influence is described as "the degree to which a consumer perceives that important others believe he or she should use a technology-based service." (Zhu & Chang, 2014).

3.6.5 Free trial

According to Zhu and Chang (2014) technology-based companies commonly use free trials as way to market themselves and as a way to reduce uncertainties which a customer might have. This, as the inability for consumers to assess a technology-based service before purchase, like one can with a physical product, can negatively affect a user's willingness to adopt the service. Free trial is considered to be effective in reducing the perception of risk in taking on a new technology-based service. Further, Zhu and Chang (2014) found that perceived usefulness of a service is "a fundamental driver of consumer attitude and intention toward free trial" and suggests that usefulness should be introduced to target users as a primary part of the product. Perceived ease of use, perceived risk, and social influence are other determinant factors for consumers attitude and intentions toward free trial.

3.6.6 Metrics

According to Murphy (2013), SaaS providers can use a set of metrics called Common Conversion Activities (CCA) to identify the activities that users carry out during the free trial period. By looking at historical data with these metrics, patterns of what customers did during the free trial period, who later converted to paying customers, can be identified. These historical understandings can later be used to increase the knowledge to optimize the free trial process or be used to create hypothesis for what customers most likely need to do before they convert. Further, CCA isn't meant to measure financial metrics, instead it's meant to measure the customer experience which is unique in the context. Hulick (2014) argues that instead of starting out with metrics, the designer should create a design solution and then start measuring the different customer activities to optimize the process.

3.7 Channels - multi, cross and omni

As more users and customers get digitized, the landscape of technology and devices is changing (Flaherty, 2016). This change creates new possibilities for companies to connect with potential and existing users between channels. A channel can be seen as a medium tool for a company to reach out to their customer, e.g. via email, website, mobile applications, retail store, direct mail etcetera (Marrs, 2015). This change has led to that it's not only the companies who have new opportunities to connect. The customers expect a consistent experience independent of the channel of choice and they will use multiple channels depending on the complexity of the situation they are in (Lanning & Griebeler, 2015).

Due to the changing landscape, terms such as *multichannel*, *crosschannel* and *omnichannel* have been developed to meet the needs from the user. These terms are often mentioned in marketing context, specifically in relation to customer care and shopping experience (Lanning & Griebeler, 2015; Carroll & Guzman, 2015). However, as more users connect via different channels and devices the interaction possibilities have grown (Flaherty, 2016). According to Tate (2011), the methods of how we will interact with information in the future, gear towards a more personal, physical and social context than before, this as technology will fade more into the background. This will be achieved by a consistent, context-optimized and seamless UX experience, which will benefit the user with a greater overall product experience (Bluestone, 2015). A way of achieving this user experience, is by applying the three different aspects: *help me*, *know me* and *value me* (Lanning & Griebeler, 2015; Carroll & Guzman, 2015).

3.7.1 Multichannel

The help me-aspect can be seen as the foundation in multichannel. According to Lanning and Griebeler (2015), multichannel is primarily implemented in companies to provide service on different channels, so the user can decide and use their channel of choice. This means that the user is presented with similar options and information independent of channel (Bagge, 2007). This is achieved by horizontally integrating the information and possible options presented to the user in each and every independent department in the organization, to deliver a coherent experience for the user. Further, according to Neslin et al. (2006) this experience encompasses the design, deployment, coordination and evaluation of channels to improve the user value towards the product. The help me-aspect therefore aims at assisting the user throughout the journey, independent of channel, to complete their business. However, as the landscape changes, multichannel has evolved into a more user-centric approach; crosschannel.

3.7.2 Crosschannel

Crosschannel is the evolved approach from multichannel and incorporates the horizontal aspect in an organization, however, with one big difference. According to Beck and Rygl (2015), the difference lies in that crosschannel is an integration of several channels, where the user can connect between a set of available channels. Built on top of the foundation of help me, the know me-aspect in crosschannel implies that independently of a user's channel of choice, a company must have knowledge of previous interactions, preferences, anticipated needs and focus on how to complete the journey for the specific user (Lanning & Griebeler, 2015). Further, Carroll and Guzman (2015) argues that companies must acknowledge and tailor the previous actions of a user across channels. By managing the know me-aspect, a company has potential to incorporate the value me-aspect.

3.7.3 Omnichannel

The value me-aspect gears towards recognizing the user and to treat the user like one which is valued (Lanning & Griebeler, 2015). Lanning and Griebeler continues by saying that the value me-aspect should include easy-to-use support, value the relationship with offers and provide clear and simple communication. Carroll and Guzman (2015) argue, that when the value me-aspect is fulfilled, the user is in full control. Meaning that the user has the flexibility

to manage the product and service to gain maximum self-value. The value me-aspect can be achieved in crosschannel as well as in omnichannel. The distinction between crosschannel and omnichannel is that the barriers between channels in omnichannel vanish completely (Mirsch, Lehrer & Jung, 2016). According to Lanning and Griebeler (2015), when omnichannel is adopted in a company the possibility to create optimized personalized web pages, mobile experiences and customer service is enabled for each and every interaction.

3.7.4 Omnichannel in user experience

In the field of user experience, a way of viewing the difference between crosschannel and omnichannel is to not make a distinction between them (Flaherty, 2016). Instead of keep looking at the micro level of the user experience, the designer should be looking at the macro level; the omnichannel user experience. Furthermore, Flaherty argues that the designer must focus on the experiences and transitions across channels, however, also focus on the most appropriate experience for each channel which should be based on the customer journey.

Tate (2011) and Flaherty (2016) argues for three components which together creates a successful omnichannel user experience:

- Consistent
- Optimized
- Seamless (Tate (2011) describes it as continuous)

The *consistent* component involves a cohesive and acquainted user experience across all channels. This incorporates that the user should be able to complete a given task, with a familiar execution, across all channels. By creating the best suited user experience, dependent on what device the user is trying to complete the task on, the *optimized* component is achieved. This also involves particular channel constraints and context of use. As Tate (2011) explains it, "each channel should play to its strengths". The *seamless*, or continuous, component gears toward making the transitions across channels as painless as possible. To fulfill this component, the designer must make the channels aware of each other and help the user to continue their task independent of channel.

Flaherty (2016) added two more components which can improve the user experience in relation to omnichannel:

- Orchestrated
- Collaborative

The *orchestrated* component includes a proactive individual journey, delivering personalized messages and interaction possibilities at the right time. The *collaborative* component involves using multiple channels, which support different functions, to enrich the journey and the overall user experience. By allowing a user to be logged in at multiple channels at the same time, each channel can have a particular role to fulfill the given task. For instance, using the fingerprint reader on a smartphone to log in to the bank on a computer.

3.8 Layered design

In order to adapt the interface depending on the level of experience of user or user group, due to graphical interfaces becoming more advanced and complex, the layered design approach can be used. By using layered design, the content of the graphical interface is divided up into layers. These layers are arranged in a structure where each layer incorporates a specific set of functions. The arrangement of the layers and functions could be based on parameters such as complexity of use, frequency of use or level of difficulty. By following this design approach, users should be presented with a meaningful sequence of relevant functions that needs to be used (Christiernin, 2007).

In a graphical interface, the designer has the possibility to choose how to divide the functions between layers or if the graphical presentation of objects should change between layers. This also includes the presentation of information, that can be changed depending on layer. By applying layered design to an application, the designer needs to take into consideration that users can enter a stage where they feel most confident. This can make layered design complicated due to the independency of layers. Thus, the application needs to be presented as an integrated whole but tailored for user specific needs on specific layers (Christiernin, 2007).

To ease the understanding of layered design five characteristics have been identified:

1. There needs to be a minimum of two interface layers, arranged by a main ordering parameter.
2. Each new layer must contain all the previous function as well as new functions. The functions appearance can change depending on layer.
3. All layers must add to an overarching structure.
4. The arrangement of layers must provide a meaningful sequence.
5. The last layer in the sequence must provide all functionality of the application.

To be able to create a suitable and fully functional layered design, four constraints have to be met:

1. A layered structure is only meaningful if the application can be divided into two or more layers and still maintain or improve the user efficiency.
2. A layered structure is only manageable if the functions of the application can be divided.
3. The dividing of two functions between two layers is only suitable if there is no relationship between them.
4. The change in appearance between layers should only be implemented if efficiency is maintained or increased.

These characteristics is the basis of how to apply layered design to an interface. Taking the perspective of using user knowledge as main ordering parameter, based on the layered design foundation, a new branch of layered design has emerged; multi-layered design (Christiernin, 2007).

3.8.1 Multi-layered design

Schneiderman (2002) proposed multi-layered design as a way to do more for first-time and novice users in reducing complexity for them. Multi-layered design is a branch of layered design, where the user learns the interface through steps in a learning sequence to understand the functions that need to be used (Christiernin, 2007). By guiding the user through the interface to help the user perform their task, the user can progress. New interface concepts are introduced when the user needs to perform more demanding tasks. Depending on user ambitions of what to perform with the application, they have the possibility to start and stop at their complexity level of choice, making it possible to support a wide range of potential users. As Christiernin state, "Multi-layered design thus has a dualistic goal to meet: first it should support the users to develop their skills in their own pace by preparing a learning curve from the novice to the expert user, secondly it should provide highly functional layers for the users who consciously choose to work at a non-novice, but still non-expert level.".

Shneiderman (2002) described three variations of using multi-layered design. The first one provide roughly the same number of features introduced and a clear path for learning. The second approach is not as restrictive and include having a small first layer and then only a couple of subsequent layers with many more features. The third approach is to use one or two layers with few features which are followed by several different layers where the user can choose a preferred way of continued exploration of feature sets.

4 Methodology

This section describes the foundation of how designers approach problems, which is often referred to as "design thinking". This project has a starting point in human-centered design, used as a basis to form the design process and to choose methods. Human-centered design will inform decisions throughout the process, however other approaches may also be used.

4.1 Design Thinking

The design activity involves "many different decisions, dealing with many different and potentially independent factors of an artefact, all situated within the specific circumstances of production and use" (Gaver, 2012). The type of problems that designers deal with, which are often referred to as "wicked problems", are defined by their indeterminacy, meaning that there are no definitive solutions or limits to such a problem (Buchanan, 1992). Also, wicked problems' high level of complexity means no a priori solution exist (Gaver, 2012). The design thinking which aims at dealing with these problems moves across rigid borders of existing domains, in a process which is not linear (Buchanan, 1992). This reflects the non-linear process of design thinking and the uniqueness of each problem with no clear existing solution. Kolko (2011) explains that, it is by using a combination of ways of addressing the wide scope and scale of wicked problems, one will reach the most beneficial outcome.

According to Brown (2009) practicing design thinking is about producing innovations and means applying a thought process which includes the stages of "divergence", "convergence" "analysis" and "synthesis". These stages are often applied in iterations and by continuously moving between them. They serve the purpose of first widening the problem space, narrow and sort the options and lastly identify patterns to come up with new solutions to "real world problems" (Brown, 2009). A design process is not a linear process and should be seen as a "system of spaces" as opposed to a linear model with sequential steps taken in order to reach a goal (Brown, 2008). Further, Brown argues that innovations are created in a collaborative team effort of experts by using design thinking in a human-centered design process.

4.1.1 Human-centered design

Human-centered design can be described as the attempt at acquiring an understanding of the desires, needs and experiences of the intended users of a product. This is achieved by methods that empathizes, interacts and communicates with those people in the process (Giacomin, 2014). This often mean that designers gain an understanding of needs and desires which transcends the understanding the potential users themselves have access to. This basis of trying to understand the desires and needs of the people for which the design is intended comprise the reason for why it is called "human-centered" design.

IDEO (2008) considers human-centered design both a set of methods and a process which have the purpose of creating new solutions, or "innovations" as Brown (2008) states it. In the process, a designer is meant to make use of the lenses; desirability, feasibility, and viability which serves to first understand the range of desires and needs of potential users and then look at what is feasible and viable within the scope of the project. The process itself is nonlinear and iteration is key in reaching a good result. Brown (2008) explains it as a design process eventually needs to go through the three stages of inspiration, ideation, and implementation, however looping will occur continuously between these stages. Inspiration means researching the problem area and understanding where opportunities exist. Ideation is comprised of generating, developing, and testing ideas that could lead to solutions and lastly implementation where deployment occurs.

Maguire (2001) argues for several principles of a successful human-centered design approach where the key principles are to get users to be actively involved, get a clear understanding of users and the requirements of the task, being able to iterate between design solutions and having multidisciplinary teams and allocate function between user and system in an appropriate way. By using usability methods in cooperation with the ISO standard for Human-centered design process (ISO, 1999) (see figure 4.1), these principles are to be considered to find a more usable design solution. The ISO standard follows the five stages of a process; plan the human-centered design process, understand and specify the context of use, specify the user and organizational requirements, produce designs and prototypes, carry out user-based assessment (ISO, 1999). These stages in the process are used in an iterative manner (see figure 4.1) and are repeated until a suitable usability solution has been met. To create a successful human-centered design approach, it must be carefully planned throughout the whole process and maintain the flow of information to all relevant parts (Maguire, 2001).

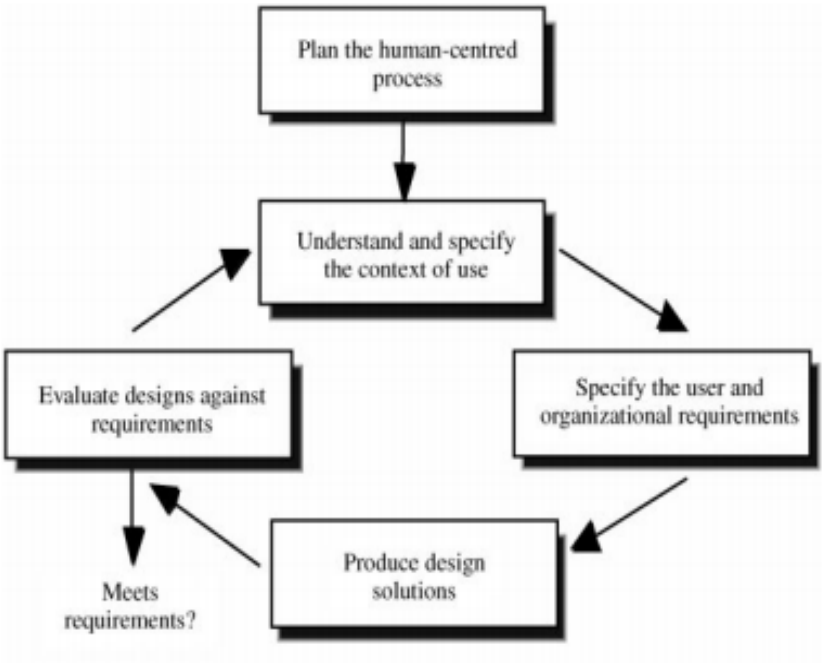

Figure 4.1. The five stages of the process according to ISO standard 13407 (ISO, 1999).

4.2 Methods

In this section, a collection of methods which are intended to be used is described.

4.2.1 Autoethnography

Autoethnography can be seen as an "ethnography-lite" where researchers conduct research on themselves, to understand their working context and own behaviors. The researcher should adopt an objective stance, when interpreting actions, thoughts and behavior to come up with requirements for an interaction form or interface (Cunningham & Jones, 2005).

4.2.2 A/B Testing

A/B testing is a method used for comparing two different versions of a design, allowing for analysis of which one is most purposeful (Martin & Hanington, 2012). By making small modifications and run A/B tests a designer can investigate questions, such as, which design solution works best getting people to sign up to a service.

A disadvantage in using A/B testing is that it does not answer questions of why one design solution works better than another and should, thus, not replace qualitative methods but be seen as complementary (Martin & Hanington, 2012).

4.2.3 Affinity Diagramming

Affinity diagramming is a bottom up approach to clustering insights from research into meaningful clusters. As a way of externalizing tacit knowledge it helps design teams to create a shared understanding of what is gathered in a research process. The basic principle is that each member in a team writes down observations concerns or requirements on a sticky note each, which then are clustered based on similar intent, problem or issue. The purpose of the clusters is then to induce overarching themes or categories which can be referred back to when considering a user or stakeholder (Martin & Hanington, 2012).

4.2.4 Interviews

This fundamental research method serves to gather the personal accounts of experience, opinions, attitudes and perceptions of users (Martin & Hanington, 2012). Interviews work best if performed in an interviewee's own space (IDEO, 2014) but can also be conducted remotely by for example phone (Martin & Hanington, 2012). IDEO (2014) states that interviews are key in reaching insights not possible if only working behind a desk.

Structured interviews are conducted following a script of questions and work better if wanting to avoid bias and have consistency across sessions (Martin & Hanington, 2012). This type of interview is easier to control and analyze. Unstructured interviews are better for exploratory purposes but might demand more of the researcher in terms of being able to collect the vital information in limited time of the interview. Unstructured interviews allow for a more personal tone and are thus more informal. Structured interviews are more rigid and considered formal. Semi-structured interviews are interviews where the interviewer

creates an interview guide in the form of listed questions and topics which are to be covered. The questions are meant to be followed orderly but the interviewer is able to follow topical trajectories and asking follow-up questions when deemed appropriate (Cohen & Crabtree, 2006). Some benefits with using semi structured interviews are that it allows the interviewer to prepare in advance and allow interviewees to express their views in their own terms.

4.2.5 Personas

Personas are archetypal descriptions of real user behavior patterns, based on information collected in research (Cooper et al., 2014). Personas are presented in the form of a representative profile and serve to aid decision making in the design process. They equip a design team with means of thinking and communicating about behaviors in a group of users. More specifically, according to Cooper et al., personas help designers in; determining how a product should behave, communicating with stakeholders, shape commitment and consensus to a design and measure the effectiveness in a design solution. Furthermore, personas contribute to other product-related efforts such as marketing and sales plans. Personas provide a human reference throughout the design process which designers can use in combination with other methods, such as checking scenarios of use (Martin & Hanington, 2012).

According to Cooper et al., (2014) personas exist to prevent the flawed logic of trying to accommodate everyone by making functionality as extensive as possible and further states that "The best way to successfully accommodate a variety of users is to design for specific types of individuals with specific needs.".

4.2.6 Brainstorming

Brainstorming is used to generate ideas and make use of a broad source of creativity and knowledge and works best with a positive and open mindset (IDEO, 2014). Kelly (2000) describes brainstorming as a skill or an art which one gets good at by practicing. Brainstorming should be clearly defined and taken as a serious part of work in order to succeed. Further, a good brainstorming starts with having a clear problem statement.

IDEO (2014) has seven rules to ensure good brainstorming session with the purpose of generating a high quantity of ideas. Their list of rules follows; defer judgement, encourage wild ideas, build on the ideas of others, stay focused on the topic, one conversation at the time, be visual and go for quantity.

Different ways of extending a brainstorming session exist in order to drive it forward or to expose features which might be hidden. Examples of this is to use extreme characters (Djajadiningrat, Gaver & Fres, 2000) or Five why's? (IDEO, 2003).

4.2.7 Creating Frameworks

Creating frameworks consist of making visual representations of systems in order to understand data and clarify relationships (IDEO, 2014). By sharing information or stories gathered in the ideation phase, within the design team and trying to identify patterns, the patterns can be visualized in forms such as relation maps, Venn diagrams or 2x2 matrices.

Relation maps are used to better understand how different aspects relate to each other and to organize them. This can be done by starting with one aspect in the center and continue by visualizing how other aspects work in relation to that aspect. As the design process evolves the frameworks will too, and help in understanding perspectives of potential users and contextual issues.

Another example of a visual framework technique is concept mapping (Martin & Hanington, 2012). This method consists of individual concepts which are connected via "linking words" that in turn creates meaningful statements, called "propositions". The benefit is to highlight new connections between concepts within a domain that is already well understood.

4.2.8 Design Workshops

Design workshops are sessions where creative co-design methods are organized in order to collect a high amount of insight from participants or design team members (Martin & Hanington, 2012). They consist of several planned and organized activities which are led by a design team facilitator. In the exploration of a design, workshops serve the purpose of gaining insight of the user's perspective and generate design implications. Important aspects are to plan the session properly, gather materials for the design activities and to be adaptable in the ongoing session.

4.2.9 Prototyping

Martin and Hanington (2012) describe prototyping as "the tangible creation of artifacts at various levels of resolution, for development and testing of ideas within design teams and with clients and users". It can be seen as a transformation of research and ideation into a creative tangible representation. Prototypes are often divided by level of fidelity or resolution, and thus they are described as either low-fidelity or high-fidelity prototypes (Martin & Hanington, 2012).

4.2.9.1 Low-fidelity Prototyping

Low-fidelity prototyping is common in early stages of the design process where it can take the form of, for example, sketches or storyboards (Martin & Hanington, 2012). They function as both internal communication tools and early testing of ideas. Martin and Hanington (2012) describe paper prototyping as a regularly used method for prototyping the design of a user interface, where pages are representing screens which can be tested with potential users. This type of prototyping can also be referred to as wireframing (Treder, 2016) which should show groups of content, structure of information and basic visualization of interactions. Some benefits with keeping prototypes low-fidelity are that they; require less time, are easier to change, put less pressure on the user and they don't communicate a product which is expected to be finished (Pernice, 2016).

4.2.9.2 High-fidelity Prototyping

By representing the appearance of the final product to a higher degree, the high-fidelity prototype is more refined (Martin & Hanington, 2012) compared to low-fidelity prototyping. High-fidelity prototypes can include basic interactions, which highlights the division of static versus interactive prototypes (Pernice, 2016). They are more fitting in the later stages of a

design process, to evaluate user responses based on aesthetics, interactions and usability. Some benefits with high-fidelity prototypes are; more realistic responses from the system, more likely to induce real behavior in users and allow designers to focus on observing rather than maintaining the test itself (Pernice, 2016).

4.2.10 Benchmarking

In the benchmarking process, comparing a business performance on a predefined set of parameters against another top performing business, is conducted. This, by continuously identifying, understanding and adapting practices and processes that are located inside and outside of a business. Benchmarking results in gathering information from other businesses and applying it to one's own business to improve work processes. When conducting benchmarking studies, focus should primarily lie on "best practices" instead of best performance, due to that "best practices" is the reason of best performance. If businesses identify the "best practices", they have the opportunity to obtain an operational, strategic and financial advantage (Kelessidis, 2000).

4.2.11 Remote Usability Testing

Remote usability testing, according to Lanoue (2015), is "a research methodology that uses an online software program to record the screen (and voice, depending on the tool you choose) of test participants as they use your site or app in their natural environment - at home, in their office, or even a specific location you ask them to go.". There are two different types of remote usability testing; moderated and unmoderated.

4.2.11.1 Moderated

In remote moderated user testing the participant and the researcher are in two different locations but the researcher can see what the participants are doing, in real-time, via a shared screen and they can communicate with the help of a web or conference call. Activities, that should be completed using a design or interface, are handed out to the participant and the researcher observe the participant in the process. The participant usually "think out loud" while completing the tasks and the researcher can ask questions to gather data or for clarification. These tests are often time consuming due to the involvement of a researcher for each test which results in a smaller sample size of participants (Lanoue, 2015).

4.2.11.2 Unmoderated

In unmoderated usability testing the participant should complete the tasks given alone with no real-time interaction with the researcher. Due to the lack of real-time interaction the researcher cannot ask questions to gain more data or clarify passages in the tasks. Instead, questions are often built into the study or emailed for the participant to answer after the completion of the tasks. The researcher often asks the participant to "think out loud" but there is no way to check if this is fulfilled until the test is over. Remote unmoderated usability tests are often preferable when the focus is on a few elements in the design (Schade, 2013). Further, these tests are also great when the researcher has limited amount of time or when the researcher need a larger sample size which can allow for more significant data (Lanoue, 2015)

4.2.12 Expert Heuristic Evaluation

Nielsen (1995) describes heuristic evaluation as a method for "finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process". It consists of experts evaluating an interface by making assessments of how it corresponds to certain heuristics.

In practice, evaluators are not always rigid in trying to map each problem found to a specific heuristic. Macefield (2014) states that experts "typically just state what heuristics they're using, then *keep them in mind* when identifying problems and recommending solutions.".

4.2.13 UX curve

According to Kujala et al. (2011), a UX curve is used to identify the chronological order of user experience. The UX curve consists of that users draw a curve that represents the relationship toward a product from first time usage until a particular time. This is done on a template including a graph with two dimensions, where the horizontal axis represents time and the vertical axis the intensity level of the user's experience. Further, in the middle of the graph a horizontal line separates the two intensity levels into a positive and negative part. As a complement to understand why users draw a certain curve, users are asked to mark the reason at the location on the curve.

5 Process

This section describes the process under which this project was conducted (see figure 5.1). This description is, as much as possible, described in chronological order of how each phase of the process was conducted. As iteration is an important part of the human centered design process, which was used as a foundation in this project, this occurred both within and between different phases of the process. Thus, activities within the different phases informed and affected each other throughout the process in order to reach a fruitful result. The idea was to have a clear purpose and outcome for each included phase where the outcome could be used to build on the subsequent phase in the process. This, to ensure that the undertaken activities were as effective as possible. Each phase, except the literature study and further delimitations, include a result and analysis.

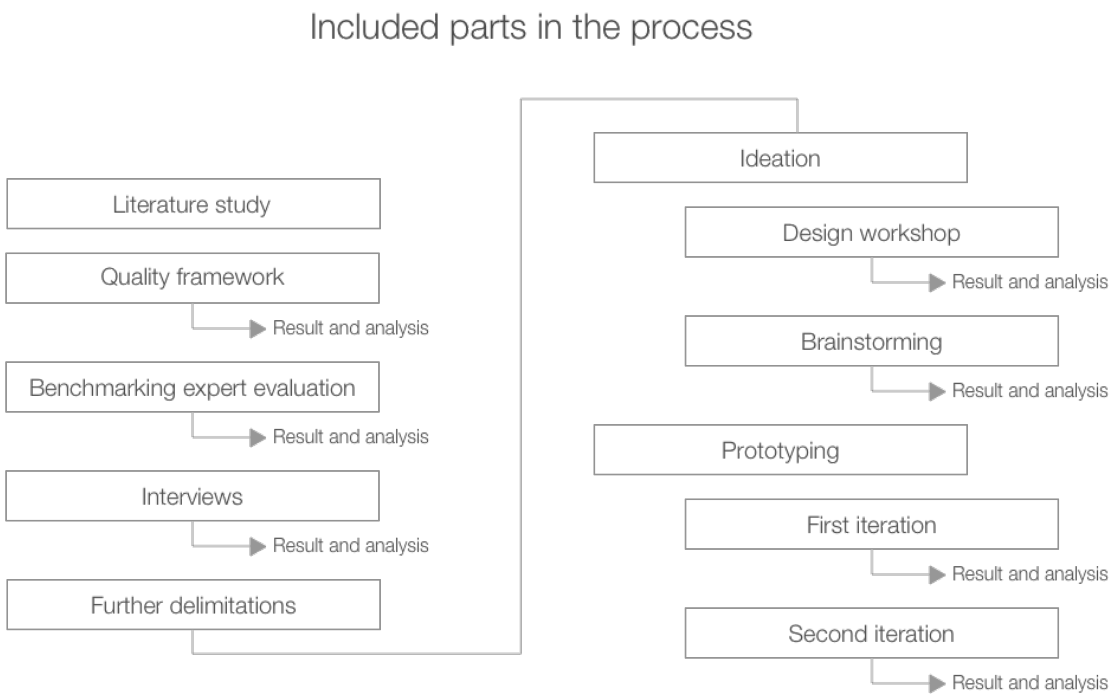

Figure 5.1. Presentation, from left to right, of how the process section is structured.

5.1 Literature study

The first phase of the project consisted of conducting a four week long literature study and writing a planning report. The purpose of this phase was to immerse in the areas of user onboarding and omnichannel assistance in order to gain a deeper understanding of these, to be used as a foundation for answering the research question. As both onboarding and omnichannel were new areas, most resources were used on understanding these. As the type of investigated software in this project was in the context of business intelligence and

analytics software, these areas were also prioritized to gain relevant knowledge. Possible methods for approaching the project research questions were also gathered.

The goal for the literature study was to identify qualities of successful user onboarding and omnichannel assistance, in order to be used in the following benchmarking phase. This started with extracting possibly important aspects from the theory and knowledge gathered in the course of the literature study. To understand the relations and deeming the aspects important or not, a framework was created (see section 5.2) which was used in the benchmarking expert heuristic evaluation (see section 5.3).

5.2 Quality framework

In the literature study, the planned outcome of qualities of a successful user onboarding and omnichannel assistance were produced. The quality framework, which was constructed to understand and visualize the summary of qualities, was iterated both before and throughout the process of benchmarking phase and thus the qualities and benchmarking informed each other.

An iterative process made it possible to create the final framework, where each of the steps in the process narrowed down and removed unclear qualities. As an initial phase, all the qualities were written on a whiteboard, composing a relation map (see section 4.2.7) to visualize the relations between the different qualities. This, to identify qualities which were similar and which thus could be combined. As the relation map was considered unstructured, a top-down framework was created which had the purpose of arranging the qualities in a hierarchical structure placing qualities on a higher or lower level. As this approach was deemed ineffective, due to lack of finding the hierarchical structure, in discussions the quality framework started to take form. The quality framework was created to get a deeper and better understanding of the qualities relevance in the onboarding process, the connection between each of them and their strengths and weaknesses.

As the structure of the quality framework proved to be unsatisfyingly useful along the process, several qualities were either removed entirely or combined. One example of this was the quality called *Metrics*, which was considered highly important in creating a good onboarding process, but was removed because of the difficulty of knowing whether metrics are used or not in the services subject to evaluation. Another example of altering of qualities which emerged in the process, was the combination of the qualities *User assistance* and *UI-patterns,* where *UI-patterns* was considered as subordinate and used as means of achieving *User assistance.*

5.2.1 General description of the quality framework

The quality framework (see figure 5.2) should function as heuristics in an evaluation or guiding the work of designing a successful onboarding process and should not be seen as a fixed set of qualities to be used in one particular way.

The quality framework (see figure 5.2), consists of the overarching goal of creating a *Well curated path* in the onboarding process for the user, in order to reach the *Value insight* of using the product. By providing *Quick wins, User assistance, Feedback and drive, Product priming and*

Value prop throughout the process and *Removing points of friction* and *points of disconnect*, the user has a bigger possibility of achieving the goal. These qualities together make out the core qualities in the framework.

Surrounding the core qualities of creating a successful onboarding exist the qualities *Consistent, Optimized, Collaborative, Orchestrated* and ***S**eamless (C.O.C.O.S)* and *Help me, Know me* and *Value me* which should be used as guidance for evaluators or designers when considering the omnichannel perspective. Furthermore, the qualities *Perceived usefulness, Perceived ease of use* and *Perceived risk* should be used as guidance when adopting new technology. These qualities are not building blocks of creating a well curated path, but need to be considered as overarching qualities, present in all parts of the process.

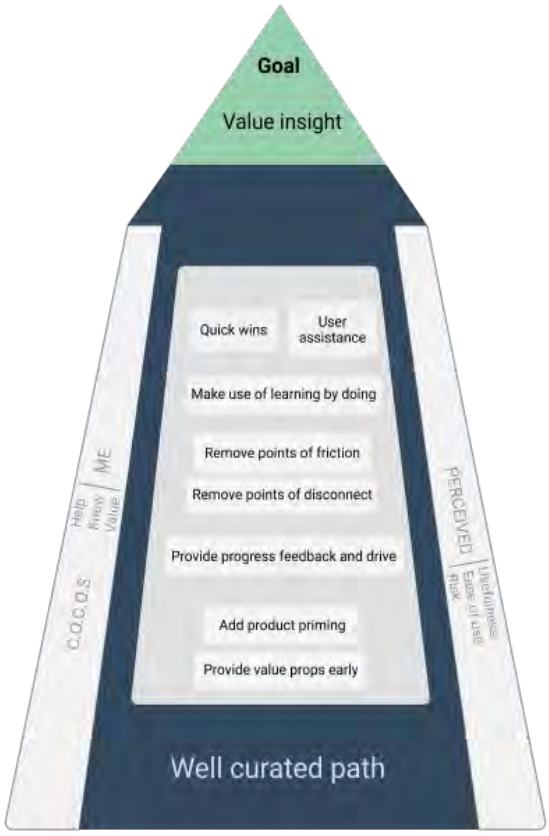

Figure 5.2. The quality framework. At the top: the goal value insight. The blue center section makes out the subordinate goal well curated path which contains the core qualities. On the sides: background qualities

The qualities are divided in three main parts; goal qualities, core qualities and background qualities. A more detailed description is made in the following section in order to provide a more substantial understanding of the qualities´ function in the framework.

5.2.1.1 Goals

The main goal is for the user to reach value insight in the onboarding process. This goal is achieved by reaching the subordinate goal of designing a well curated path. The two goals are described in more detail in this section.

Value insight

The onboarding process should include a goal of the user reaching insight of what value the service may provide.

Value insight is the goal for the onboarding process and this quality shifts focus one step further from the user learning the product to what the user can achieve in using the product, in terms of improvements in their daily lives (see section 3.6.1). The goal itself serves a purpose of providing the user with the sense of being onboarded and is vital to understand what to design the well curated path towards.

Well curated path

Create an overarching well curated path during the onboarding process to make the user reach value insight.

This quality serves to make sure that the user is provided with a clear path in the onboarding process including all touchpoints. The quality highlights that fixing only one part of the process is not enough for creating a successful onboarding, as described in section 3.6.1. This quality should be regarded as an overarching goal in the framework, which is created by using the subordinate core qualities.

5.2.1.2 Core Qualities

The core qualities described below are viewed as the foundation of creating a well-organized onboarding process and do not function in isolation. Each quality is expected to improve the user's chance to successfully onboard a service and reach value insight.

Quick wins

Provide the user with quick wins to boost the sense of accomplishment and achieve progress in the onboarding process.

What defines a quick win depends on the service or product. As described in section 3.6.3, it serves the purpose of providing the user with valuable knowledge and progressing in meaningful work. Quick wins are therefore closely connected to where in the process the user is located and what might be achievable at that point. This means that the user might be provided with user assistance in how to learn a basic feature, but as a result of being introduced to this too late and in a cumbersome way, the quick win is lost.

User assistance

The user should be assisted with their needs throughout the onboarding process as an inherent part of adopting the service.

As described in section 3.6.2, the purpose of user assistance is to improve the user experience. This can be achieved by making use of relevant UI patterns, where the choice of patterns is dependent on which context it is being used.

Remove points of friction

In the users path to reach understanding of a new service, no friction that confuse or interrupts the flow should exist.

A point of friction, as described in section 3.6.1, is when the user's flow gets interrupted by confusion or uncertainty. Points of friction can be discovered when observing user behavior or in expert evaluation when something can be deemed as interrupting or confusing for the user. Removing these frictions is beneficial for the user flow and progress when onboarding a new service.

Remove points of disconnect

In the user's flow when onboarding a new service, no points diverting the user's attention should exist.

As described in section 3.6.1, points of disconnect is when the user is diverted from the onboarding path and thus the attention is put on something else. Points of disconnect can be discovered when observing user behavior or in expert evaluation when something diverts the user attention and stops the progression of the onboarding process. By removing these points of disconnect, a more focused path can be created.

Provide progress feedback and drive

The user should be provided feedback in the progression of being onboarded, with a clear way forward.

This quality highlights the importance of providing the user with feedback of where in onboarding process the user is located. Ways of driving the user progression in the right direction should also be used. Provide feedback and drive is beneficial to give the user understanding of when milestones of the onboarding process are completed and provide the sense of being onboarded.

Provide value prop early

The user should as early as possible be introduced to insight of the potential value of the service.

Providing the user with early notions of possible value in using the service can function as stepping stones for the user in reaching value insight in the onboarding process. The user should be provided with text, images and video as a part of building toward this goal. Value props can also be used throughout the process, as motivations to why certain demands are put on the user.

Add product priming

The user should be primed of the product look and feel early on to provide a sense of familiarity when starting to use the product.

This quality aims to give users an understanding of where they are going to end up in subsequent steps of the interface and provide familiarity of features when starting to use the product.

Make use of learning by doing

The user should be taught through action in order to learn important parts of the interface by actively carrying out vital interactions in the interface.

When interacting with the product in the onboarding process, the user should be taught through action which means the user will learn by doing. This, to engage the users in the usage of the product and to prevent the user from clicking through important parts of the onboarding.

5.2.1.3 Background qualities

The background qualities should be continuously checked if present throughout the entire onboarding process. Thus, they are overarching and support the holistic perception of the onboarding process.

Help me, Know me, Value me

Help me, know me and value me are described in section 3.7 as aspects to deliver a good user experience independently of which channel is used. The qualities help me, know me and value me act as guiding notions to check if the user is supported, understood and valued throughout the onboarding process.

Consistent, Optimized, Collaborate, Orchestrated and Seamless

The aspects in C.O.C.O.S (see section 3.7), include important notions on how to focus on the appropriate experience for each channel. These aspects can thus be used, to check if they are fulfilled in and between each channel in the onboarding process. In the context of this project, the focus on devices is down-sized, as these channels are not vital to this service. By successfully making use of these aspects, the user experiences a streamlined onboarding process, providing the user a greater chance of reaching early value.

Perceived usefulness, Perceived ease of use, Perceived risk

As described in section 3.6.4, perceived usefulness, perceived ease of use and perceived risk are used to evaluate users´ perception of adopting new technology. As qualities, they serve the purpose of reminding the evaluator or designer to take in the perspective of how a user is perceiving the usefulness, ease of use and risk toward the new service, in the onboarding process.

5.3 Benchmarking expert evaluation

With the purpose of investigating current use of user onboarding and omnichannel assistance in different domains and in the Company software, a benchmarking expert evaluation was conducted. Furthermore, the purpose was to compare how the qualities were met in the onboarding process of the different software services included in the benchmarking evaluation. The expected outcome, was a mapping of how the qualities in the different onboarding journeys were met and good examples currently used in different domains as well as in the Company software. This, to identify where to put focus in subsequent steps in the project, based on identified weaknesses and strengths in the Company software.

A benchmarking expert evaluation was conducted on a total of seven services, of which three were analytics software, including the Company software and four were less complex services. The analytics software were considered more complex in that they offered more features to users and consequently containing a more complex user interface. The included analytics software were chosen as they exist in the same domain as the Company software, allowing for purposeful comparisons. The less complex software services were chosen based on recommendations and previous knowledge, expecting them of having well designed onboarding processes.

The same process for each service was applied with minor deviations. The group members of this project acted as expert evaluators and conducted one evaluation each for every service.

This, to provide a good foundation for comparison between the services. Each service was evaluated, using the qualities in the quality framework (see section 5.2) as heuristics, which could be assessed on which degree the qualities were met or not. Due to time limitations, only first time usage was evaluated for each service, even though the onboarding process could be considered to continue for a longer period of time. Each evaluation lasted from a couple of hours up to a full working day.

A hypothetical *value insight* goal was posed for each service which could be checked if being fulfilled or not. Each service was then found via a search engine and entered via an ad or a link. As each service is different, the onboarding process for each service differ. Therefore, examples of activities were extracted and assessed in terms of either fulfilling a quality or not from both evaluators. When an onboarding was completed, each example was discussed and explained by the evaluators and then plotted in a UX curve (see figure 5.3). The y-axis on the UX curve consisted of a grading scale from 5 to - 5 and the x-axis stated five generic temporal phases of the onboarding process; potential value, sign-up, getting started, explore and excel in usage.

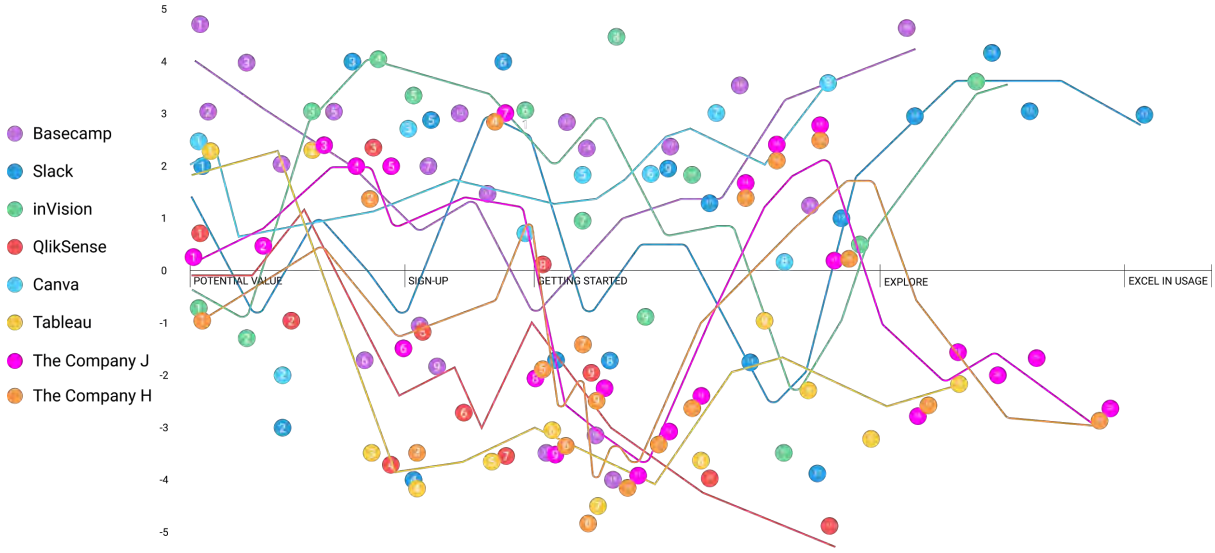

Figure 5.3. UX curves for all the evaluated services included in the benchmarking expert evaluation.

5.3.1 Result and analysis of the benchmarking expert evaluation

The benchmarking expert evaluation resulted in a total of eight UX curves (see figure 5.3). One curve for each service was produced, except for the Company software which resulted in two separate curves, one for each expert evaluation. This in order to better allow for analysis of the different entry point and paths, taken by the evaluators.

The use of qualities as heuristics in a benchmark expert evaluation was useful and provided good insight into mechanisms in different onboarding processes. However, as the framework is quite extensive and contains both core, goals and background qualities, the focus was put on using the core qualities and the goals when evaluating. The delimitation of putting less focus on the background qualities was due to both that only first time usage was taken into account and that background qualities being large concepts and require usage over time. In

addition, the evaluators extracted examples for the qualities which were deemed most important. The examples were extracted, to exemplify both good and bad ways of designing the onboarding process and to better be able to explain the qualities.

5.3.1.1 Result and analysis of use of qualities

The goal *value insight* was useful in creating a hypothesis goal to reach, when conducting an evaluation of a specific service. Evaluating if a service provided a *well curated path* proved useful, in order to both identify the mere existence of an onboarding process and to evaluate a holistic perspective of the onboarding process. *Product priming* and *value prop* were mainly found in the beginning of the onboarding process, which was expected due to the nature of these qualities requiring early onset in an onboarding, in order to yield results.

As examples were extracted, it allowed to gain better understanding of how a quality was met and can be used when evaluating or designing an onboarding process. The core qualities which were the easiest to identify and useful in the evaluations were; *remove points of friction, remove points of disconnect, progress feedback and drive, learning by doing, user assistance* and *quick wins.* The results of the evaluation produced both good and bad examples of these qualities, indicating that they are all indeed important parts of the onboarding process, however not necessarily covering every important aspect. The result showed that the qualities functioned as valuable tools when evaluating existing design, mainly as they generated continuously useful discussions.

When extracting and analyzing the examples of how qualities were met in the evaluated services, the realization was made that qualities should not be considered as discrete units, as they are intertwined with each other. Meaning, that they should not be used in a rigid fashion. This includes the following examples, which are used to provide ways of thinking about an important quality, without ignoring others.

Remove points of friction

Points of friction were continuously encountered in almost all of the services and removing these is considered highly important in preventing the user flow from being interrupted. This highlights the need to consider this quality, throughout the whole process of onboarding. In the Company software (see figure 5.4), possible points of friction are removed effectively by focusing on the task relevant to the user, which concerns choosing between a desktop version or a browser version. A choice, which takes place just after signing up to the service and where the user thus has little previous knowledge. Redundant information is removed and two clear buttons which calls to action exist, providing users with an effortless choice to continue. This particular choice was experienced as difficult in several other services included in the evaluation.

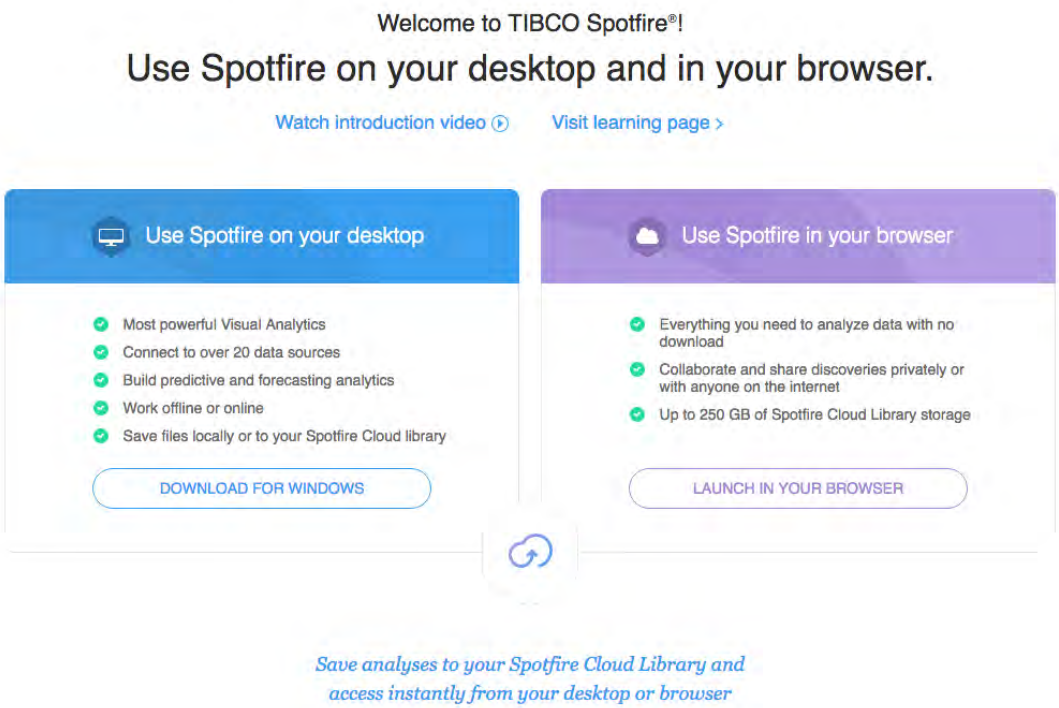

Figure 5.4. In the Company software welcome page, after sign up, friction is removed by excluding redundant information and focusing on the choice which needs to be made.

Remove points of disconnect

Possible points of disconnect were also extensively encountered in all of the onboarding evaluations. In the worst case of point of disconnect, the user runs the risk of leaving the onboarding process completely, as a result of losing attention on the onboarding process. Some poor examples which were encountered were welcome emails leading to irrelevant or non-functioning content and links leading the user through several websites just in order to agree to terms of usage. The cloud based prototyping tool Invisionapp.com provided a good example of how points of disconnect can be removed and avoided (see figure 5.5). In their case, the help is embedded, allowing users to gain access to user assistance such as step guides, while also trying to complete a task. The help section also stays open, even when continuing to navigate within the service, preventing the user from not having to navigate back and forth to the help. This in comparison with other services where the usual way of reaching help material, such as user guides or getting started guides, was to provide this on websites outside of the service itself, meaning the user is automatically transferred to a new page.

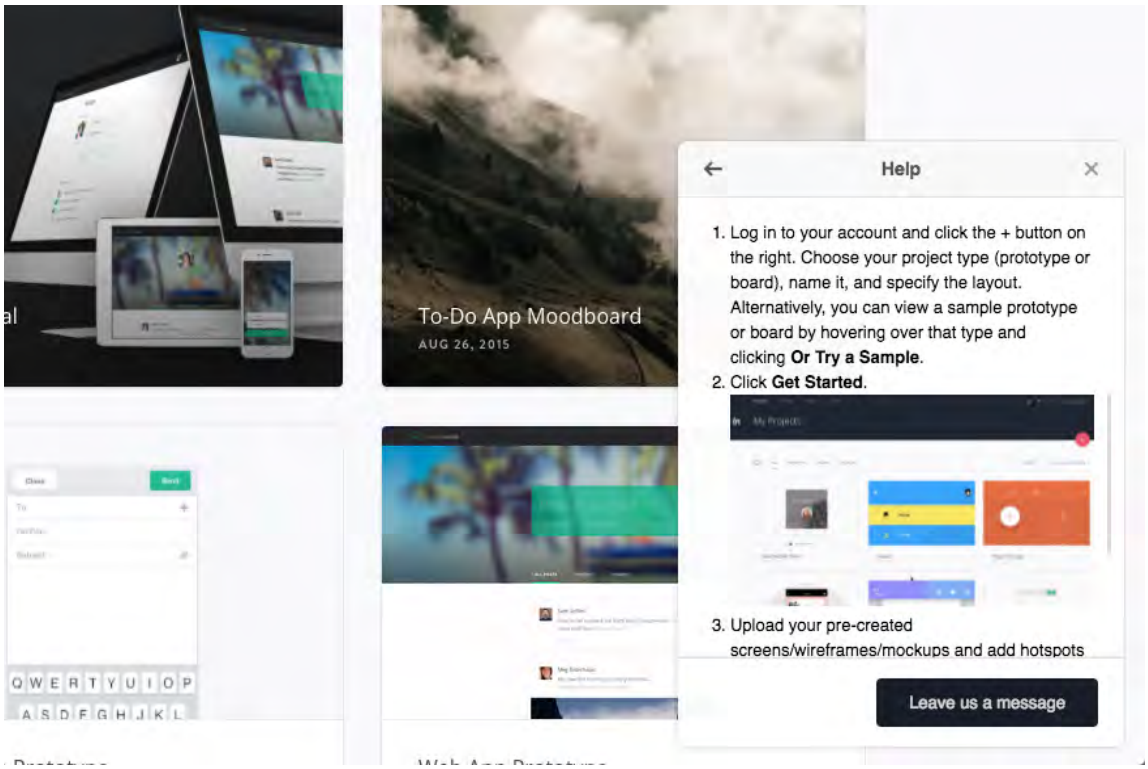

Figure 5.5. In Invision, possible points of disconnects are removed by using an embedded help which stays open when navigating within the service.

Progress Feedback and drive

Providing the user with feedback on where in the process of onboarding the user is located, was something which almost every service lacked and consequently therefore, often also not driving the user forward in a desired direction. This could be a result of the service not having considered the onboarding process at all, or it could be an overlook of providing such feedback. Including progress feedback and drive to the user, could potentially be very easy but still generate highly valuable aspects to the user. Canva, a web design tool, provided a good example of how progress feedback and drive can be provided to a user. This is exemplified in figure 5.6, where it is clearly stated that the user has completed part one of a tutorial, indicating that there is more and providing a way forward using a clear call to action for the user to follow. The user is also provided with information explaining the status of the process of completing tutorials and thus providing a path forward in continuing the learning of the software.

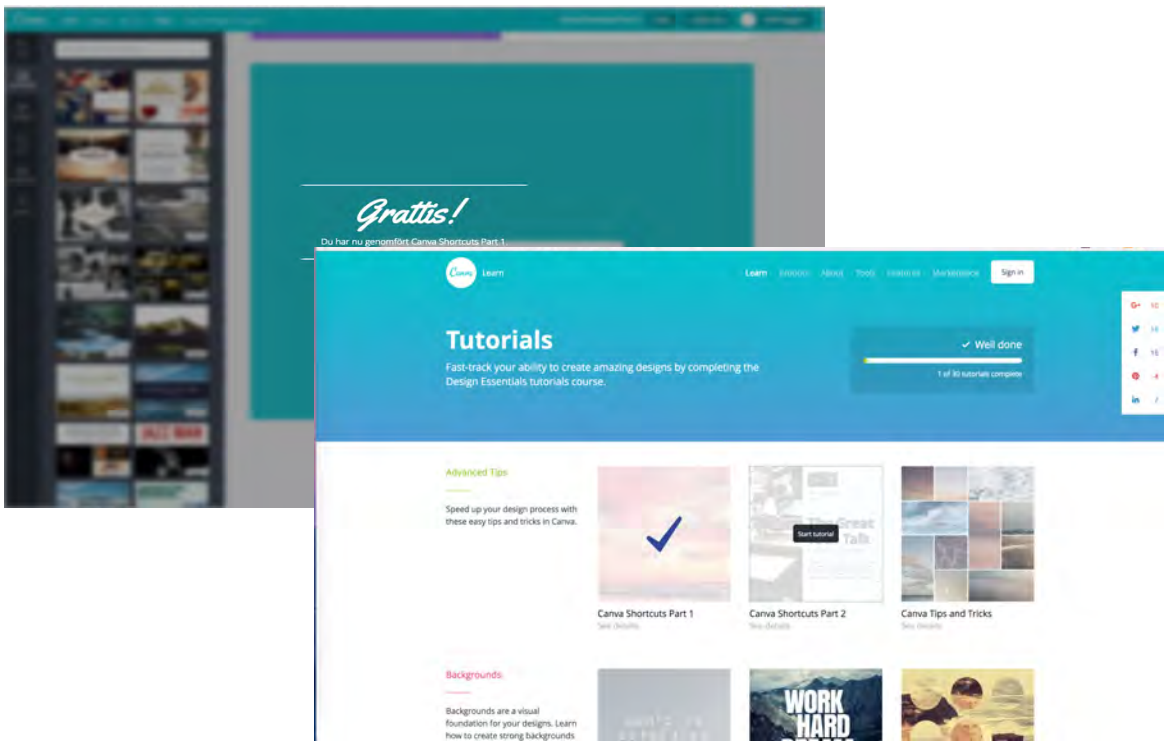

Figure 5.6. The design tool Canva provides clear feedback of what users have achieved in the onboarding process and clearly guides the path forward, making it easy for users to continue.

Learning by doing

Not many examples of learning by doing were encountered in the conducted evaluations. Missing out on providing users with explicit ways of learning basic features, could generate problems in the usage further ahead, in the process of exploring the software. This miss was a common failure in many services, where carrying out basic features failed as a result. A good example of how learning by doing can be provided without being forced upon the user, is exemplified by Canvas help site for learning shortcuts (see figure 5.7). In this section, the user can learn how to perform basic actions, by briefly reading up on how to and then actually perform the task in direct connection to the explanation. Thus, the user can engage in actions, central to the usage of the product and learn by doing instead of memorizing how to perform the actions and what the actions do.

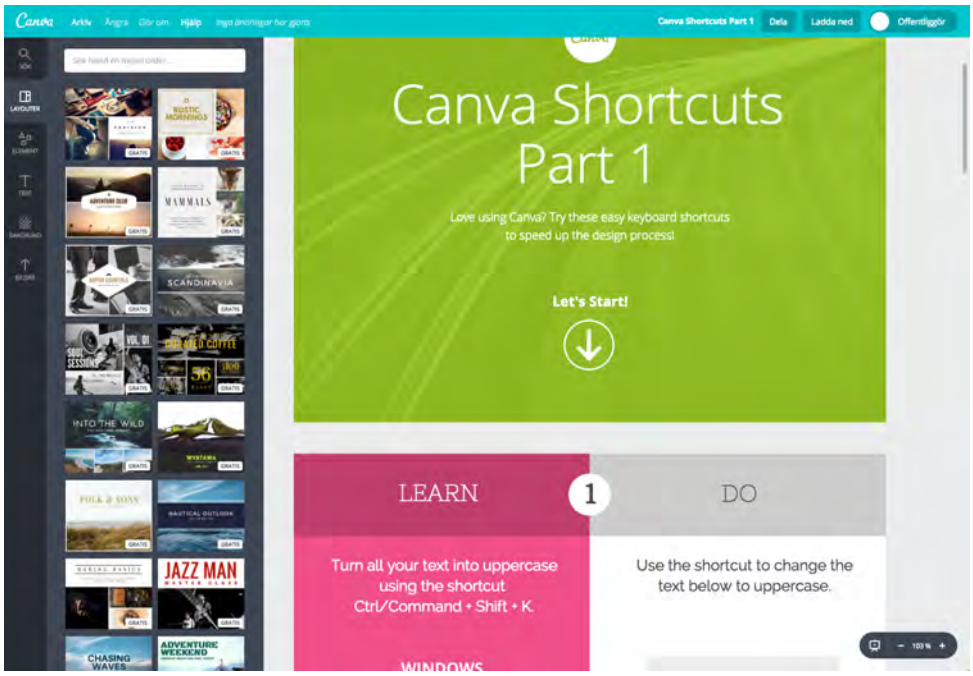

Figure 5.7. In the Canva help section users can learn shortcuts by actually performing the action instead of just memorizing how and why an action is carried out.

User assistance

User assistance is an extensive quality, where the core is to provide the user with useful assistance on how to succeed in their usage. Providing good user assistance can be done in many ways, where one good example is to use a UI-pattern which is suitable and relevant for the task at hand. This is exemplified in Slack, a communication tool, where a dedicated UI-pattern is used for a lengthy sign up flow which is carefully designed, allowing for users to understand what is required in each step of the way (see figure 5.8). Using a dedicated UI-pattern (described in section 3.6.2) allows for focusing on what is relevant in each step preventing the user from failing to complete the task and thus increases the speed of the process even though more steps might be used.

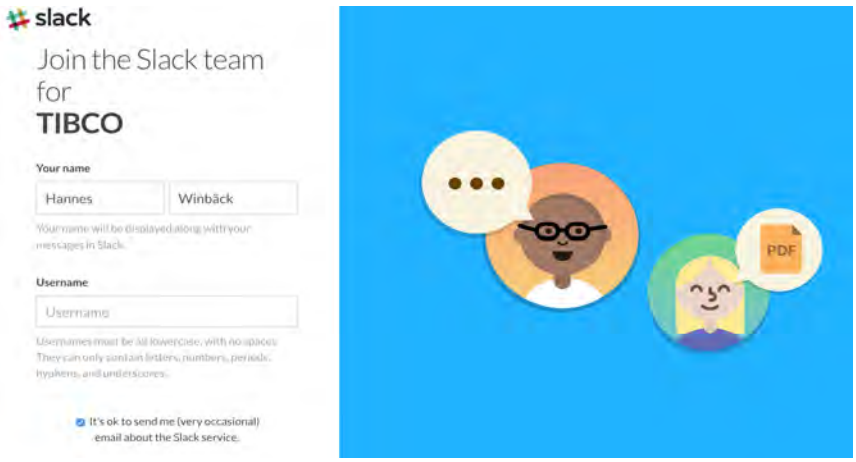

Figure 5.8. In the Slack sign up flow the dedicated UI-pattern allows to focus the user assistance on fewer and relevant tasks making it easier for users to complete. In the example the name is also auto filled from previously input, an easy but effective assistance.

Quick wins

As the quality quick wins is highly dependent on what is relevant for the user in a specific point in the onboarding process, it could be thought of as achieving quick milestones. This is exemplified in a good way in Basecamp, a project management software, where an explicit invitation to learn a basic feature of the service is provided which is then taught in a few well-designed steps (see figure 5.9). This example thus consists of several of the other qualities, such as good user assistance and progress feedback and drive, but is considered a quick win as the basic feature is introduced and well taught in a relevant place of the onboarding which allows for building on continued exploration.

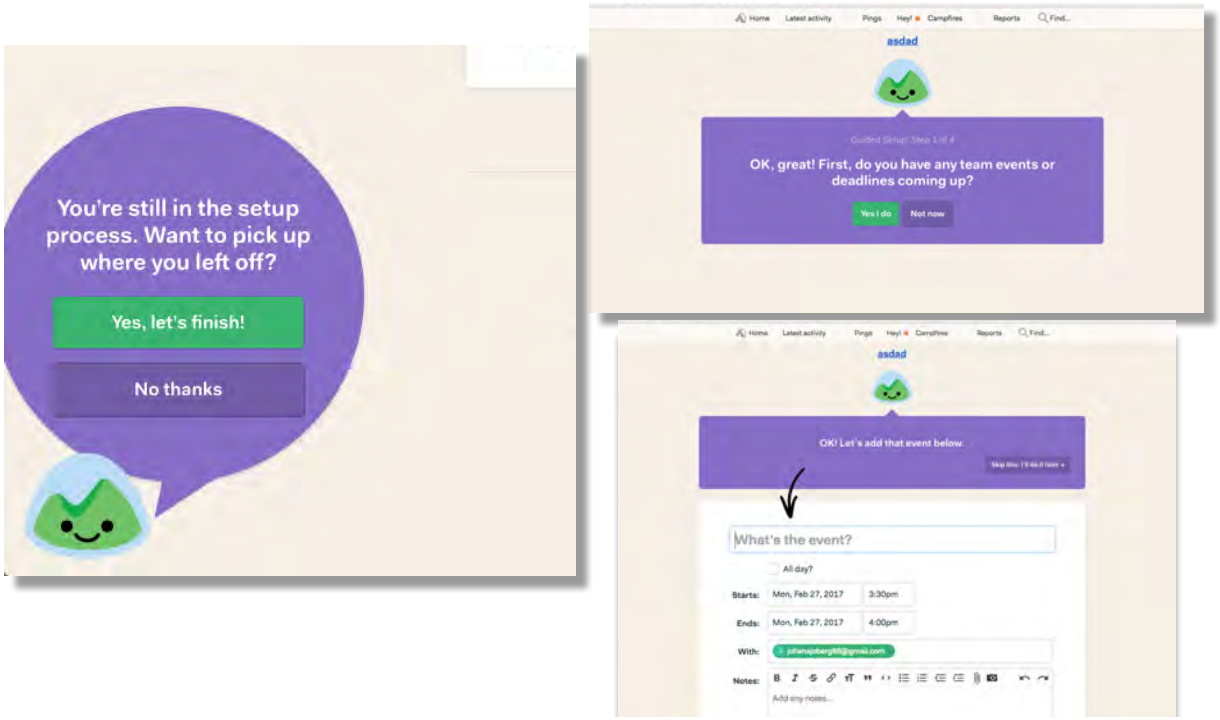

Figure 5.9. Basecamp achieves a quick win by introducing a basic feature in a relevant place of their onboarding process, in this case when just entering and starting to explore how to use the product. The basic feature is then taught to the user in a few easy steps.

5.3.1.2 Result and analysis of UX curves

Each evaluation of a service was documented in a UX-curve and a comparison between them allowed for several important insights regarding the onboarding process. There were quite significant differences between the UX-curves, depending on what type of service that was onboarded. For instance, Tableau, Qlik and the Company service yielded a less good onboarding experience with more friction and difficulty in understanding the service than other less complex services. Most of the services began the onboarding process in a positive manner, explaining the value of the service for the user. However, as the process continued the complex services displayed a negative drop in onboarding experience in the UX-curves, revealing that improvements needs to be made to the onboarding process.

When analyzing the compiled UX-curves of all the services together, two key gaps were identified which manifested weaknesses in the onboarding process. The two gaps were:

1. Sign up friction
2. The cliff of faith

The first gap exists in the sign up phase where points of frictions were identified in the sign up form, forming the main reason for the gap. This was mainly due to the services requiring extensive amounts of information in many input fields without motivating why and what it will be used for.

The major take away from analyzing the UX-curves, which was considered a highly important finding from the benchmarking expert evaluation, is found in the second gap (see figure 5.10). The second gap is located in the getting started phase after completing the sign up, when the user is about to start using the software. This gap was identified in several different services, independent of complexity, leaving the user completely on their own with no help on how to continue their process. The potential feeling of being left alone manifested in that the gap was labeled the *cliff of faith* (see figure 5.10), highlighting that the user gets no assistance in where to start their path in learning the features of the software. This lack of user assistance potentially results in interruptions in the flow and missed opportunity in guiding the user to relevant knowledge in regard to the software. Further, as seen in the Canva and Basecamp UX-curves, by providing the user with feedback and drive during their first interaction with the service, the user has the potential of understanding the software much faster. Preventing this weakness in the second gap, has the potential to create a good foundation of continued use and exploration, as the user will not get stuck in learning basic features. Solving this problem is expected to require more than a point effort. A way of approaching this weakness could be to divide the onboarding path into sections, and view these sections as individual onboarding paths to be designed where each section needs to contribute to the whole.

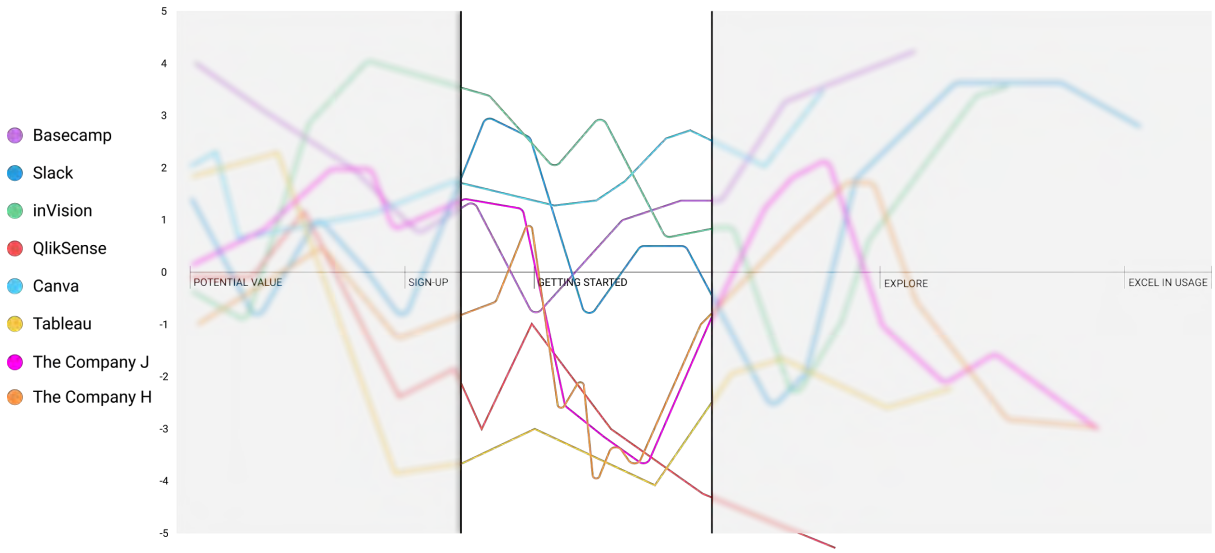

Figure 5.10. The second gap, labeled cliff of faith, in the UX curves of the evaluated onboarding processes.

An interpretation of the UX-curves is that by creating a well-designed path, which prevents the first and second gap, it will increase the likelihood of the user reaching value at later stage in a desired way.

Comparing the less complex against the complex services (see figure 5.11), the result shows that the less complex services are rated higher in their onboarding process. However, the overall impression was that the less complex services had also put more effort and time in designing their onboarding process.

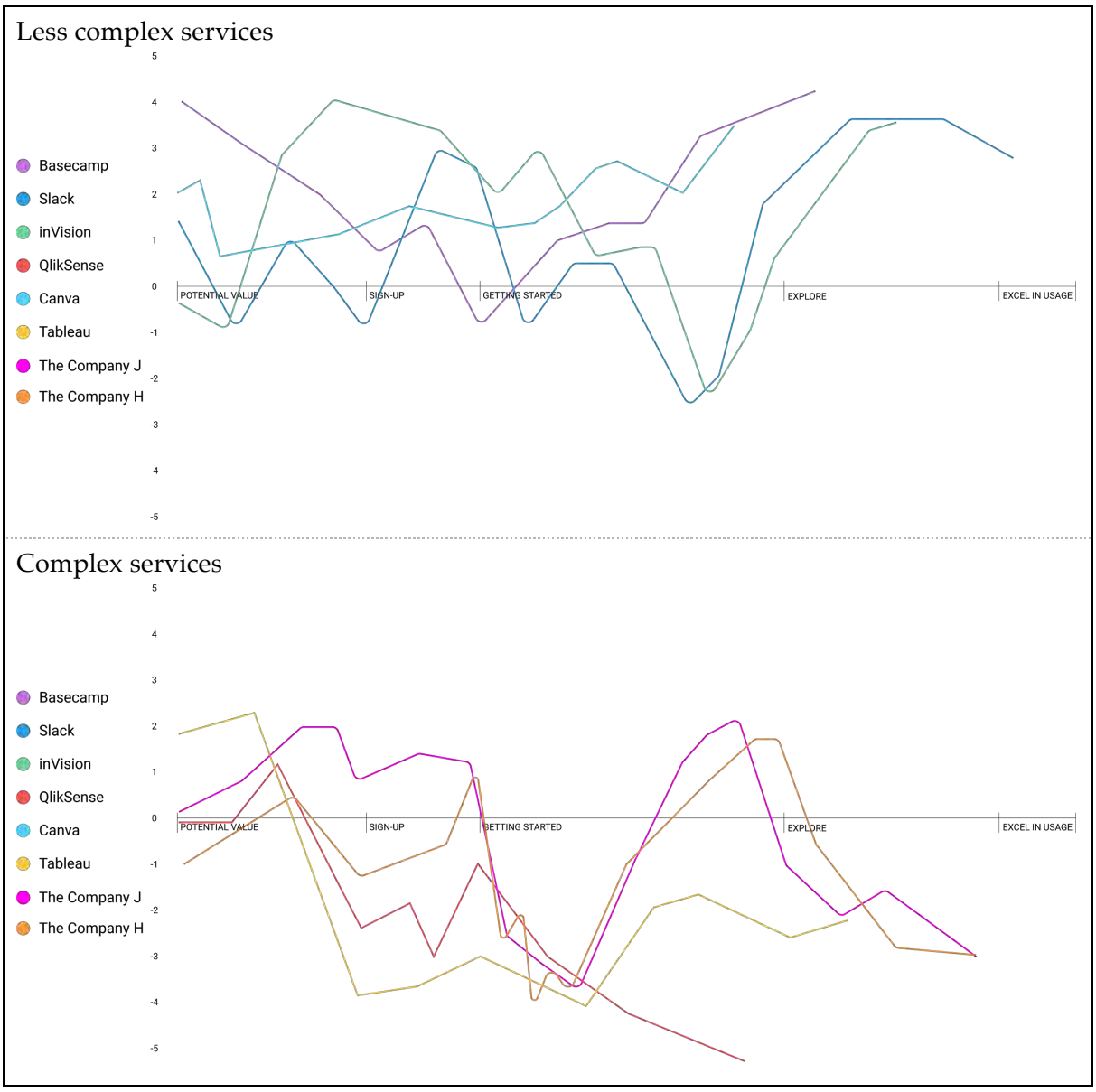

Figure 5.11. Comparison of UX curves between less complex and complex services.

5.3.1.3 The two Company evaluations

As with all of the evaluated services, two different evaluations were carried out by two evaluators. However, with the company software the two evaluations were plotted in two different paths in order to highlight the different entry points to the service as well as the difference in experience which followed from this. This section describes the major takeaways from the two evaluations and does not cover each aspect.

The evaluation labeled "The Company H" (see figure 5.12) started by clicking a Google ad leading to a campaign site. The evaluation labeled "The Company J" started by entering the

Company website in order to try the service. As a result of the evaluations taking different paths in order to explore the service, the experience of the journeys proved to be very different in some parts. This could indicate that the onboarding process is not approached in a holistic manner and thus lacks a well curated path and omnichannel perspective. A clear example of this was that The Company H journey, where the journey started with an embedded and highly frictionless sign up form that was filled out on the campaign website. However, when clicking to access the free trial, the user was transferred into the regular sign up form and the regular path, which was taken by The Company J evaluation. This transfer between sign up forms occurred without any feedback and without transferring any already filled out information. This also had an effect of generating two different welcome emails leading to different "quick start guides" creating points of disconnect for the user. This difference between the journeys for the user could mean the difference between a good and bad start when taking on the software. This could increase the risk of potential users dropping out already at this stage of the process.

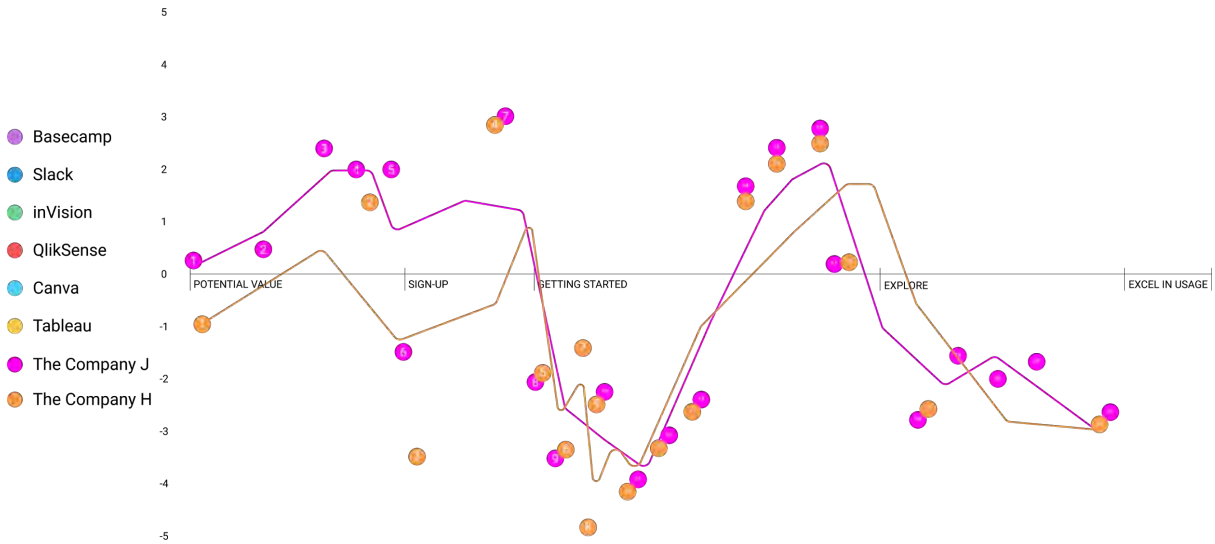

Figure 5.12. The Company J and the Company H UX curves. The cliff of faith is evident, starting at the beginning of the "getting started" phase and climbs upwards again toward the "explore" phase.

In the evaluations, it was also discovered that before signing up to the software and up to launching the browser version in the free trail, the user is provided with little insight of what will actually be encountered when done with the process of signing up. Few insights are provided where the user either gets to know the software in use or where the user will start working from when initiating usage. Improving this lack of *product priming* could with small means help the user in being better prepared when initiating usage of the software.

The choice between desktop version and browser version in the Company software, which is presented to the user after sign up, is a very good example of a section where points of frictions and disconnect are removed. This step is clearly focused on what is relevant in that step and could thus be considered a quick win for the user. Two clear call to action buttons distinguish between the possible choices which are explained by brief bullet points containing value propositions.

As can be seen in the two UX-curves (see figure 5.12) of the evaluations the cliff of faith, where users are left unassisted, is as in many of the other evaluated services evident in the two Company journeys. This drop in the UX-curves, manifesting negative experience, is

considered the most impactful in terms of affecting the user experience in that it leaves the user to commence the learning of the software without providing any guidance. In the Company software, this occurs just after making the choice of launching the service in the browser (see figure 5.13). The user lands on a page which displays a library of sample analyzes that are made in the software. The folder which makes out the first view for the user is not the head folder in the library, but a subfolder that contains samples which can be explored by users. Starting with these samples could potentially be a good start for users in taking on the software, but there are aspects in this page which removes these potential benefits for users. For example, users lack an overview perspective of the structure of these folders, as they land directly in the subfolder. This view also lacks clear purpose as to where users have ended up which creates friction in where to start and to continue the journey of their first time usage.

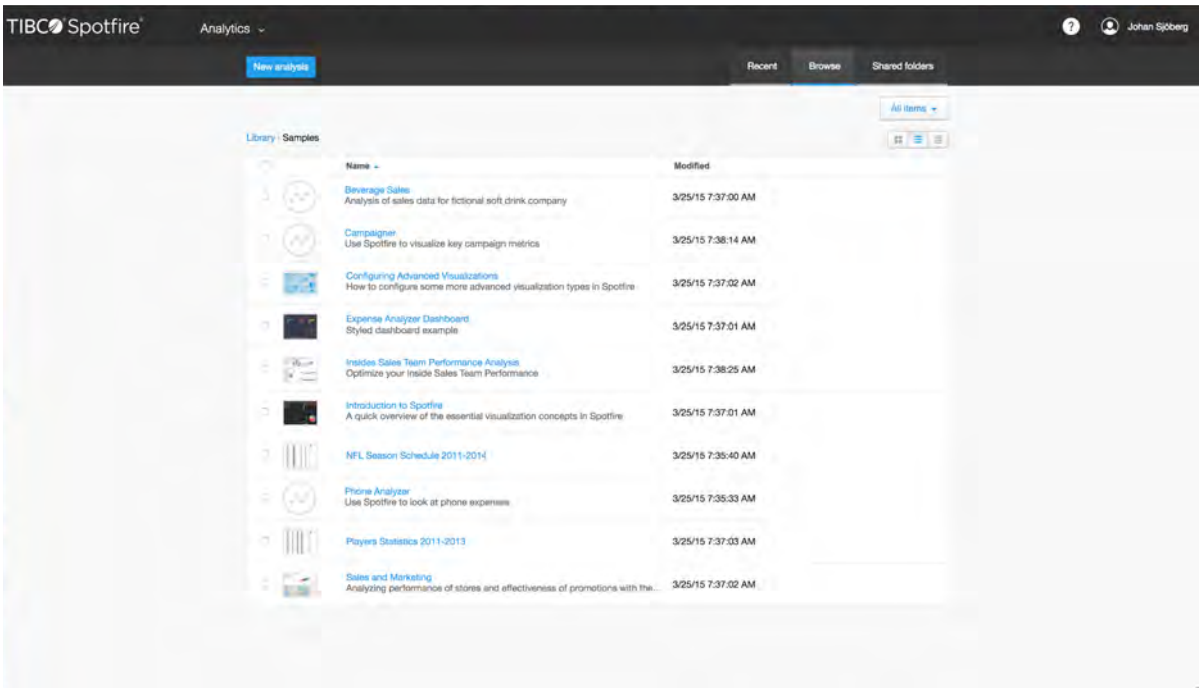

Figure 5.13. Screenshot from the Company software, showcasing the subfolder where users land after launching the browser version.

In the two different evaluations, one sample data set with beverage data and one sample data set with an interactive tour was explored, to get to know the service. None of these samples were highlighted as a potential starting point for users and thus the samples were chosen by chance in the evaluations. Moreover, as the samples had their starting point in a mode which is meant only for viewing, a clear point of friction appeared. This point of friction occurred when not knowing that the "edit"-mode was required to be activated in order to interact and build visualizations. The "edit"-mode is by default activated when creating a new analysis with own data. An explanation of how to activate the "edit"-mode was left out, leading to a point of friction which highly affected the rest of the experience. This problem could easily be fixed by for example adding a hint, but what seems important is its representation of the samples not giving the user an experience of being part of an onboarding experience providing a clear entry point to the software. The interactive sample posed the same problem but the sample proved much more beneficial in learning some of the basic features and to a higher degree provided a sense of being guided into taking on the software. Unfortunately, this sample was hidden in a separate subfolder which was

encountered by chance when exploring the folders. As an example, this could have provided users a clear way into the software as a part in an onboarding path, by clearly highlighting it as the place to start exploring basic features in the software.

As the cliff of faith appears in the moment when the user is about to actually start to use the software, it should be carefully designed considering what the user encounters the first time and what possibilities of continued usage are presented to the user. The confusion of where to start thus poses possible points of friction for the user in a state where it might be the most crucial time for points of friction to not exist. If a user has just recently chosen to take the step of signing up to the service and has been provided with the clear choice of launching it in the browser, just to land in confusion, there might be a high risk of the user leaving the software completely in this stage. From an onboarding perspective, this section can be considered of having much potential of improvement. This could mean to initiate the very important part of starting to get to know essential basic features of the software in order to reach an understanding of what the value might really be for the user.

Several good efforts have been made in order to assist users in the first time experience (see figure 5.14), such as providing a clear call to action to create a new analysis, the recommended visualization window and hints. However, in current state these efforts lack a clear place in the onboarding path. The recommended visualization window provides a quick win of creating visualizations which are suitable for the data users want to visualize. It allows for users to quickly get insight in the potential of the software and can thus be considered a good value proposition. However, it runs the risk of not being fully understood when lacking contextual connections in the onboarding process. Meaning, even if users are provided with a quick win it is unclear if they understand how to proceed in the continued exploration of those visualizations. Thus, an approach to the whole onboarding path, or at least a defined part of the path, need to be made in order to make each step of the process valuable and with a clear place in the path.

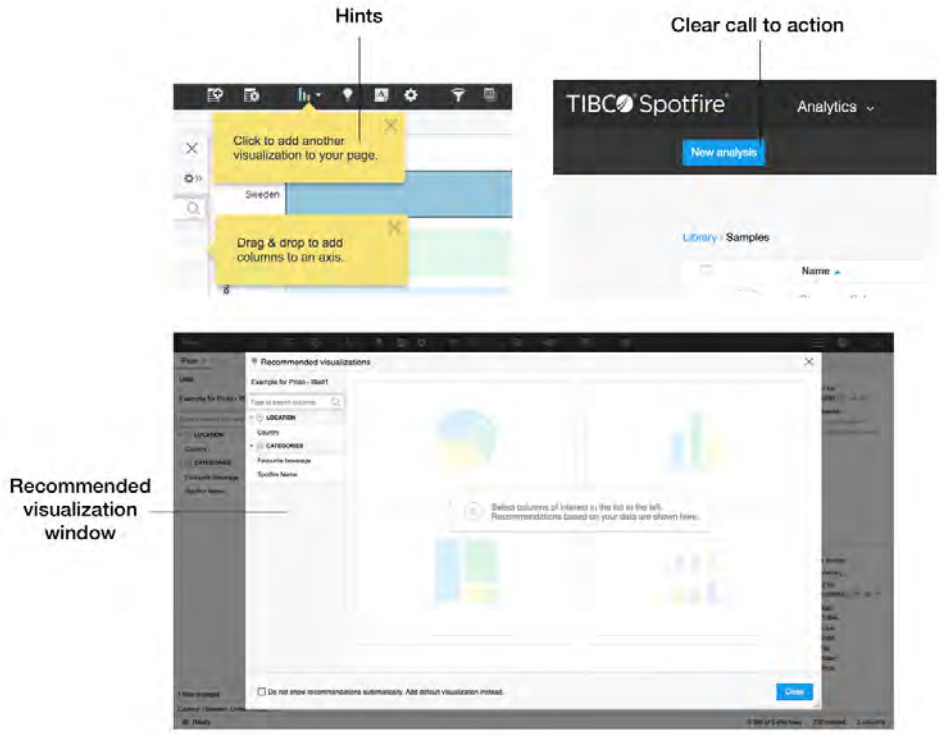

Figure 5.14. Assistance provided for users in first time usage of the Company software.

An example of lack of good transitions and consistency between channels and user assistance occurred in the late stage of The Company J journey where support was needed. As learning via images or video was in this case preferred, the chat support to get guidance of how to continue was used as a channel to get help. When asking the support for help in how to get started in the chat, a link to the YouTube channel was supplied and not a particular video for more specific help. Unfortunately landing in the channel did not prove helpful in finding context specific help and thus lead to the Customer J's journey encountering friction in continuing the onboarding.

5.4 Interviews

With the purpose of investigating different perspectives of onboarding and omnichannel and gather knowledge of how work within the Company around these subjects are carried out, a series of semi structured interviews were conducted. A total of four employees on positions in the departments of marketing, engineering, product management and user experience were interviewed. Three of the interviews were held at the Company's office and in the last one video call was used, due to differences in time zones. The interviews length ranged between 30 - 45 minutes depending on the overarching knowledge the interviewee had towards onboarding and omnichannel. During the interviews the conversation was recorded and the interviewees were told that they were to be remained anonymous.

5.4.1 Result and analysis of interviews

The interviews yielded a variety of interesting results, ranging from basic Company software knowledge that users are in need of, to overarching company situations and guidelines. In all the interviews, a clear interest in regard to the onboarding process was evident. The major takeaways which were gathered across the interviews were that users need to have a question in regard to their data when working with the software and that the strength in the software is when a user is not only understanding the visualization but also the analysis process. Further, one interviewee argued that the onboarding process needs to focus on a set of basic features in the usage of analytics software. These features; visualization, aggregation, filtering and custom expression were considered as being the most prominent when trying to learn and understand the Company software.

In the interviews, it became clear that even though onboarding was considered a relevant and important subject, no clear strategy or area of responsibility for this domain existed. The different channels which are relevant to the onboarding of new users are also not considered as a whole in regards of achieving consistency between channels. However, achieving a streamlined flow across channels was put forward as an important matter in order to achieve a better experience for users. Furthermore, to better assist users both in the beginning and throughout continued usage, a smorgasbord of possible channels and ways of getting assistance must according to one interviewee be evident and introduced to users.

Lastly, metrics was a non-existing subject in regard to onboarding except for a few initiatives. One example being user research into conversions from free trial to paying customer, in the form of interviews. This knowledge could potentially be used in improving the onboarding process, but the data gathered from the interviews is as of now not used in this way. Unfortunately, this data was not obtained in this project.

5.5 Further delimitations

As designing and testing a whole onboarding process was deemed too extensive a task for the time scope of this project, further delimitation for prototyping was required. Based on the results from the benchmarking expert evaluation and the interviews, a decision was thus made to narrow the focus for the prototyping phase of the project. The notion of *cliff of faith* clearly represented a weak point in the onboarding process for almost every product included in the benchmarking. It was therefore decided as the area of focus for the subsequent prototyping phase. The problem thus also existed in the Company product and as the problem was even more evident in the complex products than the less complex ones in the benchmarking, further motivated the area of focus.

It was decided that the omnichannel perspective was downscaled and not to be considered strictly. In following design solutions the aim would not be to try to achieve omnichannel rather be used as inspiration to make use of existing channels in this context.

As the use of metrics was not, at the time, a part of the Company software development, this could not be used to measure the effect of any design solutions. However, it was assumed that certain metrics could exist in the Company software when exploring design solutions.

5.6 Ideation

Two main activities were carried out with the purpose of exploring the design space and generating ideas. First a design workshop was held with the employees in the Company UX-team and later a brainstorming session which intended to further explore the ideas which came out of the workshop.

5.6.1 Design workshop

With the purpose to explore design solutions for approaching known problems in the onboarding process of the Company software, a workshop with nine employees in the Company UX-team was conducted. The workshop was based on the outline described in section 4.2.8, with the intent to create a well-planned workshop with structured activities. The workshop was led by the two project group members acting as facilitators and the orientation was to use the qualities identified during the literature study, focusing on self-service users and with the aim to design a continuous path after the user has chosen to enter the browser version of the Company software. This, to collect and extract ideas and thoughts of how users can continue their onboarding process, by making use of the knowledge of the Company UX-team. Further, an important aspect was to identify if the qualities were concrete enough to be used in the process of creating design solutions and how the UX-team talked and discussed about the qualities. The produced outcome of the workshop was low-fidelity prototypes which in later stages of the project were to be used in the brainstorming.

The workshop started with a presentation of the literature study, the quality framework and the benchmarking evaluation of different companies to make the participants understand the circumstances of the workshop and delimitations. After the initial introduction, a presentation of the core qualities was carried out. The delimitation of only including the core qualities was done as they were deemed more relevant to the cliff of faith context and to narrow down the scope for the workshop. These qualities were meant to function as a basis for the workshop, where the participants were to create design solutions with the qualities as guidance. An explanation of the cliff of faith, visualized with the help of the UX-curves, was conducted to further guide the participants of where in the onboarding process to focus possible design solutions. At the end of the presentation, the actual goal, task and delimitations of the workshop were explained with an associated storyboard (see figure 5.15).

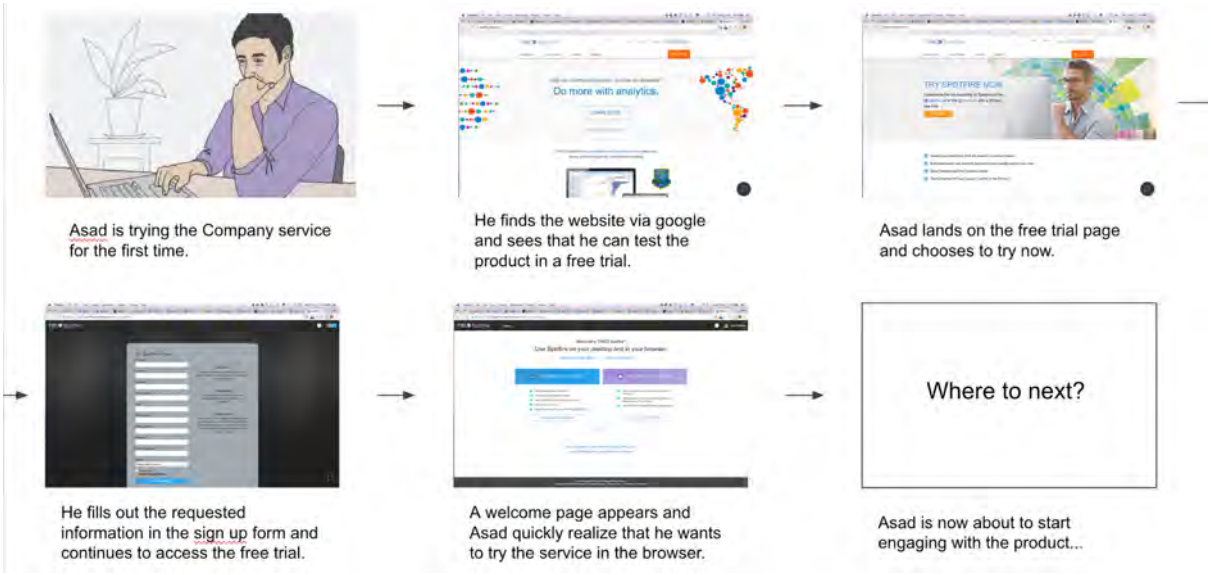

Figure 5.15. Storyboard presenting the scenario used in the workshop.

The participants were then randomly divided into groups of three people. Using bigger groups would have meant it being difficult to extract relevant information in the timeframe of the workshop. The workshop was structured in two iterations that lasted 20 minutes each in the design phase and 15 minutes in the end of each iteration for explanation and discussion of the design solutions. The task in the first iteration was to design a path forward from the end of the storyboard, guided by one quality in order for the persona Asad to reach the goal of learning the basic features in the Company software. The basic features and the quality were chosen by the participants, from their perspective, as they work with the software each day.

In the second iteration, the delimitation was changed so the participants could choose freely between the qualities or skip them completely. The task was to continue on the previously designed solution or taking a new approach. Further, the design goal was slightly changed in that participants were asked to design a well curated path. This, to mainly get the participants to start to consider the overall picture and that the process in user onboarding often consists of many steps.

During the workshop, the two facilitators walked around between the three groups and took notes and answered questions. Notes were also written down during the discussion after each iteration, to later be analyzed along with the different low-fidelity prototypes that the groups made during the workshop.

5.6.1.1 Result and analysis of design workshop

After the workshop the findings were documented and discussed between the two facilitators to extract as much detailed information as possible. The low-fidelity prototypes were marked with group number and during what iteration the prototype was produced. Early on during the workshop the understanding and usage of the different qualities in the groups was widespread and discussions of ideas in terms of the qualities were conducted. Of all the qualities that were introduced in the workshop the most prominent ones, in respective order, were make use of learning by doing, quick wins and user assistance. Two out of three

groups used make use of learning by doing in the first iteration where the last one choose to prototype around the quality quick wins. The quality user assistance was more used as a collective term to get all the users in the group to be on the same side and move toward a collective goal. There were several basic features explored and used in the different iterations. These ranged from, relatively simple features such as creating a new analysis, loading data, create a visualization, filtering in data and marking in data to more difficult features such as create a details visualization and custom expression.

All groups used the qualities to some extent to either discuss the design solution that they were about to design or use it to talk about already existing solutions during the workshop. During discussions, most of the participants in the workshop agreed upon that the qualities shouldn't be used too strictly, but instead guide and support the discussion when coming up with new design solutions. Further, the qualities could also be used as checklist or topics of discussion to evaluate already implemented design solutions. This, to have a standardized way of talking about what should be or is already implemented in the onboarding process.

It was confirmed that the cliff of faith, which was found in the evaluation when first visiting the browser version of the Company service, is a problem. The participants of the workshop agreed that this occurs but were also eager to point out that when designing for onboarding problems the solutions run the risk of only pushing the cliff of faith forward, which is not desirable. Instead one should strive for removing it completely. Further, this phase in the usage of the service should support the excelling in usage to counteract the possibility of users stopping to use the service.

There were differences in how the starting point of the low-fidelity prototypes were designed after the user has chosen to enter the browser based version of the Company service. One group continued from a view in the service called recommended visualization and discussed that it is a great way to start exploring what the service can do for the user to propel in usage. However, a major downside is that the user may have problems of understanding basic features due to that the service recommends visualizations instead of letting the user explore and figure it out by their own. Another group explored the space of how the user can explore and learn new features of the Company service immediately after choosing to enter the browser version of the service. This, by adding a section to the already implemented view where users can explore and get contextual information and inspiration independent of knowledge level. By doing this, the onboarding period will be prolonged by including information and guidance for new and old features in the service and the cliff of faith will not be pushed forward, instead removed.

The last group designed a totally new starting point that had its foundation in presenting the most basic understandings in regard to data and datasets to the user. The participants of the workshop argued that users´ understanding of data is of great importance. By presenting a dataset with rows and columns that will be used, the user will potentially have an easier time understanding how to create visualizations based on that data. On top of presenting the dataset, the group explored the possibility of creating a visualization that is based on the data. This to enhance that creating visualizations of data is the strength of the service and to investigate if users could have an easier time understanding the Company software, or to make users understand the foundation of analytics software.

5.6.2 Brainstorming

Based on the sketches and findings generated from the workshop, a brainstorming session was conducted. The purpose of the brainstorming session was to further develop ideas and to extract interesting insights from the outcome of the workshop. The aim was to explore possible design solutions for how to prevent users from being left unguided in their first time usage and to not procrastinate the problem of the cliff of faith by pushing it forward in the onboarding process.

The brainstorming session was divided into four parts. Each part consisted of a 20 minute long section for generating ideas, with a following five minute long discussion. Four themes that were extracted from the workshop as well as the literature study worked as the foundation for each part in the brainstorming session. The first theme was *layered design* which was included to explore possible ways of handling complexity as mentioned in section 3.8. The second theme, called *different perspective*, was included to explore how a user can be introduced to analytics software by going back to basic explanation of data. The third theme, called *challenging the user*, was meant to identify ways of building motivation for continued learning independently of a user's knowledge level. The last theme, called *recommended visualization*, was included to explore how the specific feature of the recommended visualization window in the software could be used in an onboarding context.

For each idea that was generated in the brainstorming session, four basic features were to be included or considered to make sure that the idea involved the most important parts to learn for new users in the Company service. The basic features were identified in the interviews with company employees as well as in the workshop and involved how to create visualizations, filtering, marking and how to create custom expression in the Company service.

During the entire brainstorming session, the qualities mentioned in section 5.2.1, were used to generate new ideas and evaluate existing ones. Further, the qualities helped to discuss the ideas in terms of fulfillment towards the different themes and how certain qualities could help to improve how users would learn the basic features.

5.6.2.1 Result & analysis of brainstorming

After the four parts in the brainstorming session, an affinity diagramming session was held. Initially the idea was to identify tacit groupings, however this did not yield a satisfying result, due to difficulty in identifying groupings. A better result instead came out of trying to combine the ideas by creating frameworks, which could be discussed with a shared goal in the design team. This approach yielded two concrete concepts. The first concept called the *circle of data life* (see figure 5.16) which had two entry points. The second concept, called *progression flow* (see figure 5.17), was more towards challenging the user and provide guidance in the usage of the Company service. Both concepts had their foundation in the different perspective theme.

Circle of data life

The concept circle of data life (see figure 5.16) was generated after the affinity diagram session and had its foundation in the different perspective theme. This theme was meant to answer the question; "How can users get a better understanding of analytics software, if presented with a basic explanation of data?". The answer to the question, was to create an

idea where users gets familiarized with the rows and columns that will be used in the data set and present the same data in a visualization. After the presentation of the dataset and the visualization, users get to create the visualization themselves in the Company software. The whole concept of circle of data life, which can be seen as an introductory tour, consists of five steps (see figure 5.16):

1. In the first screen users choose their level of expertise, in relation to the Company software. This to customize the tour for user's preferences. At the same page, users make the decision to take the tour or go directly to the main page.
2. If the decision is made to take the tour, a dataset is presented with very easy and self-explanatory data. Even if the data is self-explanatory, users should still be able to ask interesting analytic questions, based on the presented data. This, to make users realize that the important aspect of analytics software is to understand the raw data that is used.
3. After the raw data has been displayed to users, an analysis based on that data is presented including finalized visualizations that have been created in the Company software. By displaying the visualizations based on the raw data, users can see a real case usage and possible benefits of using the Company software. The visualizations are created only using basic features aimed at answering relevant analytic questions.
4. To learn the basic features, users create the visualizations presented in the previous step, in the Company software.
5. The final step consists of assisting users through the process of creating the visualization. This can be done by learning by doing, a step by step interaction and using a layered design approach.

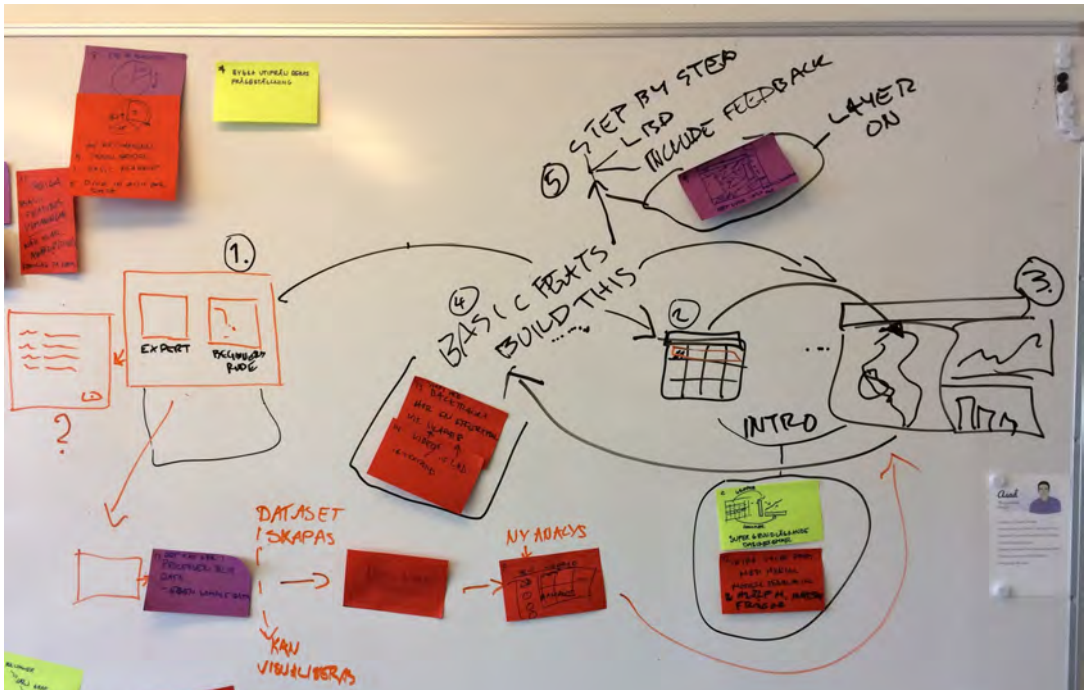

Figure 5.16. The idea of circle of data life including the two different paths.

An alternative idea for an entry point to the introductory tour consisted of displaying how users can load data in the Company software instead of visualizing the rows and columns in the beginning of the tour. Further, by gathering the information from the sign up form, a more personalized dataset could be created by using the gathered information. The entry

point could also involve a question, for example what is your favorite fruit, where the answer is bundled with the information gathered from the signup form. The dataset is generated into a spreadsheet, that users download and use to create a new analysis. The tour would then continue from step three of the circle of data life concept.

Progression flow

The idea of progression flow (see figure 5.17) was to guide users with feedback in forms of steps that should be completed. By creating an alternative landing page for users after launching the browser version of the Company software, users are presented with clear progress feedback of the onboarding process status. Each step in the progress feedback is interactive where relevant assistance in different formats, such as video, image, text, or step guide can be accessed. Users should be able to access the progress feedback and assistance in some form from anywhere in the Company software. For example, embedded learning by doing guide or a floating menu that expand if interacted with.

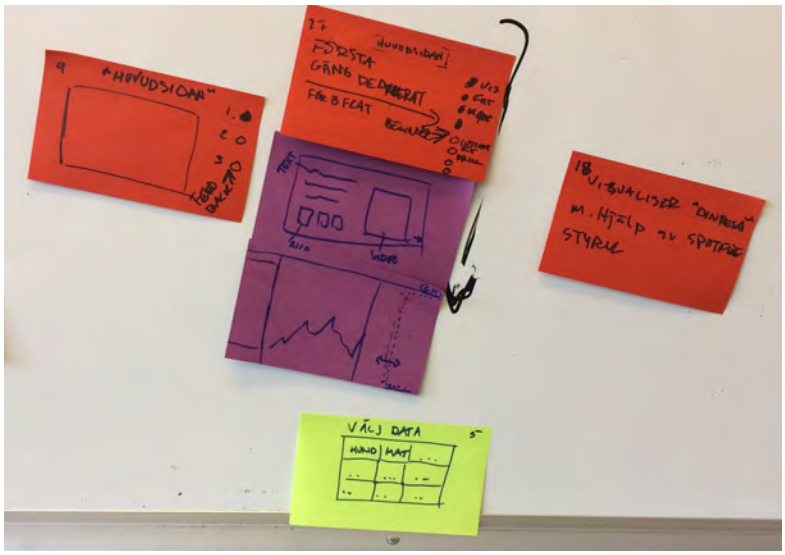

Figure 5.17. Ideas for the progression flow.

This idea can also be viewed as a part of the circle of data life concept, where this idea could function as a conceptual framing for continued learning after being introduced and taught the basics features. The progression flow will then be a means for users to learn more in relation to the Company service.

5.7 Prototyping

The ideas from the ideation phase were prototyped and tested in two iterations with the purpose to explore how the possible solutions could be realized and how they would work in relation to potential users. Each iteration included low-fidelity prototyping with wireframes, an interactive high-fidelity prototype and remote user testing to evaluate the interactive prototype. The following section describes the process and result within each iteration in more detail.

5.7.1 First iteration

Based on the outcome of the brainstorming a series of low-fidelity prototypes were created which were used as a basis for the interactive high-fidelity prototype. The interactive prototype was tested in two different remote user tests. The process of creating these first iteration prototypes, result and analysis as well as comparison between the two user tests are covered in this section.

5.7.1.1 Low-fidelity prototyping

To explore different ways of how to realize the ideas that resulted from the ideation phase, a series of low-fidelity prototypes were produced in an iterative process. The prototypes took the form of wireframes, created with the intent to communicate and explore possible solutions within the design team. The goal was to produce wireframes representing screens for most parts of the onboarding flow which had the intention to be tested. The main structure for the wireframing process, consisted of three iterations which all included a session of creating wireframes with following discussion. However, minor iterations also took place in between and after these sessions in a more unstructured manner. Before starting to wireframe, the different steps which were intended to be included and explored in the low-fidelity prototyping were outlined to guide the process.

Initially the intent was to prototype only the circle of data life concept. This changed during the low fidelity prototyping and under supervision from the Company supervisor it was decided to produce wireframes for the circle of data life with the purpose of being testable, and to also explore the progression flow idea conceptually to include a more holistic approach.

Result and analysis of low fidelity prototyping

The low-fidelity prototyping was set out to explore how to concretize and visualize the two different concepts and a series of wireframes were produced. Primarily the circle of data life concept was explored. In this, many important design problems were processed leading to decisions of how the testable prototype would eventually take form.

The initial core design problems that were explored in the low-fidelity phase were; how to make the data relatable and recognizable to users, how to make users pose analytical questions and how to design for users understanding the value of visualizations early on. Being able to relate to data and knowing its structure was an important notion to easier learn the software and build interest. In the wireframing session, this was explored by trying to prototype ways for using own data (see figure 5.18). This, by using an extremely basic data set or making use of the user's information from the signup form, as a sample data set. This was mainly explored in two different entry points for how to introduce the product to users after signing up and making the choice to launch the browser version of the software. The two different entry points captured different benefits. One of the entry points was considered beneficial in that users would use their own data and thus would have an easier time to pose analytical questions early on.

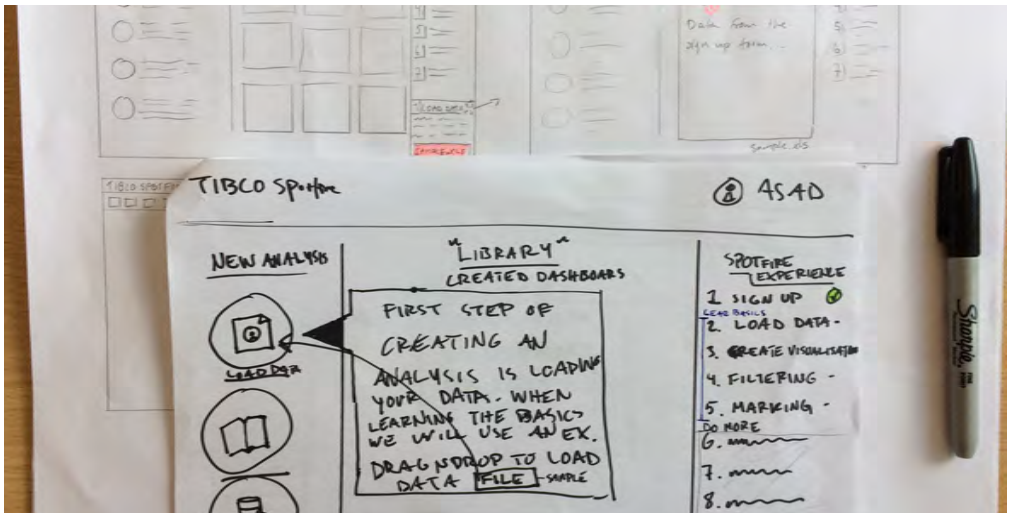

Figure 5.18. Wireframe sketches exploring the entry point of using own data.

Moreover, the benefit of exploring the different features in relation to posing analytical questions would make it more relevant than by using sample data previously unknown to users. The disadvantage of such an approach was considered to demand too many steps and that it would require users to bring own data, which would also have to be well structured in order to function. The use of own data as an entry point was dismissed because of this.

One of the benefits of the alternate entry point was therefore considered to be that users would not require their own data which might run the risk of not loading correctly. The main benefit of the alternate entry point was however that it was considered as taking a new interesting perspective on the onboarding. This entry point allowed for going back to the basics of how data is structured, making it relatable to all target users and therefore build an understanding of the power of the software, namely to quickly being able to create visualizations from which insights could be drawn. However, how to make data relatable (see figure 5.19) to a vast amount of users without dumbing the data down too much, was considered a difficult challenge. Making the data relatable could be achieved either by using an extremely simple data set and asking a question in relation to that data set, which anyone could recognize or to use data generated from the user's own sign up process.

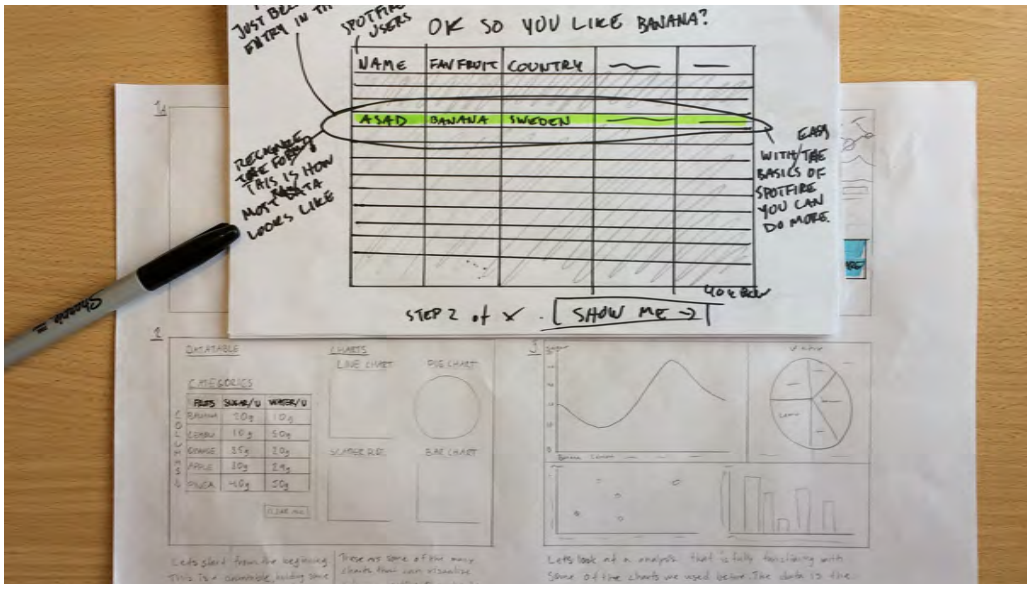

Figure 5.19. Wireframe sketches of the two perspectives for making data sets relatable to users.

The decision to include both these perspectives was made. This resulted in a flow where users were introduced to the introduction by answering a simple question "what is your favorite beverage?" and displaying the answer in a spreadsheet, with rows and columns. The data would consist of all the answers from Company users to the same question. In this way, the data from the signup process would be used with the intent of making the data more relatable for the user.

The wireframing also set out to explore how to concretize the idea of using the notion of showing users how the rows and columns in a data table could be visualized by using basic features of the Company software (see figure 5.20). The intention was to display what you could do with data and then teach users to build that same visualization by making use of learning by doing. Several different flows for how to design for users to understand the connection between the basic data in rows and columns to the visualization example of the data in the Company software were explored, ranging from several separate steps to trying to explain the connection in one screen.

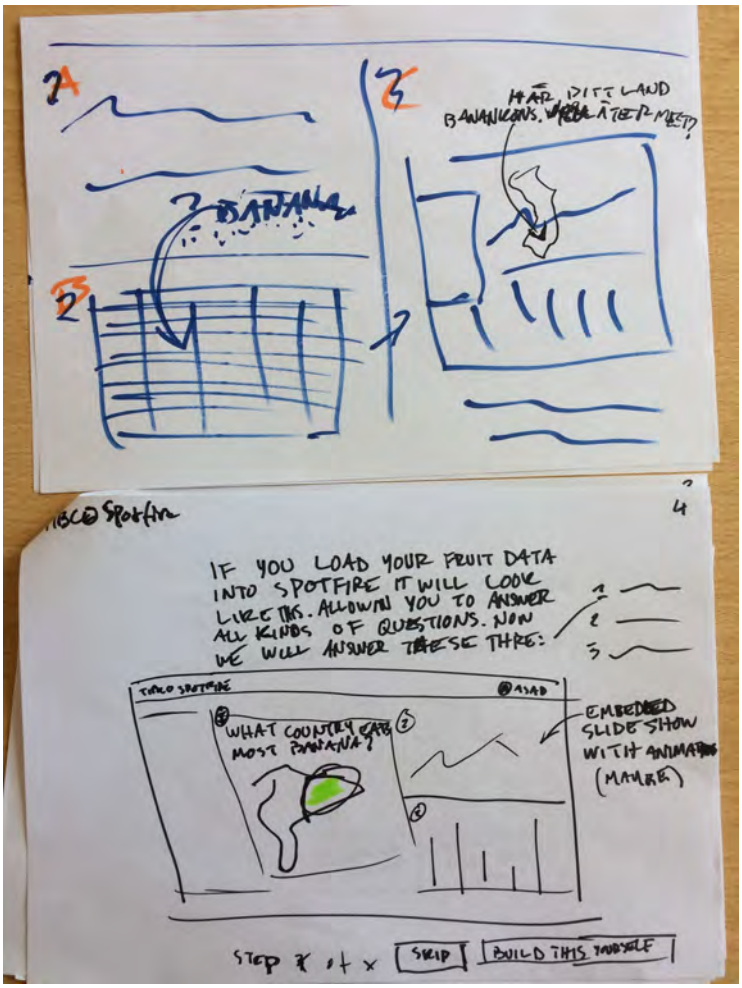

Figure 5.20. Wireframe sketches of how to visualize the transition from rows and columns to visualizations.

The inclusion of helping users posing analytical questions was also deemed as a potential powerful way of allowing for users to grasp the value early on. In the resulting wireframes, this was included by asking a question which was intended to not be possible to answer by using only data in the form of rows and columns. Then prompt users to answer that same question when seeing the data visualized which would then supposedly be quite an easy task for users.

Teaching a user the basic features by backtracking the steps of building a visualization with relatable data, which had just been displayed was considered one of the strongest parts of the circle of data life idea. The idea was that backtracking the creation of the visualization, from which the user early on had been able to see the potential of the software, would provide the user with a more contextual entry than if only using a sample without any previous introduction. Therefore, a major part of the wireframing efforts were put on this part to find a suitable way of learning the basic features of the software (see figure 5.21). This by making use of the qualities learning by doing and progress feedback and drive. The length and complexity of the step guide should not be overly extensive, yet still it had to teach users or at least introduce the included basic features. In this process, the text presented in the instructions made a big impact on users and had to be short and to the point, explaining what effect certain interaction have and why they occur. By mapping out

the steps that users need to take to complete the tasks given, relevant instructions could be formulated and included in the step by step guide.

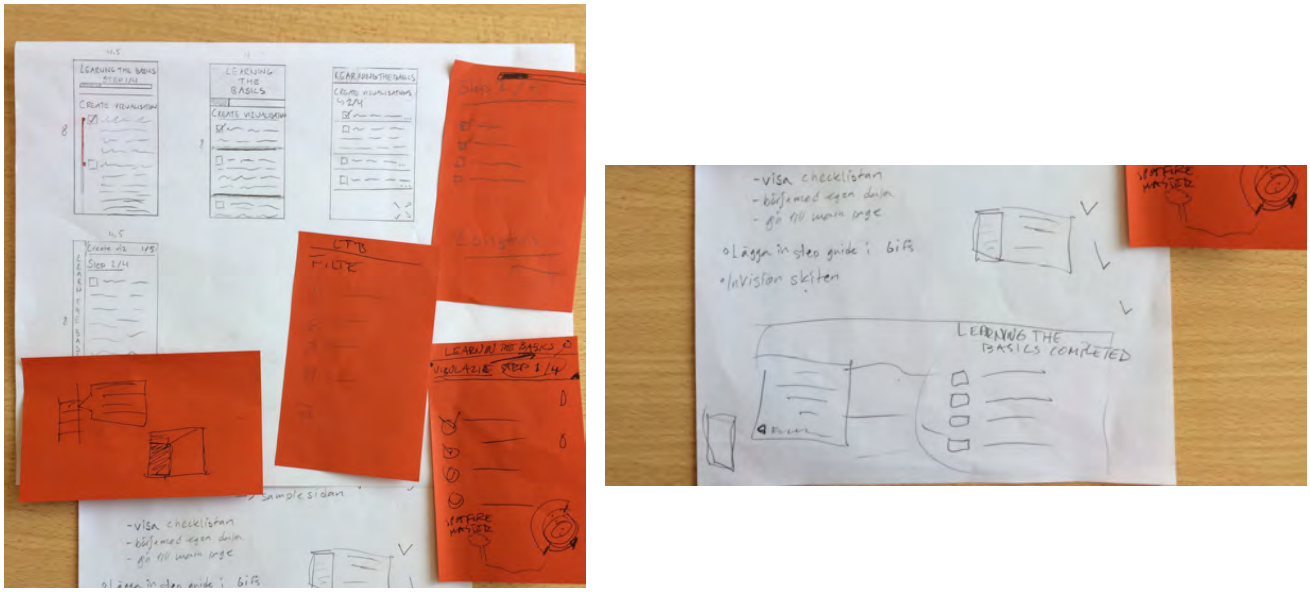

Figure 5.21. Wireframe sketches displaying different approaches to explain basic features to the user.

In exploration of how the step guide of learning the basics would take shape, a decision was made to make use of three UI-patterns (see section 3.6.2) which were deemed relevant for this part. The UI-pattern *action driven tooltips* was used to force users to execute the interaction in the flow. The UI-pattern *hotspots* was used to be able to focus text towards the value of the product rather than explaining how to interact, as hotspots take away some of the load of explaining interactions. The last pattern, called *progress checklist*, was used to better meet the quality progress feedback and drive. During the low-fidelity prototyping sessions the focus shifted from teaching users exactly how to build a visualization and rather to teaching them how to use the basic features of the software.

In creating wireframes for the step guide a goal visualization was decided upon which would include going through the basic features; creating a visualization, marking, filtering and drill down. Later, the feature customizes a visualization was also added. Before entering the high-fidelity prototyping phase all the steps which were intended to be included in the step guide were documented, to create a solid foundation for creating the interactive high-fidelity prototype. Screens for all the steps were printed which were used to sketch overlays on the actual interface.

During the wireframing sessions a decision was made to explore the concept of layered design (see figure 5.22) and try to scale down the impressions for the user when adopting the new software, as much as possible. This, by reducing noise and complexity which would allow for easier adoption of the interface and to focus on the relevant parts in the beginning of the onboarding process. The wireframing of potential ways of using layered design resulted in only including a layer on the main toolbar in the software.

Figure 5.22. Wireframe sketch of layered design being activated, in the toolbar.

This would mean not testing layered design fully following the outlines described in section 3.8. Instead, only including a small part inspired by layered design to test how potential users would perceive such an approach and if any potential benefits in using this approach would exist. A salient button would provide users with information, that the layer is on or off and with the freedom of choosing when to have it activated. Explaining this would also be part of the introductory tour. To test a more extensive layered design approach, was considered to not fit within the time frame of the project.

5.7.1.2 High-fidelity prototyping

The purpose of the first iteration high-fidelity prototyping phase was to produce an interactive prototype, using the low-fidelity wireframe outcome as foundation, which could be tested remotely on potential users of the Company software. It was decided early on in the process to use Sketch software to create high-fidelity screens and invisionapp.com to make the prototype interactive. As both software were familiar to the design team, using them would save time and prevent from getting stuck in the process. They were also considered highly suitable in achieving a desired and acceptable outcome in terms of producing a testable prototype.

The prototyping process started with creating examples of how to visualize the beginning of the flow in the prototype (see image 5.23). This part included an introduction screen and the visualization of showing the connection of data from rows and columns to a demo of the data visualized in the Company software. Partly this was done to explore how the initial part of the process could be visualized but also with the intent of creating an example which would function as a style guide for the design team. This would ensure consistency of the look and feel in the prototype and allow for division of the labor within the design team. The intention with the high-fidelity prototype was to provide the user with a native look and feel by making use of the Company visual guidelines. This was important as in following user tests, the users would have to move between the prototype and the real product.

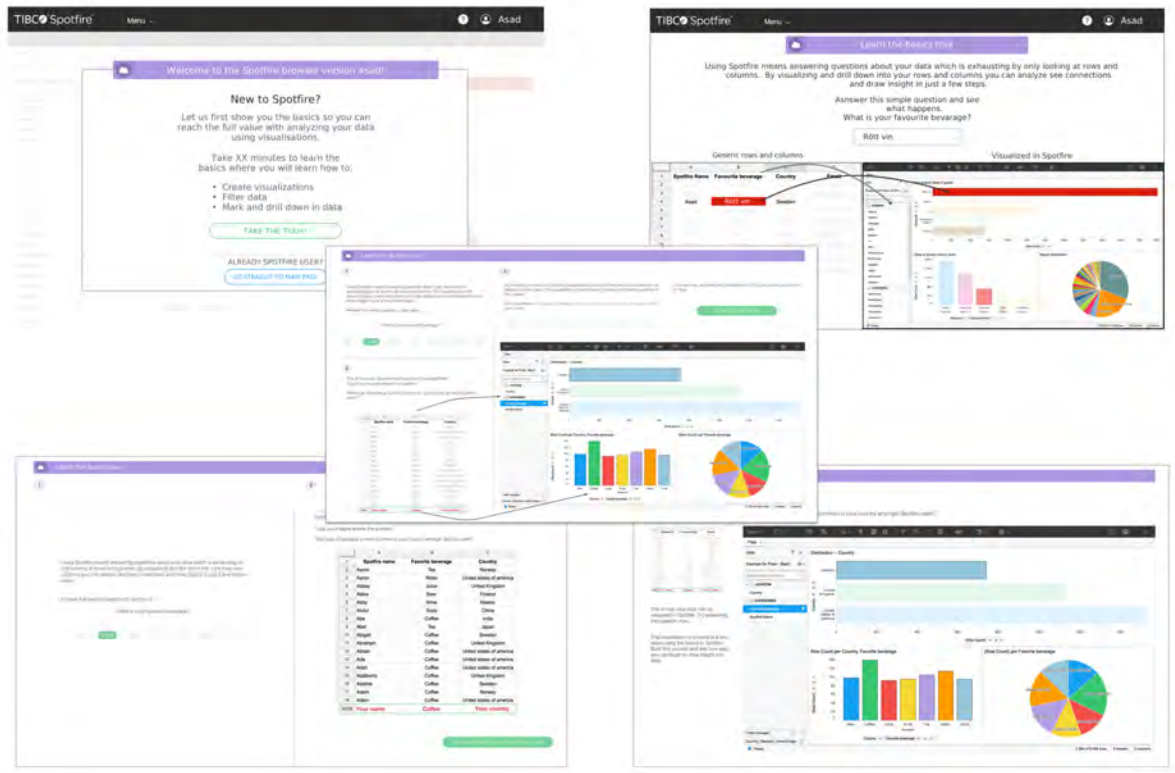

Figure 5.23. Early high fidelity prototyping screens which were produced to explore the look and feel and how to visualize the data connection from rows and columns to a demo visualization.

In the invisionapp.com tool, the only interaction forms possible were click and hover. Animations in Graphics Interchange Format (GIF) were thus decided to be included in the interactive prototype, in order to be able to show users certain interaction forms which are possible in the real product but not in the interactive prototype. This was considered important, as knowledge of which interaction forms are hidden to the user, but still central for achieving some task which were included in the learning the basics section in the prototype. Animations were also considered beneficial in highlighting the connection between information when transferring between screens (e.g. semantic connection between raw data and the demo visualization shown to a user).

In order to create an interactive prototype screens and animations were produced for each step in the prototype. The screens were then made interactive by using invisionapp.com where an interactive area can be created on a screen which links to a screen of choice by clicking or hovering.

5.7.1.3 First interactive prototype

The interactive prototype that was created based on the low fidelity prototyping consisted of two sections. A total of 64 screens and five animations were used. The introduction section, explains the raw data to the user by displaying the data in a demo visualization. The learning the basics section, is a step by step guide where the user learns the basic features in the Company software, by creating the demo visualization.

In the first screen of the prototype (see figure 5.24), the user is provided with the option to take the tour or go directly to the main page, providing an opt-out for users who are already

familiar with the Company software. A brief text instructs the user with the benefits of taking the tour as well as how much time the tour will take. A list which explains what type of basic features the user will learn, is also presented. In this case users who take the tour will learn to create visualizations, how to mark and filter data, how to drill down in data and how to customize visualization. This, to guide new users, who are in most need of the tour, to realize the importance and the potential benefit of taking the tour.

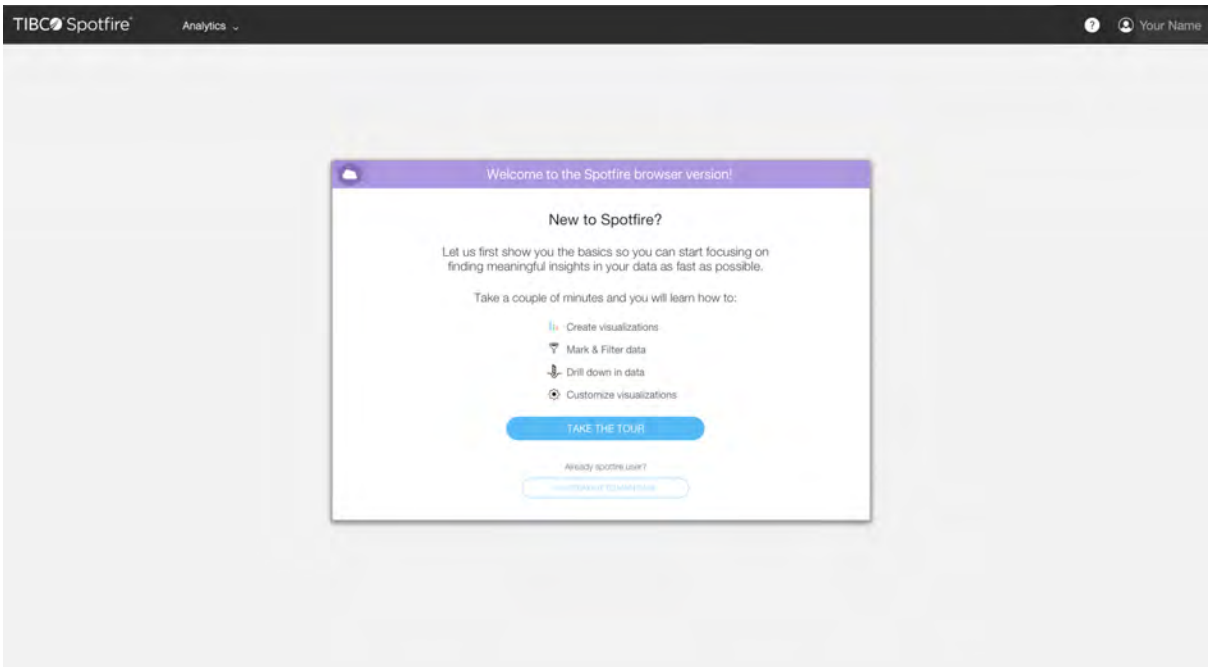

Figure 5.24. First screen of the prototype providing the user with a choice to take the tour and information of intended learning outcomes of basic features.

If the user has made the choice to take the tour, a simple question is prompted (see figure 5.25). The answer to the questions is bundled with data that consists of the name of the user and country of origin, to make it more personalized. When the user has answered the question, an animation is showcasing the transition to a new screen. The new screen displays a spreadsheet, consisting of the bundled data from answering the question and other users data. This puts the answer and the bundled data in a raw data context (see figure 5.26), with the purpose for the user to grasp the underlying structure of how visualizations are constructed and its connection to the data structure which many of the potential users are familiar with. In the prototype a question is asked in relation to the spreadsheet which is not possible to answer. But, in the next step, the question is easily answered when the data is presented in a visualization. This to introduce the user to the importance of posing analytical questions.

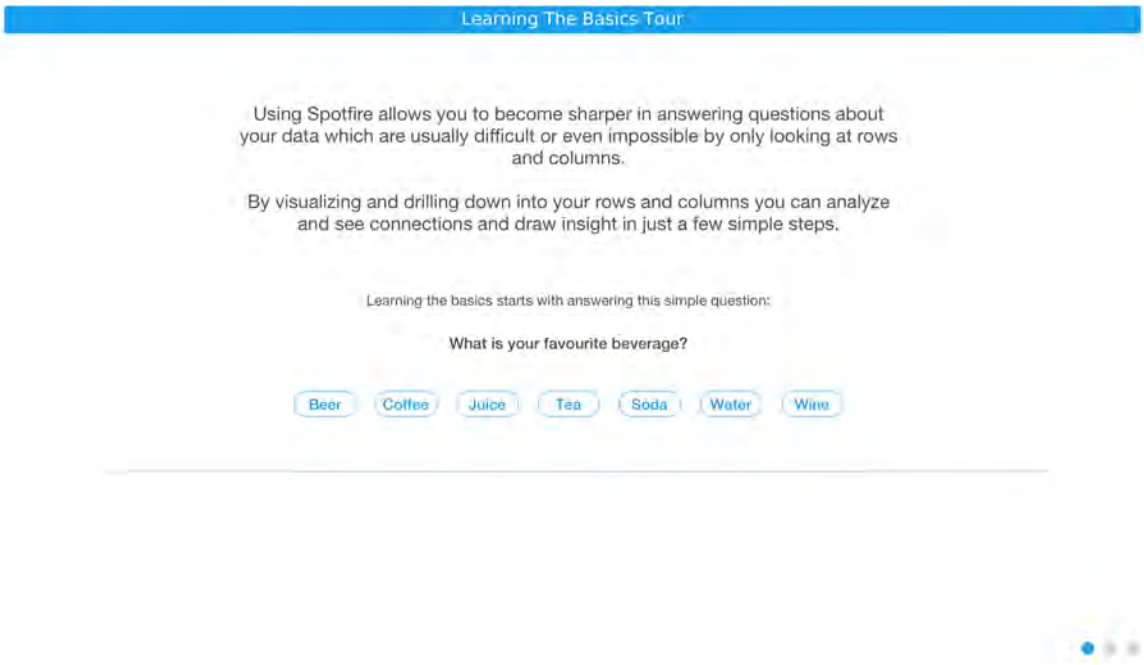

Figure 5.25. The user is provided with information of potential benefits from using the Company software and prompted the question "What is your favorite beverage?".

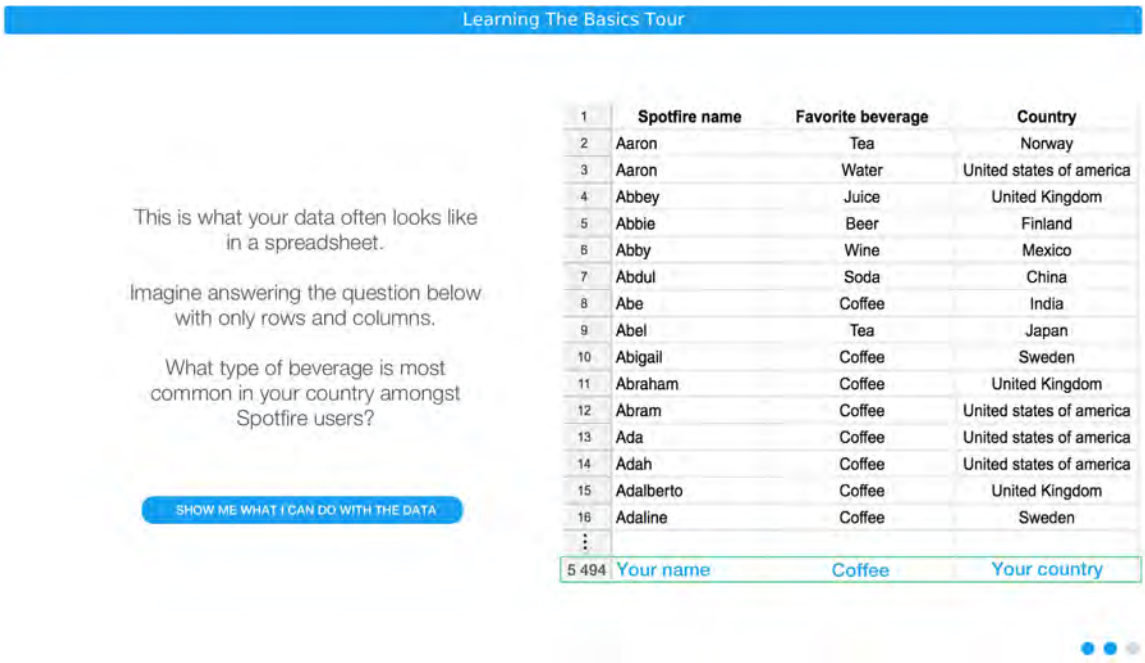

Figure 5.26. The answer from the user is presented in a fictive spreadsheet with data from other the Company users. A context of rows and columns which many users are familiar with.

In the following step a demo visualization (see figure 5.27) that is based on the spreadsheet is presented to the user. This, to further highlight how raw data is translated into a visualization as well as how much easier it is to answer the analytical question by using a visualization. By providing an early visual presentation of the Company software, the intention is to as early as possible give the user insight of what the software looks like. Further, the visualization presented is the one the user will create in the upcoming learning

the basics section. This is included to provide a mental model displaying the final visualization, which is of importance to give the user an understanding of what to achieve.

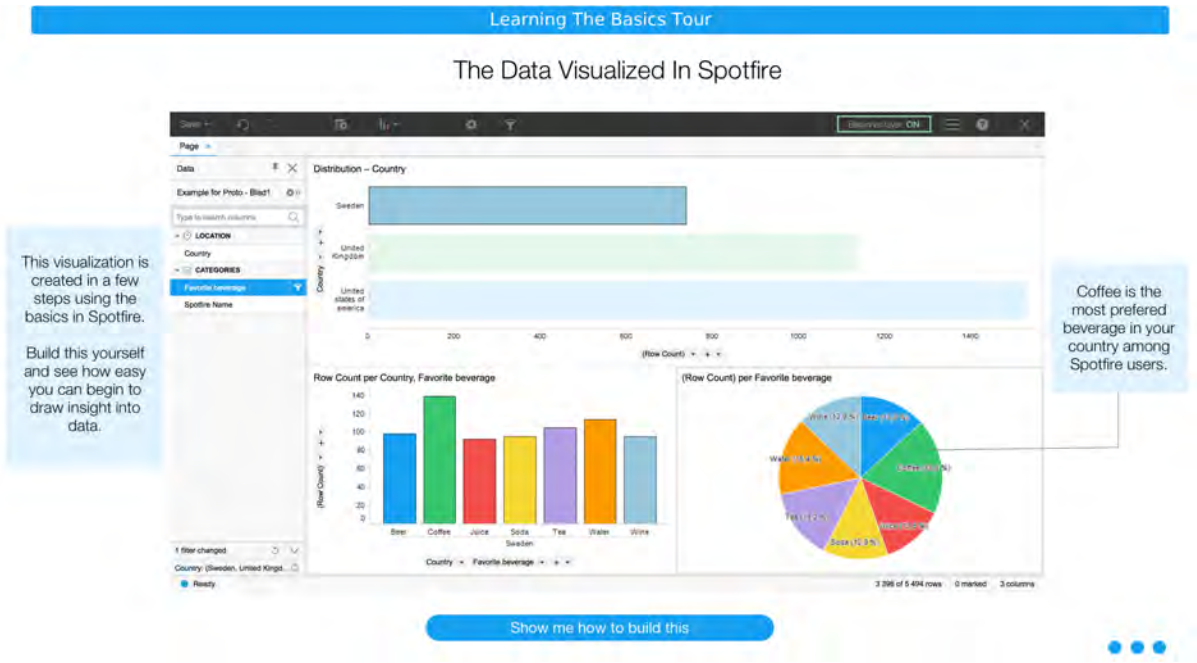

Figure 5.27. The demo visualization that is based on the previously shown spreadsheet. Text indicates important aspects in relation to the visualization.

In the beginning of the step by step guide, where the user will learn the basic features, a modal window welcomes the user to the tour and explains the step by step guide window (see figure 5.28). To introduce the user to the Company software, the background is greyed out but still visible, making it possible for the user to predict where to end up when continuing the guide. The step by step guide explains the section of the guide and progression flow to make the user understand where in the progress the user is located. The subsection explains what part of the learning the basics section the user is currently performing. Further, a prominent visual indication displays which step the user is currently carrying out in that particular sub-section, as well as instructions for how to complete the step.

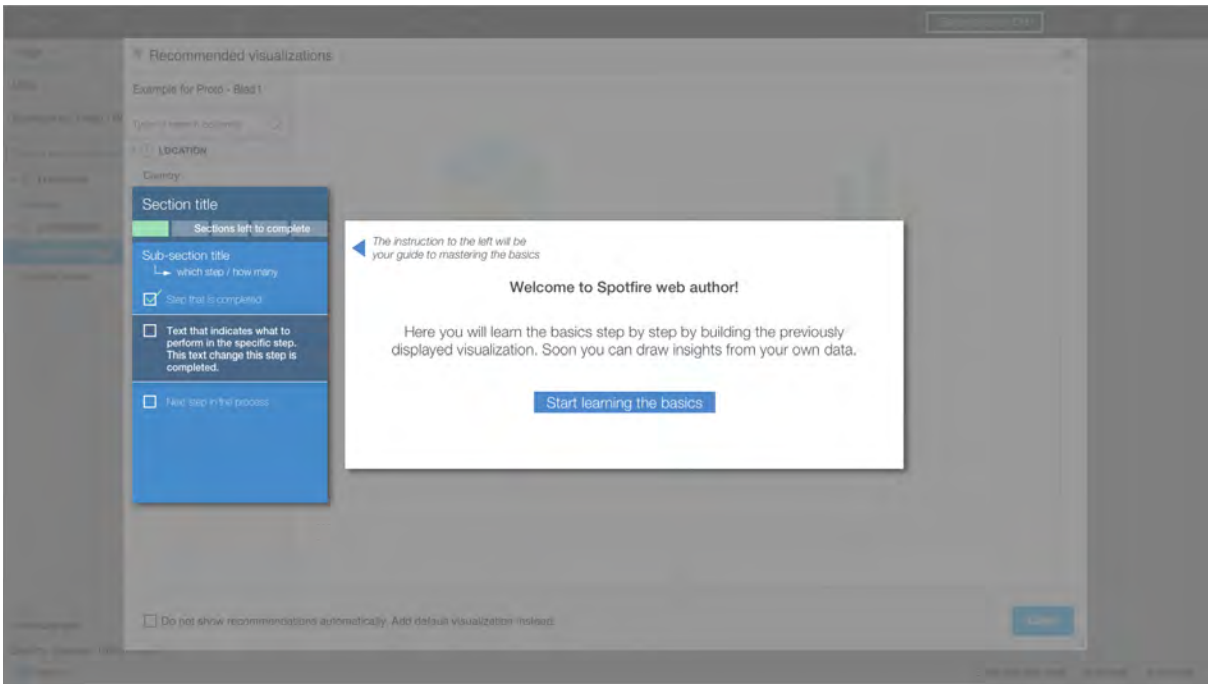

Figure 5.28. The welcome window in the first time usage of the step by step guide including text to instruct the user.

The step by step guide is explaining each step that needs to be taken to learn the basic features in the Company software (see figure 5.29). Indication with a visible hotspot, is present in the user interface to further highlight the area that needs to be interacted with, to complete the specific step. By providing the user with a defined hotspot, the written instructions could be focused on teaching the basic features to the user instead of instructing them in regard to interaction possibilities. This made it possible to minimize the amount of written text, but increased the risk that the user would interact with the hotspot directly and skip the text completely.

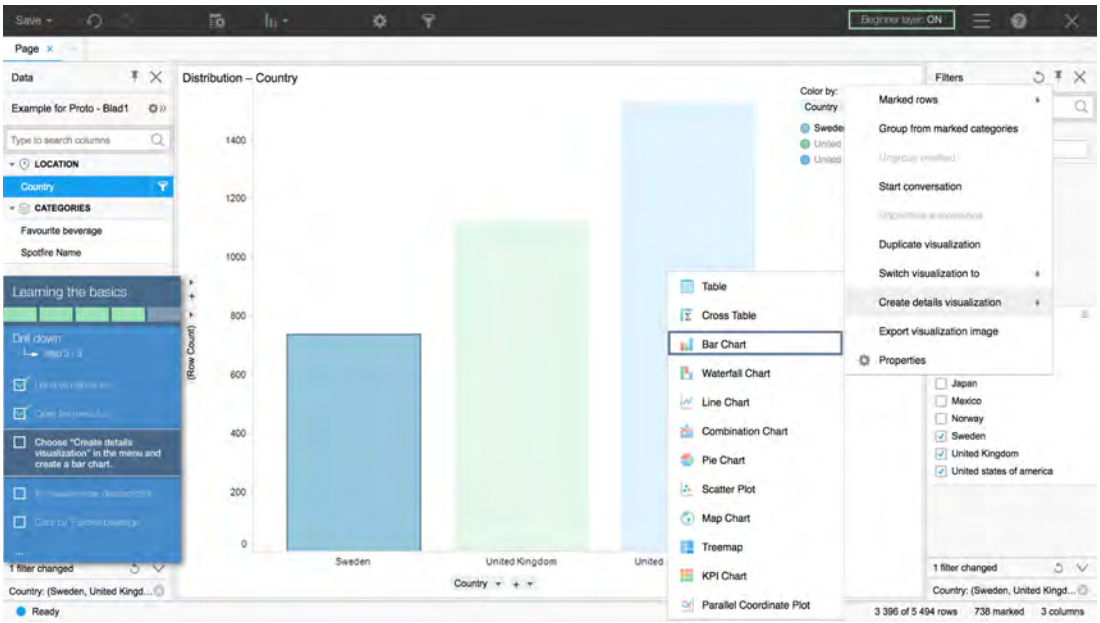

Figure 5.29. To the left; the step by step guide with instructions of how to drill down. To the right: a blue outlined hotspot, displaying what area the user can interact with for that particular step.

When the user has completed a subsection in the step guide, a message is displayed to congratulate the user for reaching a milestone (see figure 5.30). Providing an indication that progress is achieved, is included with the intention of producing a feeling of success for the user and promote continued usage.

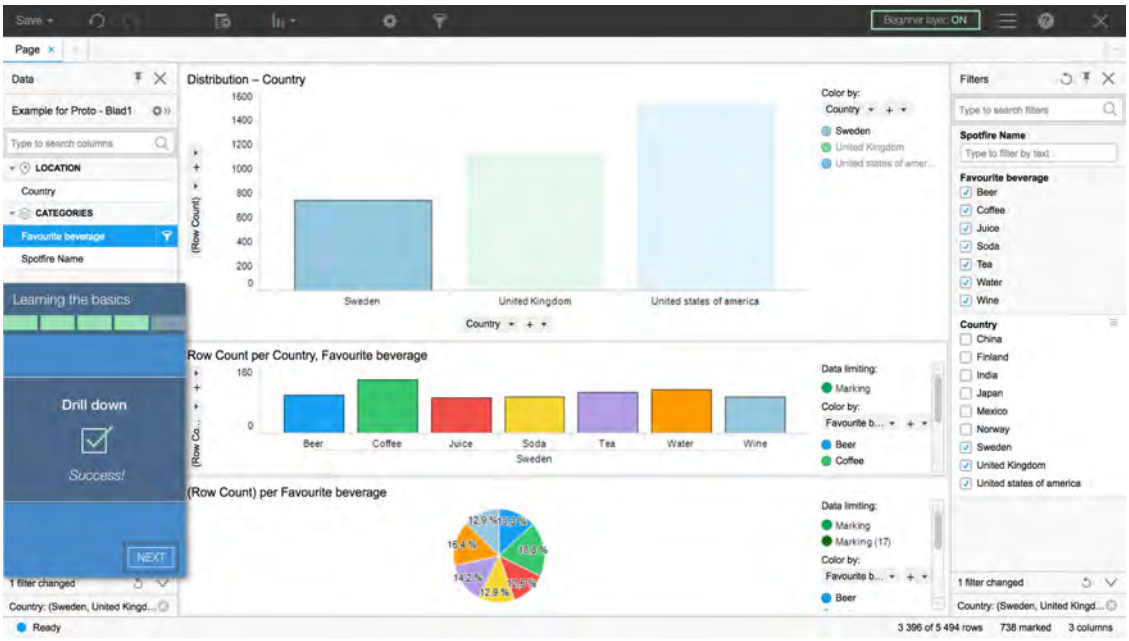

Figure 5.30. One of the messages displayed to the user when completing a subsection.

In the final stage of the prototype the user gets an explanation of the included layered design in a brief text and by interacting with the toggle button (see figure 5.31). Putting the layered design explanation at the end of the prototype was made with the intention to create a smooth transition to the real product as well as not putting too much emphasis on the layer to see if users would detect it themselves. Layered design has been applied to the top toolbar, to downgrade the options for the particular situation that is provided to the user. By minimizing and hiding the options and menus that will not be used, the user can more easily identify and interact with the options that are still present.

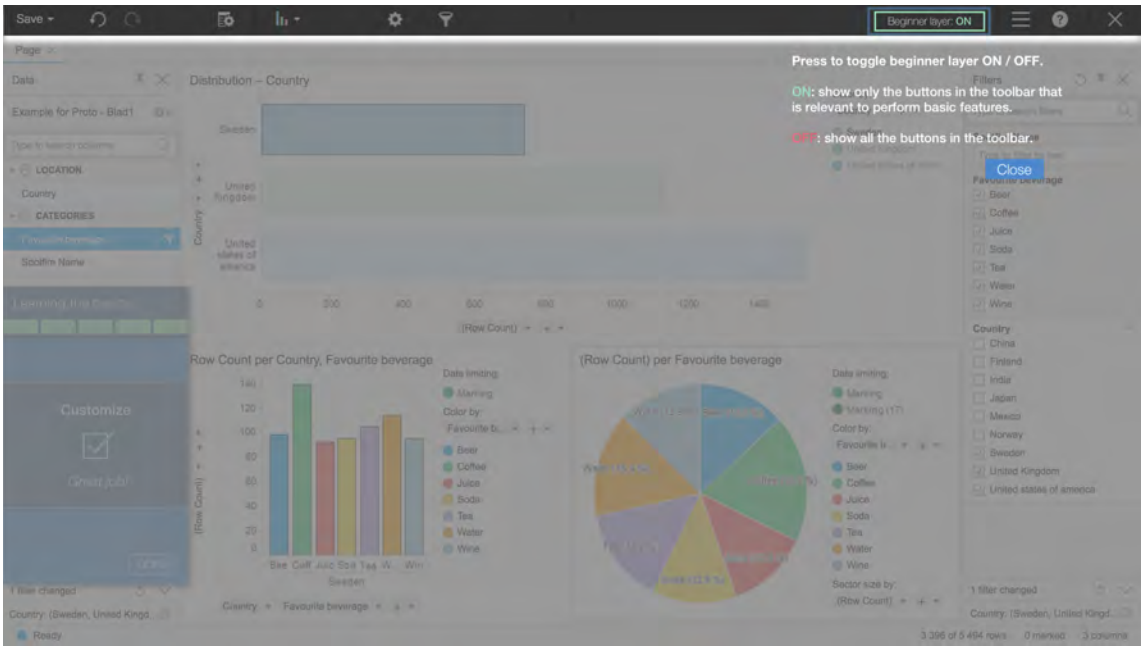

Figure 5.31. Beginner layer is active with instructions of the different toggle options.

When the tour is done, a modal window is displaying feedback of all the subsections that the user has completed during the tour (see figure 5.32). A text is presented to the user, explaining that the tour is over and that the user now has mastered the basic features in the Company software. Further, the text is also explaining that more advanced features can be identified with the user's own data. This to make it evident that the Company software is more advanced than what is shown in the tour and to highlight the importance of using their own data in continued usage. In the bottom of the modal window a button indicates that the user will continue to the main page of the Company software and that the tour is over.

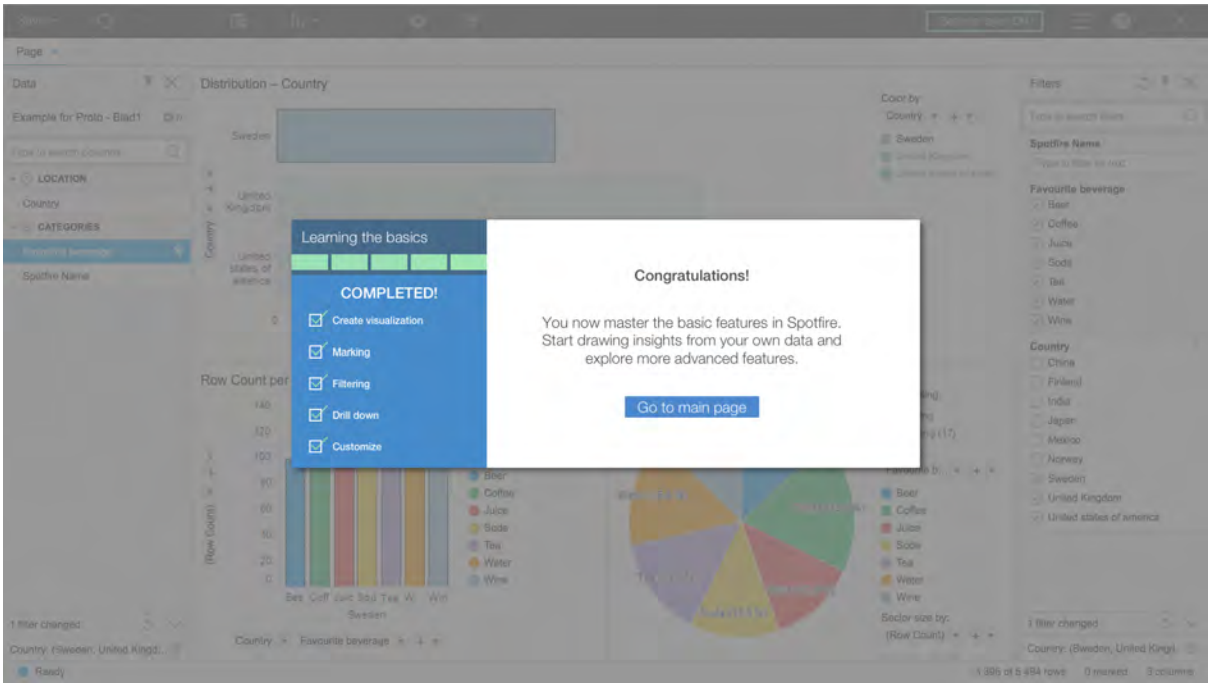

Figure 5.32. Final screen in learning the basics section, displaying that the tour is completed and what the user has learned.

5.7.1.4 Evaluation of first interactive prototype

The purpose of the first iteration user tests was to identify if using the prototype before the Company software could facilitate the first time usage, in contrast to only using the Company's software. Additional purposes were to identify to what extent the prototype would assist the user in completing a set of given tasks and how to onboard new users in the Company software.

To perform remote user tests the service usertesting.com was used. The service was used within the Company and it is a commonly used service within the industry. The service was used as it was considered to be time effective, provided easy access to new users who had prior knowledge of working with data. It was also considered being an interesting opportunity for the design team to explore the usage of remote user testing.

A remote user test is constructed by providing instructions and a set of tasks for the user to complete. Each user records their own screen and audio as well as answers any included written questions (see figure 5.33). Users are, by the service, prompted to think aloud throughout the test. The test data is accessed via a website, allowing analysis of video, sound and written responses.

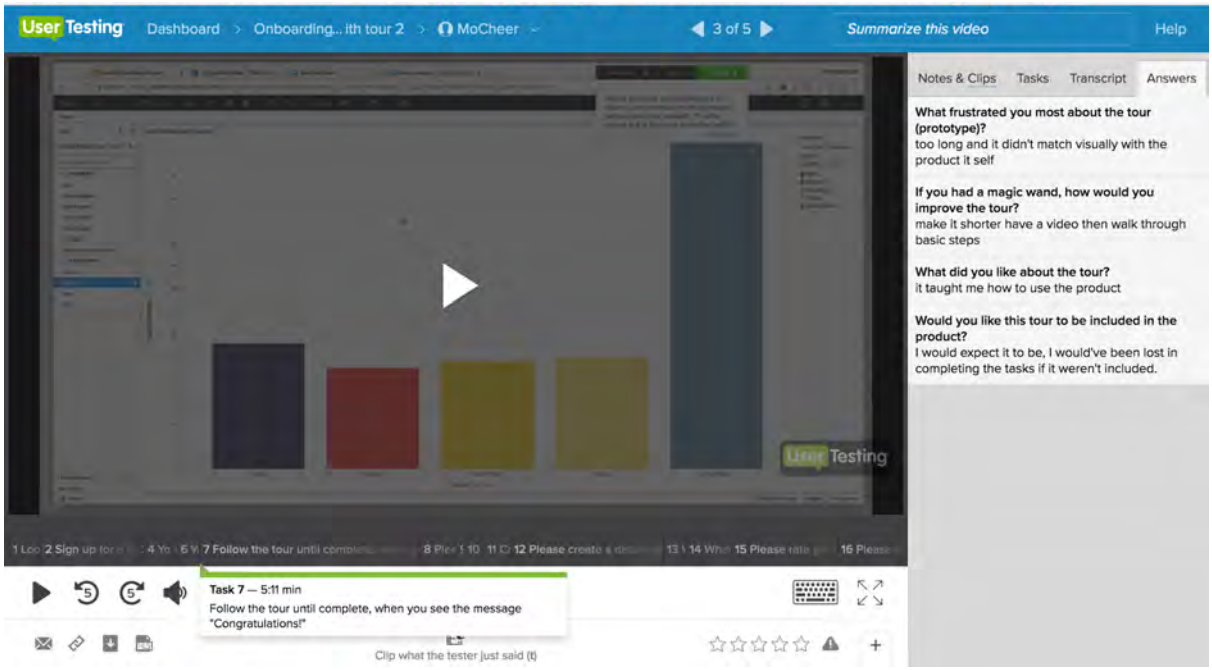

Figure 5.33. Video recording provided by usertesting.com, of user interacting with the prototype.

In order to include users who could be represented by the persona Asad, a set of requirements were used. A user should be a weekly user of excel or similar software with experience of viewing and calculating data, but not a frequent user of reports. A user was required to consider themselves as advanced web users who had no previous experience of using the Company software. User age ranged between 25-60 years with a yearly income between 40 000 - 150 000 dollar and any gender was included. Users were required to be native English speakers.

Pilot user test

A pilot user test was sent out to identify users´ understanding of interaction possibilities in the prototype, the overall structure of the prototype including the instructions provided and the length of the user test. The pilot user test consisted of the same instructions and steps as the first user test, meaning that users were to interact with the prototype and afterwards, use the Company software. A few changes were made to the prototype, as an outcome of the pilot user test, resulting mainly in minor text changes. A bigger change was to include an animation, highlighting when the user has added a visualization from the recommended window to the software page. This, to make it more evident that an action had occurred. Further, changes in arrangement of the step by step guide window, moving it closer to the modal window to make it more prominent, was also a result of the pilot user test. The revised prototype, was then used in the following user testing in the first iteration.

User testing

Two different user tests were sent out (see figure 5.34), with a total of ten participants in two groups where all users fulfilled the requirements. All tests were considered usable for analysis except one which was replaced with a new test. In order to create a version of A/B testing (see section 4.2.2), the two test groups differed in that in the first group the prototype was included and in the second group the prototype was excluded. This to allow for comparison between participants who were using the Company software the first time without any assistance versus participants having used the prototype.

The user test, for the first group (see figure 5.34), was structured to simulate a first time usage of the product with participants using the prototype as a natural integration in the onboarding flow, after launching the browser version. This included the parts of; briefly looking around the Company software landing page, signing up for a free trial and select the browser version, using the prototype and completing the tasks in the Company software. The prototype was accessed via a website link with the instruction to imagine that the first page in the prototype would appear after selecting the browser version. A scenario was described to the participants, explaining that they were to pretend being from Sweden and having coffee has their favorite beverage. The participants were then instructed to follow the prototype steps until completed.

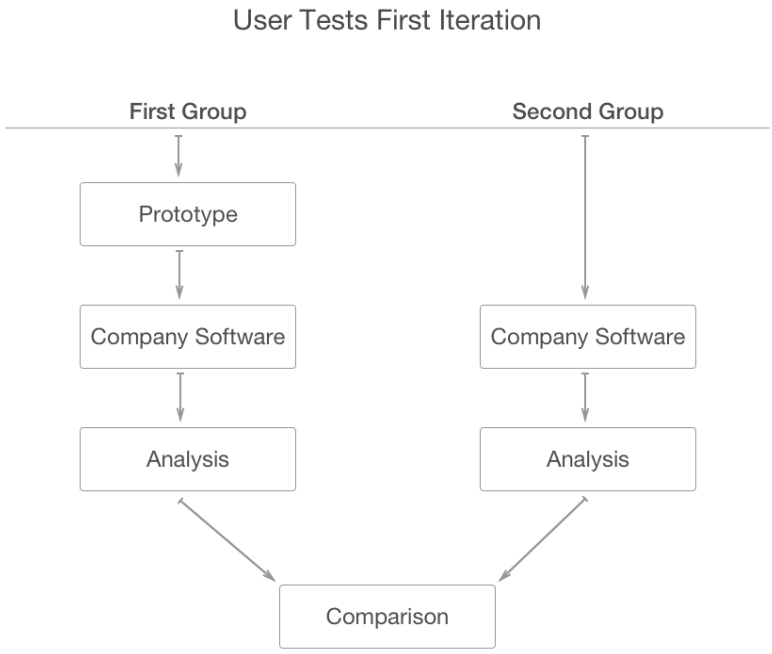

Figure 5.34. Structure of the two different user tests, conducted in the first iteration.

The second part of the user test was conducted in the Company software, where participants were presented with a set of tasks. The initial task was to create a new analysis based on the sample data set of Olympic medals, which the user was asked to download in the introduction section of the user test. The main tasks were to create a bar chart showing gold medals per year and then create a details visualization based on the bar chart, displaying data for the year 2012. The second test group only carried out this second part (see figure 5.34) of the user test and thus went directly from signing up to the free trial to the task of creating a new analysis in the Company software.

The analysis of the user tests consisted of both designers in the design team, attentively watching the videos from the user tests and documenting insights and observations on sticky notes. The sticky notes were structured according to the method affinity diagram (see section 4.2.3) emerging into categories. The categories were iteratively arranged and structured to best find the relevant patterns moving from a large amount of small groupings into larger categories. The result was later used to improve the prototype for subsequent iterations.

Result and analysis first iteration user tests

A series of categories emerged as a result from the analysis of the test groups in the first iteration. This section will bring a description of the resulting analysis of the two different sets of user tests, following a comparison between the two. The main approach in the analysis of the user tests was to focus on onboarding related issues and to ignore issues which could be explained by shortcomings of the prototype.

First test group

In the user test for the first group of five participants, which included the prototype, the initial categories which emerged were related to behaviors of the users when interacting with

the prototype and was consequently labeled *behavioral observations of usage in prototype*. The following four categories emerged under this label:

- Missed readings
- Interest in understanding rows, columns and visualization
- Easy tour parts
- Attention to layered design

The category *missed readings* covers observations such as users ignoring the information in the very first screens. This was probably due to the formulation of the instruction in the task which was the same text as on the call to action button. This made some users to directly interact with the button, without reading any text. Overall, the majority of users read the instructions more or less focused, where some users read every single line of text and some skipped entire sections. Some users did not read all instructions in the learning the basics section and sometimes failed to recognize that the instructions were present. The category *interest in understanding rows, columns and visualization* describes observations of users generally being interested in understanding the basic description of connection between raw data in a table view and the visualization created with that data. This was of interest in the analysis as it was unclear if this section would be relevant and at all effective. The category of *easy tour parts* includes observations of users generally understanding what they should do when interacting with the prototype. Two parts in the learning the basics section, marking and filtering, stood out as easily comprehensible both in regard to completing the tasks and understanding their purpose. These basic features can however, beforehand be considered as being of the easier nature, from an interaction viewpoint. The last category under this label, *attention to layered design*, covers observations from users understanding of the beginner layer and the scaled down toolbar which was presented at the end of the prototype. In this section, the understanding varied between users. Some users seemed to not fully understand nor reflect of what beginner layer was. However, one user said "I probably keep this on for the first couple of weeks". Another user expressed "I can see why you wanted me to turn that off". These results were promising for the use of layered design being beneficial and effective but that there is a need for better explanation of its existence and purpose.

The following categories emerged from insights drawn from observations of users interaction with the Company software after having used the prototype. As the intention of the prototype was to introduce users to the software and teach the basic features, these observations were of high importance in relation to knowing possible effects the prototype might have had in fulfilling its purpose. Under the label *in product from prototype* a set of six categories emerged:

- Missed potential learnings
- Recalls from tour
- What users thought they learned
- The question why
- In product UI related issues
- Lacking understanding of own data

Missed potential learnings emerged as a major category, representing the failing of the prototype's ability of transferring knowledge to users of carrying out basic features. This became evident in users´ attempt to achieve tasks in the real product, which would have required the usage of basic features. In some cases, however, it was hard to determine if the

failing to use the basic features was due to the task being poorly described or to complex and thus having the effect of blocking out the knowledge of recently learned features. Another contributing factor could be that the users had no knowledge of the data set structure which they used, which was intended to simulate their own data. The major missed potential learnings were users not being able to get past the recommended visualization window, not understanding the concept of drill down, failing the task to create a details visualization and some users not completely understanding all interaction forms. These were all considered possible learning outcomes from completing the introduction section and the learning the basics section, but where it became evident that much of what had been walked through in these sections did not exist as knowledge for users when trying to complete tasks when using the real product. This was an important insight as one of the intentions with the user tests was to gather insights of what knowledge users brought along from having used the prototype.

In general, users on few occasions referred back to the learning the basics section or the introduction section when using the Company software and trying to complete the task in the user testing. This manifested that users did not reflect much on what they had achieved in the prototype. This was a minor category in terms of number of observations but was, again, considered a highly important one as the intention of including a task in using the real product after having used the prototype was to gather knowledge of what users learned in the prototype. Some referrals back to the prototype were however made by a few users where they often tried to remember how to achieve a task or an interaction form, but could not recall exactly how. A possible concurrent factor to why few referrals were made to the prototype was that users did not know the data set they were using and upon that they were presented with a perhaps too complex task early on. This potentially having the effect of users only focusing on the task itself and trying to get to know the data set, blocking the users and overloading them with information, eating away at their cognitive resources.

The category *what they think they learned* consists of verbal expressions from users of what they thought they had learned from having used the prototype. These statements came from users being asked of what they learned in the end of using the prototype as well as from spontaneous expressions when using the prototype. These statements depicted a clear contrast to the observations made in the category *missed potential learnings* where users behavior in general did not correspond to what users stated to have learned. Almost all users, when asked, stated to have learned all the basic features which were included in the learning the basics section. However, these were listed to the user and knowing to what extent users in reality grasped a basic feature or a concept, is hard to know. When comparing what learnings users stated to have learned, with what users displayed in usage behavior, the comparison did not in general match. What users seemed to have grasped to a higher degree were aspects on a conceptual level like; going from the macro to the micro in data, the process of building a visualization and the basics of getting insights from raw data by using the basics features.

Another important insight was drawn from the observation that users often sought knowledge and asked for explanations of why they were doing certain actions when using the prototype. The category *the question why,* thus represents users desire of knowing the purpose of the steps included in the learning the basics section. Many of the instructions in the prototype were written in short form, which aimed to minimize the amount of text. This was deliberate, with the intention of not intimidating the user with having to read large amounts of text to be able to use the software. Achieving a balance between providing the

user explanations with the purpose of tasks, which require more text, and not using extensive amounts of text which could scare away users, would need to be considered.

Some user behavior of failing in interacting with the Company software as well as failing when trying to complete the task after having used the prototype was ascribed as usability issues in the software itself, rather than representing problems of the prototype or the test structure. A selection of these issues was; each user failing to locate drop targets for drag and drop interaction, problems to locate the greyed out toolbar and failing to locate important interaction areas on the axis on a chart. Some of these user interface related issues of the product, sometimes highly impacted users´ ability to complete tasks, even if they had already learned the step in the prototype. Improving and counteracting user interface related issues are therefore important to be considered, as a part of improving the onboarding process as a whole. The issues should not require special treatment and be solved by afterthoughts in the onboarding process in order to be manageable by the user, rather be identified and solved as separate with the purpose of removing friction in the onboarding.

As mentioned previously, some of the problems could be ascribed to users not knowing the data they were asked to work with when using the Company software. This manifested in frequent user behavior of not being able to identify and locate relevant columns and not knowing what rows were represented in a chart. Furthermore, users to a high degree failed to identify the x-axis and the y-axis when asked, indicating possible lack of basic knowledge of reading graphs.

The final label of categories contained users evaluations of the prototype and suggestions for solutions. Under the label *user assessments of prototype* a set of four categories existed:

- Tour length and complexity
- After tour completion
- Potential improvements for learning the basics
- Possible approaches for extending prototype

First of all, when using the prototype and especially when in the learning the basics section, users often stated that the duration was too long, most prominently exemplified by the comment “holy moly that was long”. Further, statements that the number of steps included were too many were also frequent and one user stated that the prototype was not intuitive enough. One user expressed not being enough prepared from having used the prototype to use the real product. In general, the negative comments thus revolved around the unsatisfactory length of going through the different steps in the prototype.

When looking at only the statements from users regarding the length and complexity of the sections in the prototype, this could be interpreted as only being negative. However, when completing using the prototype and starting to have used the real product, the majority of users manifested an acceptance and understanding of the prototype length and complexity when in relation to the complexity of the Company software. In general, user’s showed and acceptance of the software having a steep learning curve and thus would require more time and effort to understand. All users stated that the prototype was good or helpful and that they would want to include it in the real product. However, at the same time most users stated to need more, in terms of assistance or introduction. Some statements were; “I had not understood a thing without the tour, really helpful”, “The tour gave me a feel for the software but still confused”, “A complex software as this, the tour could have been even

longer" and "Great tour length and the features". One user who had taken a course in analytics, but had never tried the Company software, stated that one could not expect to learn analytics in five minutes. The same user expressed the prototype not being as intimidating as other analytics software that the user had previously encountered. This was a response, to the simple approach, in onboarding the software by using the prototype.

As a result of the more negatively annotated statements regarded the learning the basics section, a category which covers potential improvements for the section emerged. Several users had problems understanding some of the terminology, for example "drill down", "details visualization" and "preferences", which were used as instructions in the steps. This was both due to poorly formulated instructions, but also due to the introduction of new terminology related to the Company software which sometimes were misunderstood, hard to remember, or did not match users previous understanding of certain terminology. Another important aspect regarded users understanding of the hotspot, which was included to guide users to where to interact in the prototype. This aspect was previously discussed within the design team of running the risk of users only following the hotspot and skip reading instruction. This would thus prevent users from learning by doing and reflecting upon their actions. A more subtle hotspot was therefore used, but with risk of users not realizing the hotspot's existence at all. In the user tests, some users had problems identifying the hotspot's existence and some users only used the hotspot to guide them through certain steps, where one user stated, "now I'm just clicking after hotspots". Users not being able to find the hotspot was probably a consequence of the hotspot not being introduced as a concept to users and it was only referred to in the instructions. Further, the hotspot following the outlines of the UI elements it referred to, made it discreet and difficult to identify. Lastly, some users stated the need to better match the prototype visually, with the real product.

Under the last category exist a collection of possible ways for extending the prototype, suggestions which came throughout the user testing. The most evident ones regarded adding even more basic explanations of the software, to include a tour of the user interface, offer practice tutorials and offer the possibility to test the product before the introduction section and learning the basics section.

Second test group

The user testing of the second test group, including five participants, was aimed at identifying how users with no prior knowledge of the Company software could understand and solve a set of given tasks without using the prototype beforehand. The affinity diagram session for the second group resulted in a series of categories, ranging from users verbal expressed concerns to interaction problems with the Company software.

For the second test group, all users successfully loaded the sample dataset to create a new analysis. The initial recommended visualization window constituted a noticeable obstacle, leaving all five participants confused. These problems, were exemplified with three categories:

- Correct chart type
- How to see the added chart
- Recommended visualization window mistaken as the actual software

The category *correct chart type*, concerns users misunderstandings when trying to identify charts based on their names alone (see figure 5.35). This taking its form in the user test, that users had problems identifying the correct chart type which they were instructed to add. Several users asked for better labels of chart type. However, even charts which had a label were mistaken as other charts, which could be seen as some users not being able to correlate a chart name to a visual presentation of the same. When a chart was added, some of the users had problems to see the added chart. One user could not locate the close button and another user misunderstood the close button as by interacting with it, the software would "close" down. Several users mistook the recommended visualizations window as the workspace in the software, a problem which could to some extent be ascribed to the screen resolution. The lower the resolution, resulting in less screen real estate, leading to the user having a more difficult time identifying what was added to the underlying page, which consisted of the Company software.

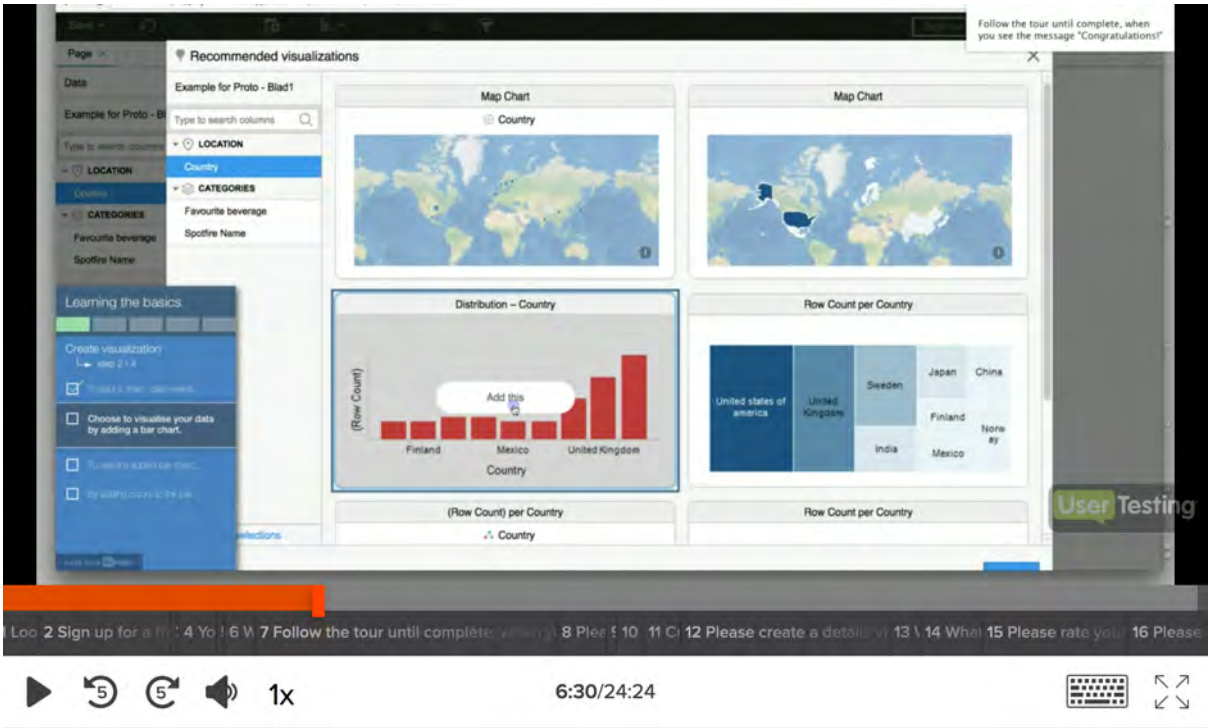

Figure 5.35. The recommended visualization window that was presented to users in the second test group.

A major result in the second test group, was that users failed to understand the basic features. Three categories emerged under the label *failing basic features*:

- Missed conceptual understanding
- Type of interaction forms
- User interface understanding

Missed conceptual understanding concerns users inability to understand the underlying meaning of how basic features are structured. Some users had problems understanding the filter function in the software, mainly regarding what the filter was applied to. This resulted in that users constantly created new charts or new pages, instead of clearing the filter in the first page to start over. Some users had problems in relation to the x-axis, mainly how to add a column but also as before, how to filter data. In the recommended visualization window,

users failed to locate the correct interaction form and tried drag and drop and double-clicking instead of left-click to add data to the charts.

Another major problem, was that users did not *understand the user interface*, mainly in regard to the two axes in a chart. Users could not locate the two different interaction areas that are accessible in each axis. This resulted in a set of different problems where some users had trouble changing data on the axis and where others had problems locating how to change basic chart options, such as to only show top five data points or how to add more than one column to an axis. This could be seen as the underlying source to the symptom, of why users created new charts and pages when filtering, instead of continue working on the chart previously created. Allowing for users to identify the menus corresponding with certain charts, making options become visible, could make it easier to perform the task in mind.

Many users requested user assistance when interacting with the Company software, partly due to that users perceived the software as complex and having a steep learning curve. Users asked for different kinds of assistance, such as videos explaining the steps that need to be taken or tutorials highlighting certain important aspects in the software. One user felt in need of being introduced to the most basic features in the software, gradually being introduced to more advanced features, when the appropriate skill level was reached. The same user repeatedly requested contextual help, which should be accessed easily from the software. This, to be able to toggle between playing around in the software and when needed, get additional help. A lot of users also suggested to implement hints to guide the first time users in the software. This was mainly to introduce the users to features, which were important in the first time usage.

Several users went back to the spreadsheet of the dataset or were actively searching to view the raw data within the Company software. No users had prior knowledge of the data, resulting in lack of trust when analyzing created visualizations. As a consequence, some users added table visualizations instead of charts, to be able to solve the given task.

Comparison between first and second user test

As user tests were carried out, both including the use of the prototype and without using the prototype previous to taking on the task in the Company software, insights could be drawn from a comparison between the two.

From having used the prototype, users clearly had a better understanding of the potential of using the software, even if they did not learn exactly how to achieve the basic features and interacting successfully with the user interface. A first insight was that neither of the test groups understood the initial concept of the recommended visualization window when starting to create an analysis, and thus the prototype failed to introduce this in a satisfactory way. To understand and grasp this part of the software is of importance for users being able to continue their analysis and creation of visualizations.

A clear symptom of lacking understanding of what could be achieved in using the software, among the users who had not used the prototype, was that almost every user created a new chart or page instead of exploring the one they had already created. This problem did not occur between users who had used the prototype. Another beneficial consequence of having used the prototype was that users appeared to reflect much more upon why tasks and interactions were carried out throughout the usage of the real product. Better knowledge and understanding of the user interface also seemed to exist to a higher degree in users having

used the prototype, as they to a lesser degree clicked around aimlessly exploring in search for relevant features. These users also expressed having a more defined goal in mind, than the users who had not used the prototype. However, even if using the prototype indicated several positive benefits, the users still did not display satisfactory knowledge of how to find their way in the user interface. One prominent example of lacking knowledge of important interaction areas in the user interface, was the failure to locate the different interaction areas on the axes of charts, which existed in both test groups.

Users, who did not use the prototype, frequently asked for assistance to learn the basics of the software and requested this in the form of video, tutorials, contextual help and even in the form of providing layered design. These requests matched well with the intended purpose of the prototype, as well as with what was included in the prototype. Furthermore, the non-prototype users also showed the need for looking at the raw data in the data set and viewing it in the spreadsheet format, which could be interpreted as a symptom of not being able to manipulate the data in a desired way by using the Company software. This need was not as evident in the users who had used the prototype.

Not any of the users fully understood the concept of drill down or how to create a details visualization, when trying to complete the task in the Company software. The concept of drill down was considered an important inclusion, as it is one of the most powerful features in the Company software, also distinguishing from other analytics software. However, it is also somewhat complex and a challenge to teach in the short time frame of a first time usage. The concept was included in the prototype, more to introduce the concept rather than fully teach it to users. Users not being able to understand the concept could be a result of several factors such as, lacking conceptual analytical knowledge, lacking UI-knowledge or failure to understand task description.

In both test groups users had problems which could be, at least partially, explained by lacking knowledge of the data set. Many issues in taking on the software could possibly be prevented or helped if users had a better understanding of the data set, as they would if using their own data. A way of simulating this could be to ask the users to familiarize themselves with the raw data and provide a more open task when starting to use the real product and prompt reflections of learnings in the onboarding process. Providing a more open task in the user test could provide better knowledge of how users reflect upon the learnings gathered in the prototype. This as more cognitive resources could be used to explore the basic features in the software, instead of trying to understand the task itself.

5.7.2 Second iteration

The first iteration of user testing generated important insights and a series of improvements for the prototype which was tested in second iteration of user testing. Further, it was decided to widen the scope for the prototype to explore additional aspects of interest. The process of the second iteration was carried out in a similar fashion as the first iteration and consisted of the following parts; low fidelity prototyping, high-fidelity prototyping, user testing and analysis by affinity diagramming.

The improvements for the prototype, which were generated as a result from the first iteration, regarded both the introduction section and the learning the basics section. The improvements were as follows:

- Increase the visual consistency between the prototype and the Company software.
- Shorten the learning the basics section, by decreasing the amount of visualizations to create and include less steps.
- Introduce the user to the interface by adding a UI-tour.
- Not introduce in depth functionality too early to the user.
- Focus on conveying the purpose of included steps in learning the basics section to the user.
- Explore another version of hotspot.
- Introduce the layered design concept earlier and make it more native.
- Explain the purpose and functionality of the recommended visualization window.

There were several reasons for widening the scope of the prototype. First, the project was initially partly set out to explore the inclusion of omnichannel perspective in user onboarding, an aspect which had not been present in the first iteration. An additional reason was to explore how a continued onboarding could be designed, stretching beyond only the introduction and learning the basics section of the prototype. This had the purpose of preventing only pushing the cliff of faith forward and having the same problem occur at a later stage. As of this, a decision was made to focus the second iteration on designing a new *main page*, which the user would encounter after launching the browser version of the software.

5.7.2.1 Low-fidelity prototyping

When users choose the browser version of the Company software, they end up on the main page where sample files can be accessed via a library section. As no onboarding process exist as of today, users are on their own to explore and understand where to go next. This creates a clear point of friction, making out a part of the cliff of faith. In order to explore both the inclusion of omnichannel perspective in onboarding and how a continued onboarding could be designed, a set of requirements were defined.

These requirements were based on the existing main page in the Company software. This to maintain the native feeling of the prototype and build on existing functionality. By extracting necessary ideas from this page, as base to design a new page with focus on user onboarding, a set of requirements emerged:

- Include a section to create new analysis.
- Revise the library section, due to unnecessary complexity.
- Include a section which makes it possible for users to access the step by step guide and contextual help to interact with appropriate channels.

Based on these requirements, the design team created low-fidelity sketches, giving each other constructive feedback in several iterations. A total of seven sketches were made, including exploring different design solutions, mainly for how to include the step by step guide connection and provide assistance to the user.

Result and analysis

The low-fidelity sketches resulted in a set of design solutions for how to include a section to create a new analysis, to browse between files and access the step by step guide as well as access external channels (see figure 5.36). Most focus was put on how to create a design

solution for the step by step guide, to give users assistance in first time usage and how to include it in the new main page. The sections that included new analysis and library had less focus, as these sections were considered less relevant from an onboarding and omnichannel perspective.

The new analysis section was designed so that users, as easy as possible, could visually recognize the data connections available when creating a new analysis. Including this section as a part of the main page would reduce the amount of clicks to create a new analysis as well as preventing users from having to transfer to a new page. This to create a more well curated path for users, which facilitates the user onboarding process.

The library section design solutions ranged from large folder structure to tree structure, where users had a complete structural overview. All of the solutions included sections where users had the possibility to share folders or files between each other, visualize the most recently opened files and a section that represented the user's own files and folders structure. As the current main page is cumbersome for first time users, a detailed folder structure would therefore not be suitable to implement in the new main page. By providing users with a macro level structure, a more prominent path is presented where users can choose what to interact with based on that all information in the library section is visible.

As the user tests in the first iteration had shown users asking for extended ways of handling the complexity of the software, an approach where users are offered a continued learning and user assistance was considered highly relevant to explore. Based on this, design solutions were created with the purpose to complement the user onboarding process including contextual help for users. This was later labeled the knowledge hub. The early design solutions of the knowledge hub were focused on look and feel as well as the location on the screen. The solution would also have to present the progress to the user and options on continued paths.

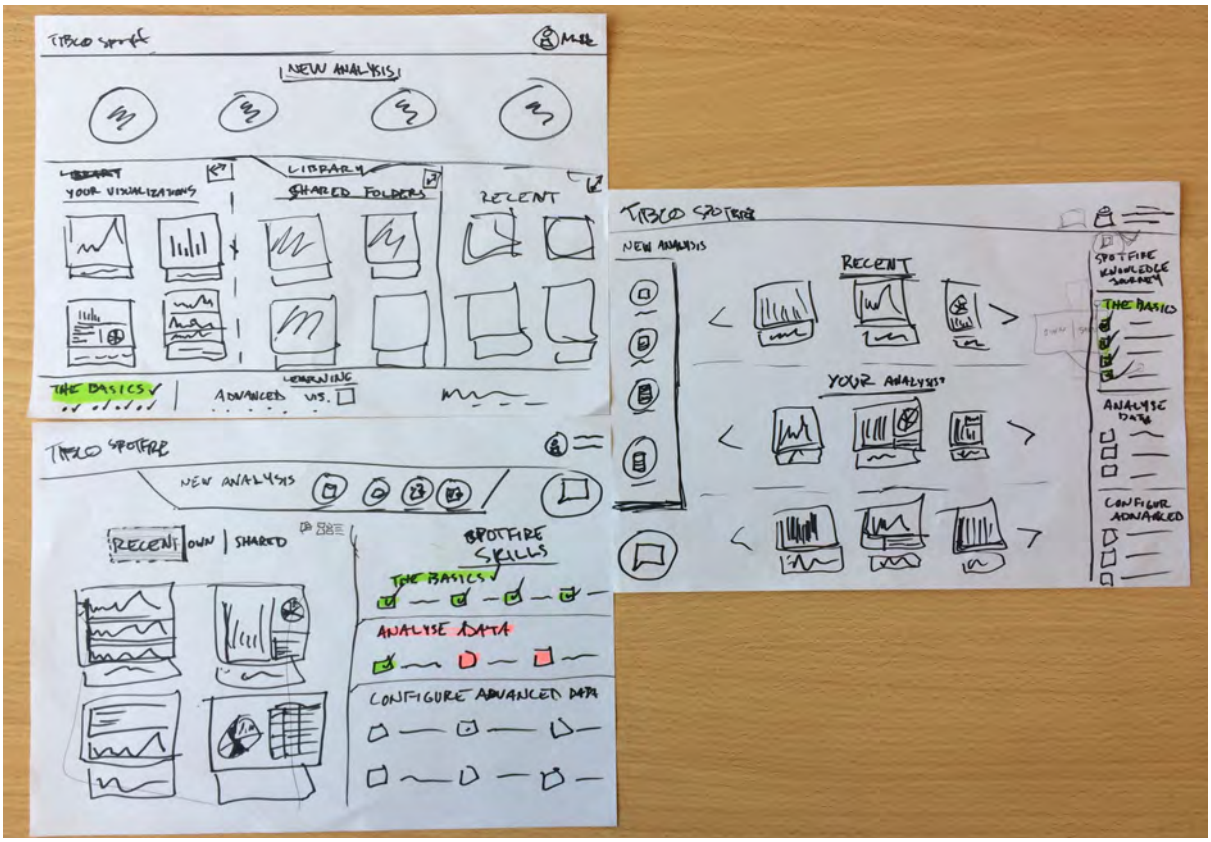

Figure 5.36. Sketches for what the main page with the knowledge hub could look like.

Two paths, the *embedded user assistance path* and the *external user assistance path* were explored of how a step guide, contextual help and a continued onboarding could be designed and integrated in the knowledge hub. The paths were similar in that both included some form of step guide for the user, which would function as a continuation of the onboarding steps for learning basic features included in the first iteration prototype. This would allow for users to receive feedback on completed onboarding steps and putting the steps in context of a continued onboarding by accessing step guides for learning more features. Within each section of steps, a connection to relevant user assistance channels would exist to help users to find relevant information. The two paths differed in users possibilities to access user assistance in both the new main page and when in use of the Company software. In the external user assistance path, user assistance related channels were treated as only reachable for the user via links to each respective external page for that channel. This was considered a more simplistic approach, focusing on improving continued onboarding of the step guide, but still provide guidance to relevant user assistance, connected to each section of learning features in the step guide.

The embedded user assistance path constituted a more holistic approach, where the relevant user assistance to each step would be embedded instead of only accessible on external pages (see figure 5.37). In this way users would have the possibility to access information from different channels relevant to specific features in the step guide. This more holistic approach posed design problems such as potentially being overwhelming for users, requiring more screen real estate. This approach was thus considered as having more potential benefit for users, but more complex in reaching a valid design solution. The two paths were partly explored entering the high-fidelity prototyping phase. The potential benefit of this

embedded approach, was considered to outweigh the complexity of the design problems and was thus chosen as the one to explore in further user testing in the second iteration.

Based on the embedded user assistance path, three more sketches of the knowledge hub were created, all located to the right side of the screen. In this step of the low-fidelity prototyping, five channels were included to provide user assistance to users. These channels were; video, user guide, community, access the step by step guide and a chat function. Including these different channels, users could assimilate the information in an individually preferred way. This, to create an even more contextual user assistance.

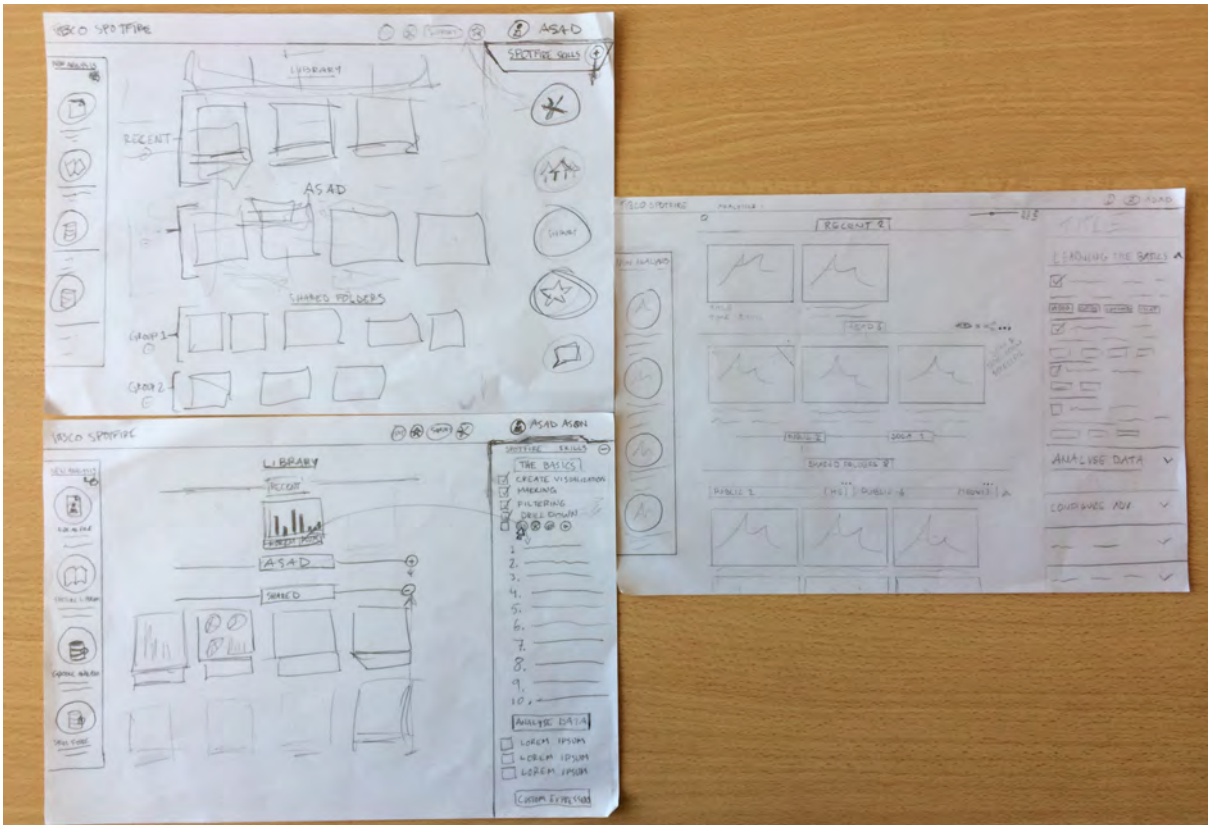

Figure 5.37. Low-fidelity sketches visualizing the new main page and knowledge hub including the channel perspective.

A clear problem emerged in regard to the knowledge hub, namely how to include the knowledge hub in the Company software. Due to the complexity of the software, the screen is filled with different functions, making it difficult implementing a new section to the screen. The knowledge hub needs a certain size so users could interpret the text or visual assistance that is presented. Based on this, design solutions were created which explored what type of information is visualized to the user, to make the knowledge hub smaller to be able to fit in the already implemented design. Further, some solutions were also to toggle the visibility of the knowledge hub, allowing users to decide when assistance should be provided.

5.7.2.2 High-fidelity prototyping

The purpose of the second iteration high-fidelity prototyping phase, was to produce a new testable interactive prototype, including the parts of an improved version of the introduction

section and learning the basic section, as well as the new conceptual main page with the knowledge hub. As in the first iteration high-fidelity prototyping, the Sketch software was used to produce high-fidelity screens, which were compiled into an interactive prototype using invisionapp.com.

This phase consisted of producing new screens for the new main page and knowledge hub, based on the low-fidelity prototyping. It also consisted of reusing screens which were used in the first iteration, to realize the list of improvements generated from the first iteration. This also included producing new GIF:s for animations.

As a first approach, drafts of possible ways of visualizing the new main page and partly exploring the two different paths, embedded versus external, were created which had the purpose of exploring the look and feel (see figure 5.38).

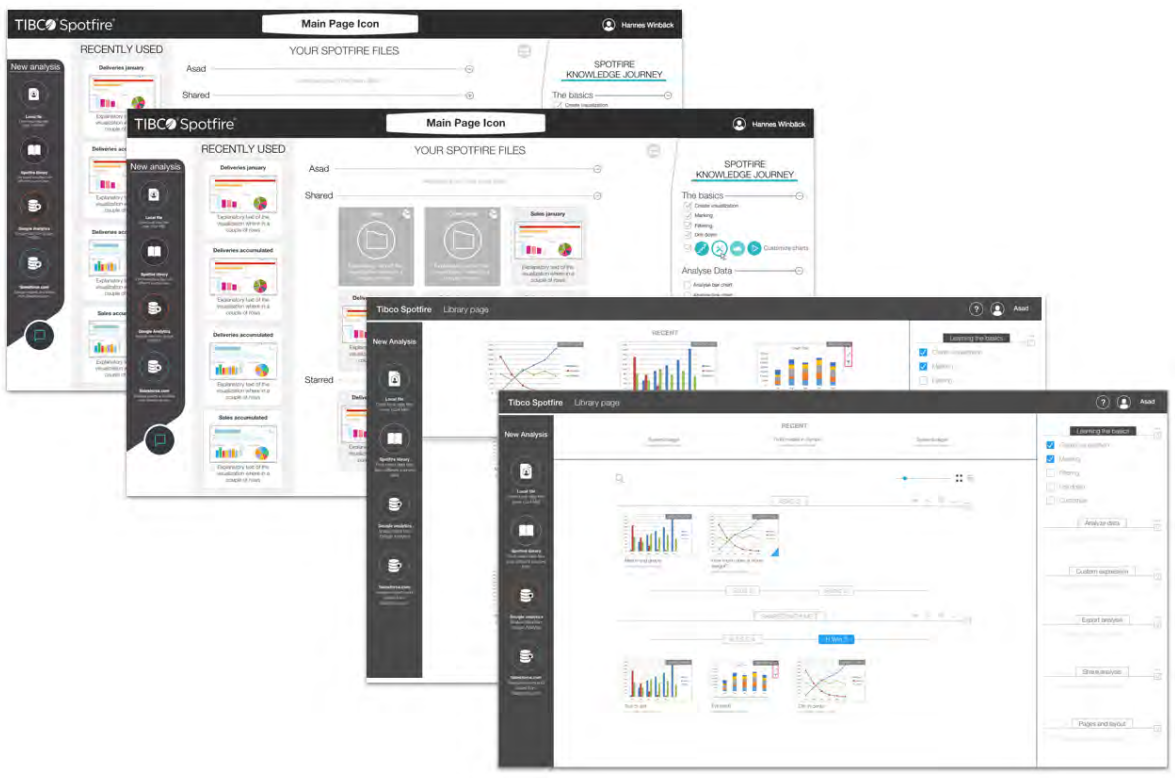

Figure 5.38. Drafts from early high-fidelity prototyping, used as basis for continued work and as style guides.

The resulting drafts, had the purpose to work as a visual style guide, allowing to maintain consistency of look and feel between all parts of the second iteration prototype.

5.7.2.3 Second interactive prototype explanation

In the second iteration interactive prototype, the first screen from the previous prototype, with the choice of taking the onboarding tour, was put into context of the new main page. This to connect the tour to the knowledge hub and visually connect the included steps to introduce the possibility of continuing the onboarding. It would also provide the user with a reference point, in the form of the main page, of where to end up after taking the tour.

The knowledge hub (see figure 5.39) is located in the right section of the screen and at the top contains buttons which link to the external channel of respective channels, user's guide, community and chat. A search field provides the user with the option to search for user assistance within the knowledge hub providing feedback on possible assistance in other channels. Below the search function, users have access to different sections of learning features in the Company software. As seen in figure 5.39, a first time user will encounter unchecked boxes, under the label "learning the basics", for the features which are included in the onboarding tour.

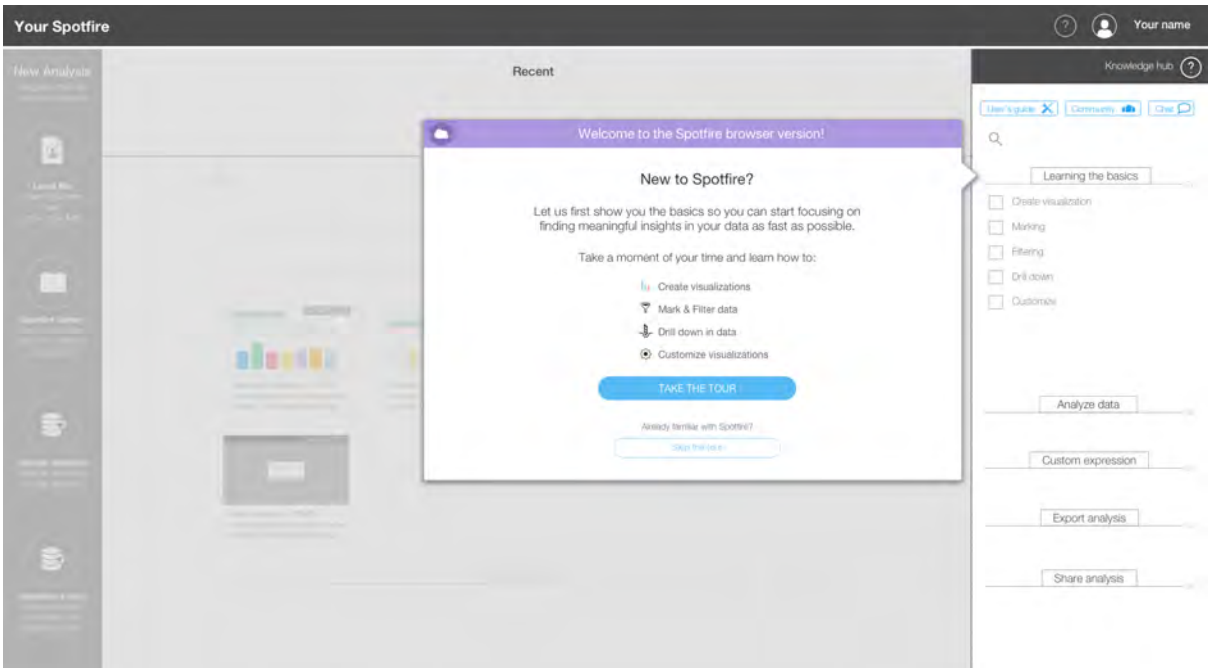

Figure 5.39. First screen in the second iteration interactive prototype displaying the modal "New to the Company?"- window in context with the new main page. Including the knowledge hub in the right panel.

In the second interactive prototype, the same introduction section was used as in the first interactive prototype with minor text revisions. Moreover, the same question asking the user of the favorite beverage, was used to gather data from the user to use in the demo visualization (see figure 5.40).

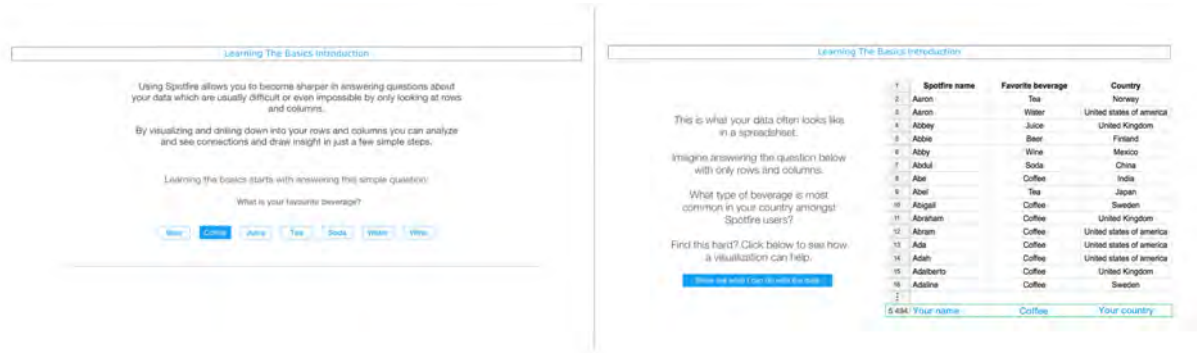

Figure 5.40. Introduction section of the second interactive prototype.

When answering the question, the user is displayed a demo visualization (see figure 5.41) of the fictive data. This was the same approach as in the first prototype, but with extended annotations aimed at reminding the user of the question which was asked initially and prompting to start drawing analytical insights from the visualization. Furthermore, the scope of the demo visualization was changed to only include two visualizations. This, to create a shorter learning the basics section, where the visualization is built by the user, with fewer steps and not introducing complex functionality too early. On top of that this approach allowed for focusing on the purpose of what is executed in the instructional text.

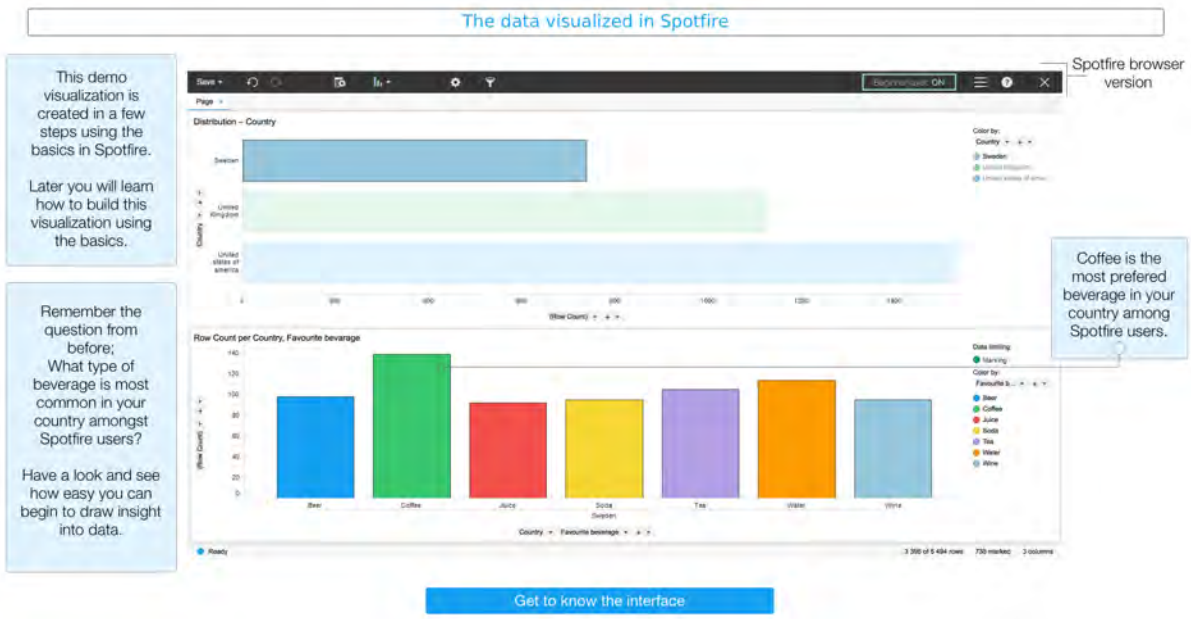

Figure 5.41. Revised demo visualization, explaining the question asked and information in regard to the visualization.

In the second prototype a user interface tour was included with the purpose of briefly introducing the user to the user interface on a more basic level than previously, highlighting important interaction areas (see figure 5.42). This section takes place after viewing the demo visualization, before entering the section learning the basics and begins with introducing the layered design part of the scaled down toolbar (see figure 5.42). An action driven tooltip UI-pattern is used, forcing the user to read and actively interact with parts in the interface to continue the tour, to prevent the user from only skipping the steps the tooltip provides. However, not all actions simulate behavior of the real product, rather the interaction takes the user forward in the UI-tour.

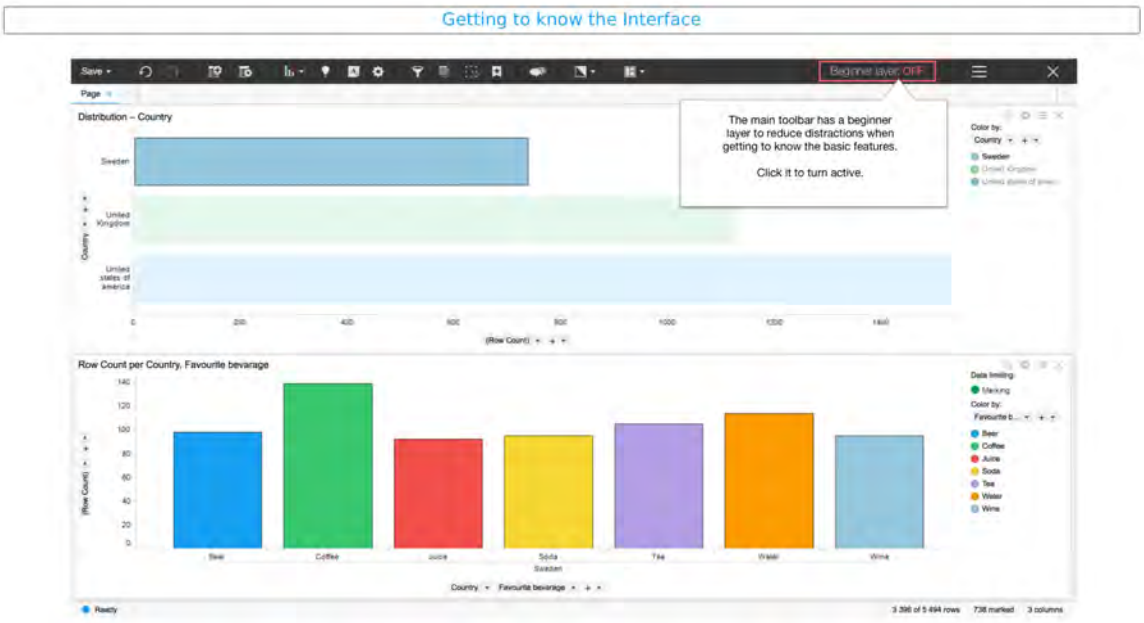

Figure 5.42. The UI-tour, which explains the user interface.

The section learning the basics was changed to build the demo visualization, including only two charts instead of three and as a consequence shortening the section (see figure 5.43). The layout was changed to match the knowledge hub, aiming for increased consistency between the prototype and the Company software.

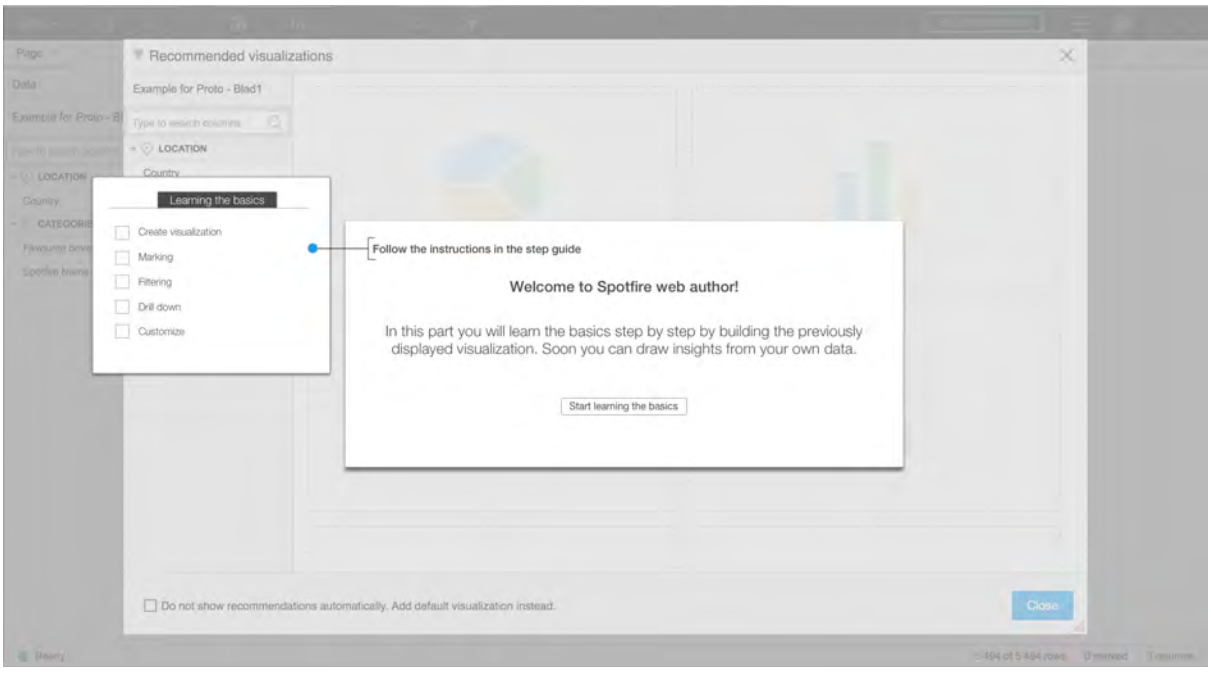

Figure 5.43. The learning the basics section, with changes in layout from iteration one, to match visually with the rest in iteration two.

The instructional text in the step guide was revised to focus on the purpose of the actions within each section, leading to longer text and more to read for users, but with fewer

individual steps which would guide the user exactly where to interact. As a result of users not identifying the hotspot and to balance the possibility of users not understanding the less explicit instructions, a more prominent hotspot was included (see figure 5.44). The hotspot is also more explicitly introduced. Moreover, several explicit indicators for guiding users in how to interact in the interface were added (see figure 5.45) as a consequence of users failing in identifying interaction areas and important interaction forms.

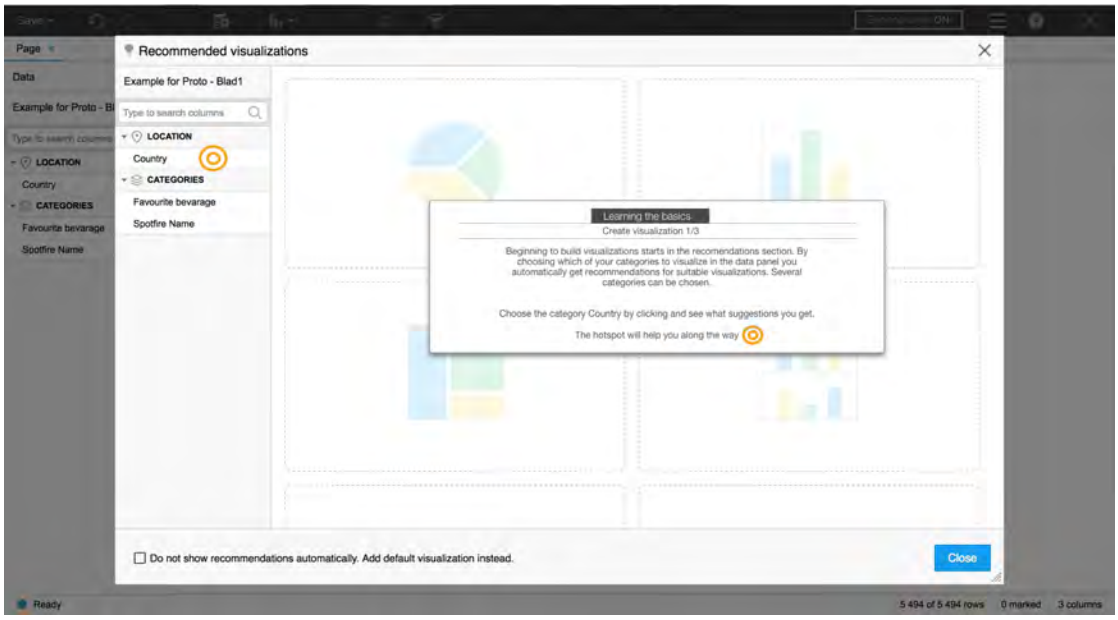

Figure 5.44. Instructions when users are to interact with the recommended visualization window.

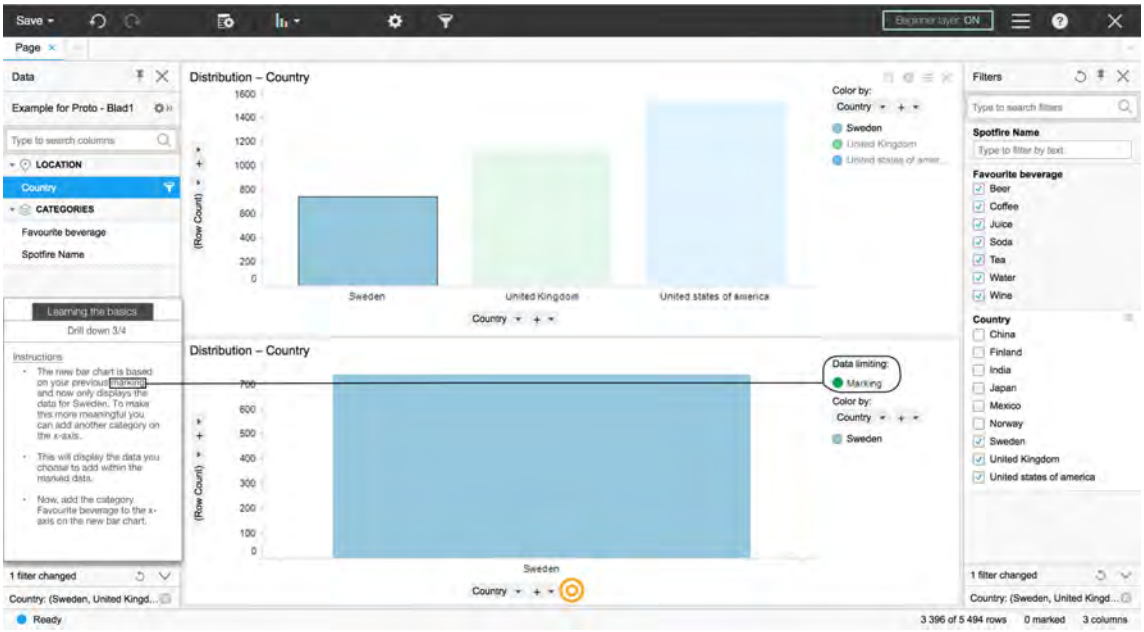

Figure 5.45. The learning the basic section in the Company software, explaining how to drill down in data.

When completing a section within the step guide, a modal window is displayed to the user with clear feedback of completion and how to progress. The decision to move the step guide

to the center of the screen, was due to that in iteration one, users had problems identifying the step guide. This resulted in that some users did not read the instructions, instead followed the hotspots. Explanations of the purpose of carrying out the steps within each section are also provided (see figure 5.46). Furthermore, inclusions of prompting the user, to reflect of what they are achieving and to draw insights, are made in several steps.

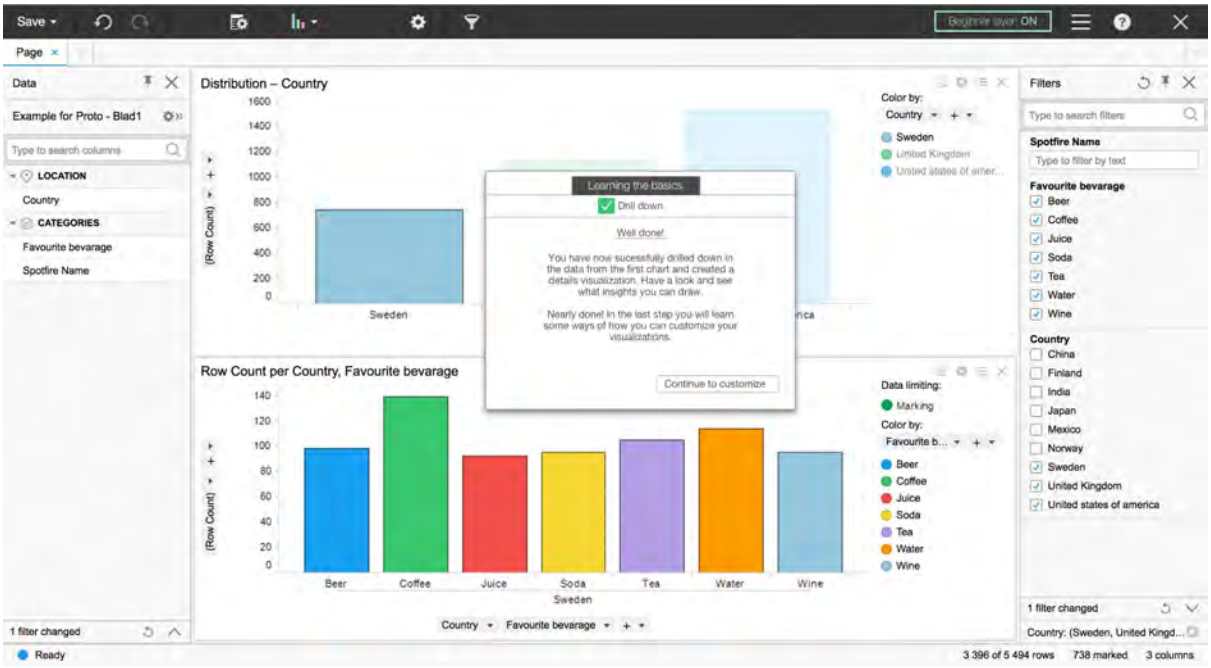

Figure 5.46. Explanation of the process, when users completing a section in the step guide.

The last screen in the learning the basics section, consists of a modal window providing feedback of what features have been successfully learned, in the form of the four basic features (see figure 5.47). A button leads the user to the new main page, back to the first encounter of the new main page.

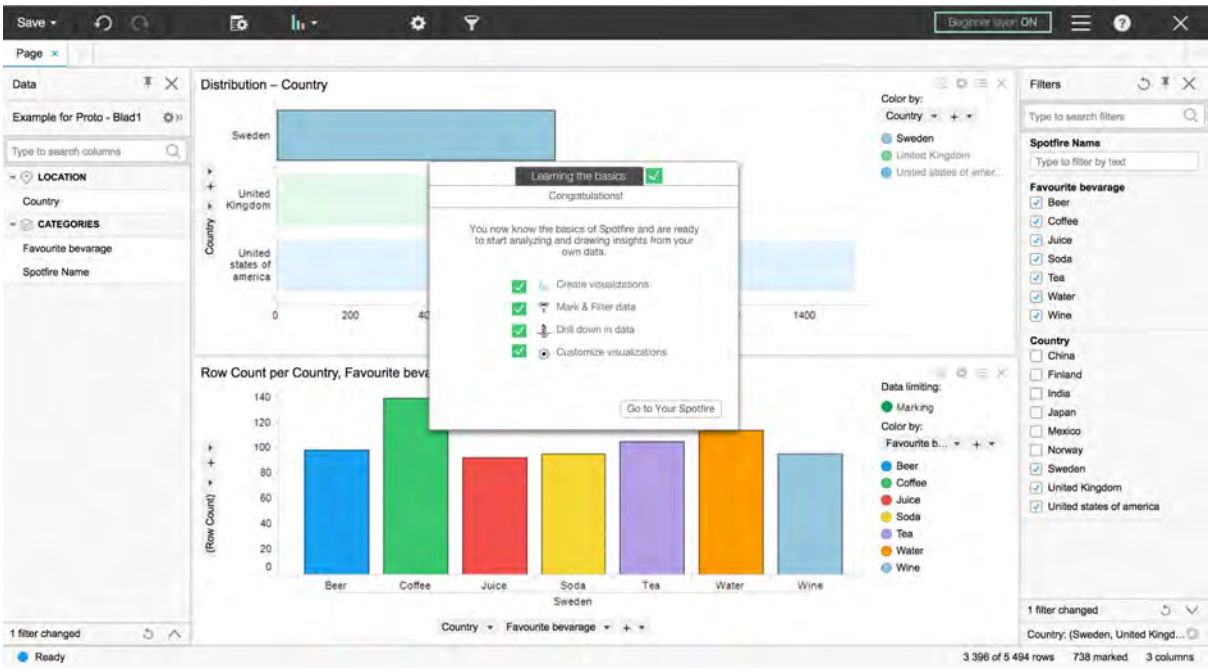

Figure 5.47. Feedback when users completing a section in the step guide.

The main page (see figure 5.48) is created with the purpose of being a clear reference point for the user when using the Company software. The functionality of the interactive prototype in this section is limited, as the purpose was to test it on a conceptual level. It consists of a new analysis section, a library section including recently used analyses and the knowledge hub. In the new analysis section the existing possible choices for what data to use when creating a new analysis are included in the new main page instead of being hidden behind a button. This to reduce steps to create an analysis and make use of screen real estate. The library section is a central part in the new main page providing the user easy access to recently used analyses in the top part of the screen. The library section is divided into folders of the user's own created analyses, knowledge hub demos which are analyses used as basis for step guide learning features and folders which are shared with the user. The knowledge hub is located in the rightmost section of the screen, including user assistance through different channels as well as a step guide feature for continuous learning of features.

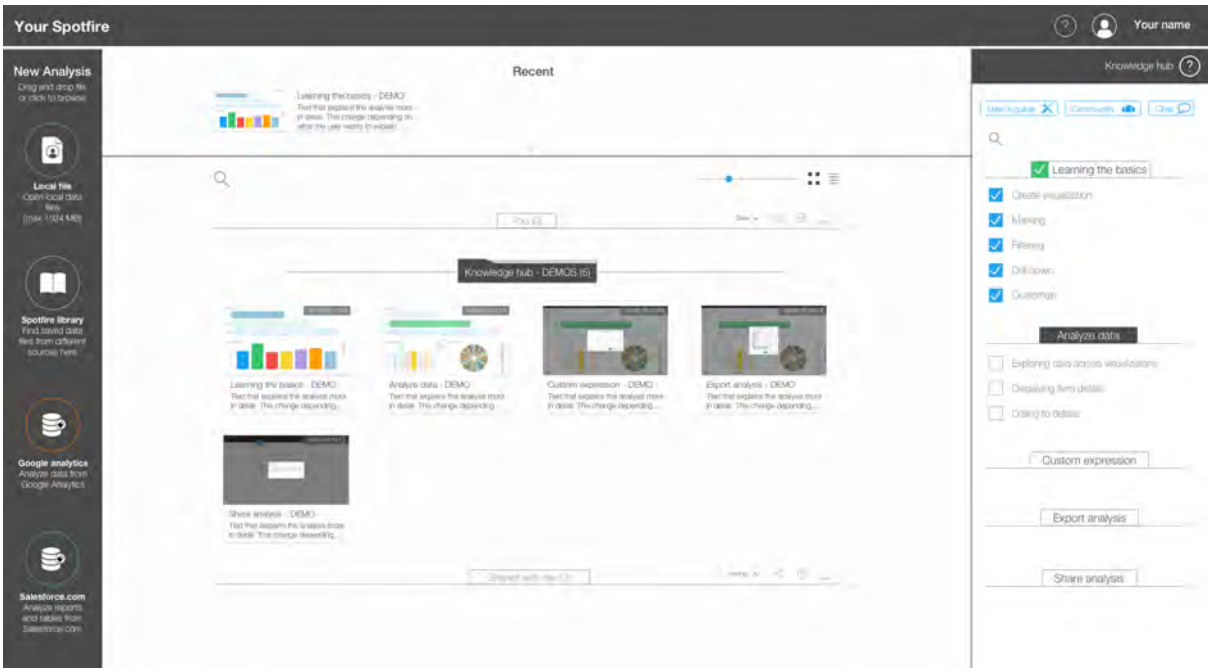

Figure 5.48. The new main page including new analysis section, library section and the knowledge hub.

When accessing the new main page, the user encounters feedback of the features being completed, under the label Learning the basics in the knowledge hub (see figure 5.49). Providing this feedback of progression is designed with the purpose of guiding the user into the continued learning, which is provided by the knowledge hub. The knowledge hub is divided into labels of features which can be learned by accessing a step guide in a demo visualization created for the purpose of learning that specific feature. Furthermore, under each feature the user is provided with user assistance relevant to that specific feature, from the different channels videos, user's guide, community and chat. Allowing for user assistance to be accessed directly in the main page prevents disconnecting users by leading them to external touch points. The user can thus explore the user assistance for features in the different labels.

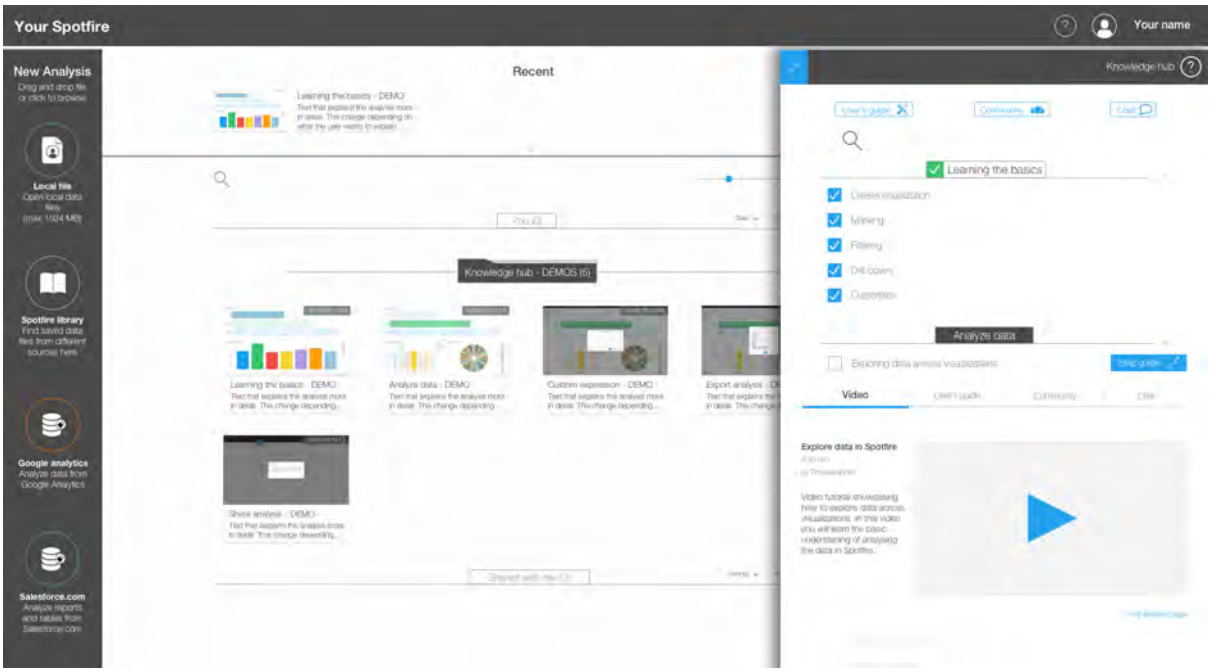

Figure 5.49. The extended version of the knowledge hub including the four channels.

When the step guide for a feature is accessed, a demo visualization is opened in the Company software, designed for learning that specific feature (see figure 5.50). The step guide for the demo visualization functions in the same manner as when initially learning the basic features, allow for users to recognize the form. The step guide can be accessed to be guided in learning new features or go back to already completed sections to reinforce knowledge.

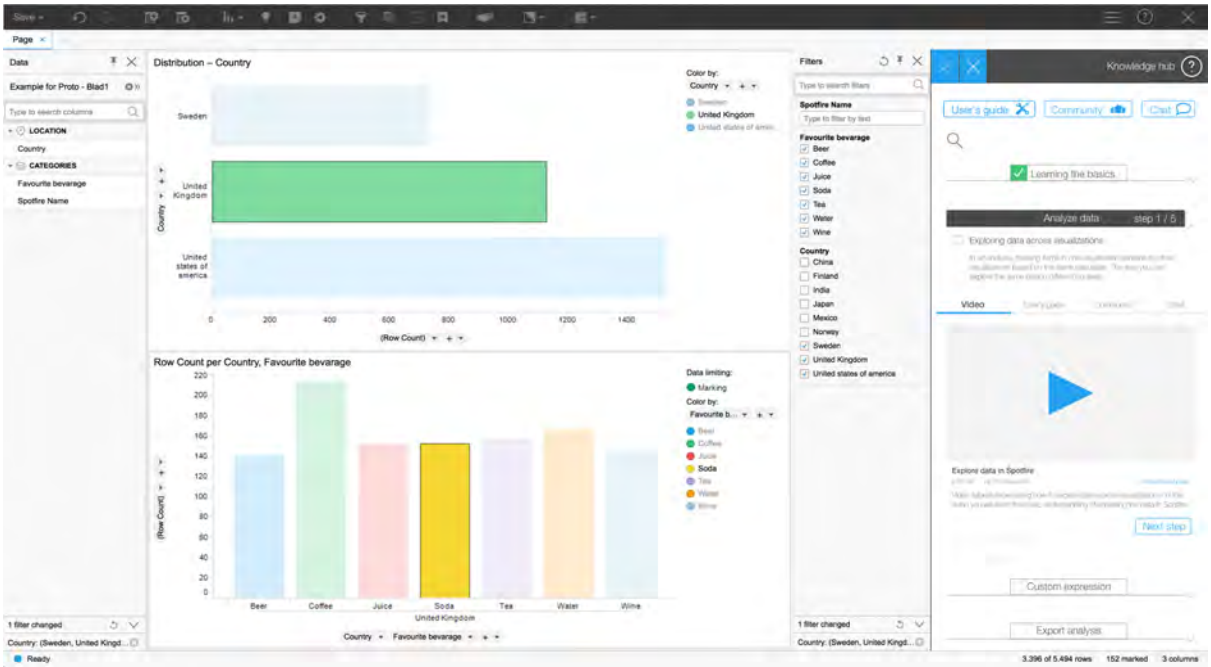

Figure 5.50. The knowledge hub included in the Company software.

The knowledge hub can also be accessed when users are creating own analyses, providing contextual help for a specific feature when in use of the Company software(see figure 5.50).

Thus, knowledge of how to achieve features can be explored in the form of different channels, without having to leave the software.

5.7.2.4 Evaluation of second interactive prototype

As the scope was widened for the second iteration, the purpose of the second interactive prototype shifted. The second evaluation had several purposes. The primary purpose was to gather knowledge of users´ perception of the new main page on a conceptual level. Specifically users´ understanding of the knowledge hub, both in the context of the new main page as well as in context of creating visualizations in the Company software. Moreover, the purpose was also to gain an understanding of how the approach of purpose oriented instructions and how the shortened learning the basics section would be interpreted by users. The additional UI-tour and earlier introduction of layered design were also to be evaluated.

As in the first evaluation, remote user tests were created, using the service Usertesting.com. The same requirements as in the first iteration were used to include users which are represented by the persona Asad.

User testing

The second iteration of user testing consisted of only testing one group (see figure 5.51), including a total of five participants. All tests were considered usable for analysis.

As in in the first iteration, the user test was structured to simulate a first time usage of the Company software with participants including the second interactive prototype as a natural integration in the onboarding flow, after launching the browser version. Consequently, the test likewise included the parts of; briefly looking around the Company software landing page, signing up for a free trial and select the browser version, using the prototype and completing the tasks in the Company software. When starting to use the prototype, participants were asked to briefly look around and describe what they encountered. This to simulate real first time usage, as well ensuring participants to some extent identifying the new main page. The same scenario as in the first iteration was used, instructing users to imagine being from Sweden and preferring coffee as favorite beverage.

In this second iteration, a new task was formulated for participants to complete in the Company software with the sample data set. The same data set, including Olympic medals data, as in the first iteration was used. As a consequence of several problems in the first iteration user testing being ascribed to users not having sufficient knowledge of the sample data set, instructions to explore the data in the original data set was included. The task for using the data sample in the Company software was designed to be more open than in the first iteration. It consisted of only instructing participants to explore the Company software, for approximately five minutes, by using what knowledge they might have gained from using the prototype. This to better be able to know how these potential users might reflect upon what they learned in the prototype, in relation to the first time usage of the software. The task ended with the instructions to describe the experience of having used the prototype before using the real product and to what extent it might have helped in the first time usage.

The five video recordings of the remote user tests were analyzed using the same structure as in the first iteration. Each video was watched carefully while documenting user behavior

observations and insights on sticky notes, which were subsequently analyzed using affinity diagramming.

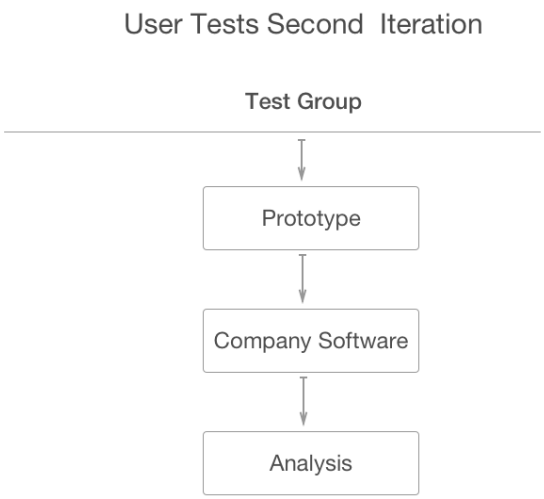

Figure 5.51. The structure of the user test in the second iteration.

Result and analysis of second interactive prototype

As in the evaluation of the first interactive prototype, a series of categories emerged as a result of the affinity diagramming analyses of the user tests (see figure 5.52). The approach for the analysis was to focus on issues related to onboarding, omnichannel and user assistance and to ignore issues which could be explained by shortcomings of the prototype.

Figure 5.52. The result of the affinity diagram session of the user test, in the second iteration.

A total of eight categories emerged as result of the analysis covering insights drawn from user behavior in both the prototype as well as usage of the Company software. The list of categories follows:

- First time usage
- User assessments of the prototype
- Understanding a steep learning curve
- User assessments of the new main page and the knowledge hub
- User preferences
- Missed potential learnings
- Learnings

The initial category *first time usage* covers insights of how users take on an introduction to a new product during first time usage. In the second iteration of user tests, some users could be considered readers, meaning they read the whole of the instruction thoroughly. Some users could be considered non-readers, more prone at skipping reading parts of instructions or whole sections. This exemplifies presumed behavior, as a consequence of difference in preference of how to acquire knowledge. A difference between users in the introduction section was observed between users stopping for reflection upon their interactions and what they might achieve and users not stopping for reflection at all. The reflective users appeared to better understand the potential with the software as well as have an easier time when interacting with the Company software after using the prototype. Thus, getting users to actively reflect on their interactions is potentially important in increasing users success in handling the complexity of the product. Furthermore, only following the hotspot might have interfered with acquiring knowledge in using the prototype. However, only one user was observed to only follow the hotspot without reading instructions.

The following category cover *user assessments of the prototype*. Only one user complained of the included sections of the prototype being too long. The same user had difficulties in understanding and taking in the presented information. Other users also made comments on the textual instructions being complex with new terminology which was hard to understand. Some users asked for information about the length of the included sections in the prototype, as no progress feedback for the whole tour existed. A majority of the users expressed that the length of the tour was good, especially in relation to realizing the complexity and richness of functionality of the Company software. Moreover, several positive remarks of the depth of the included sections in the prototype were made. One user expressed to have gained a great overall understanding of the basic features, interaction possibilities and the fundamentals of data in the software. One user went as far as stating “if no tour, I might have exited out to find another product”. The included UI-tour in general worked well, with no user asking for these type of introductions, and appeared to help rather than having a negative impact. However, the potential effect of including a UI-tour was unclear in later usage of the Company software. Regarding the introduction of the layered design toolbar, few comments were made of the layer approach itself in the user tests. One user said, “oh that’s helpful” while others did no verbal reflection. No negative comments were made.

Several users expressed an understanding of the product being a complex tool having a steep learning curve and thus would require some effort to learn. Users in general thus appeared to accept a high degree of complexity and accepting a steep learning curve, if knowing they would be guided in a satisfactory way in taking on the complexity. A challenge is thus to

design for users knowing that the steep learning curve exists, accepting it and the time it will require for them to learn.

User assessments of the new main page were in general positive and several users seemed to fully grasp the intended purpose as well as the included options. Some users initially mistook a folder in the library as making out the whole knowledge hub section, leading to some misguided answers when asked to share their thoughts regarding the knowledge hub. However, all users in a later stage correctly identified the existence of the knowledge hub. Most users appeared to readily understand the intended purpose with the knowledge hub, especially as a way providing them with a variety of options to consume user assistance related information. On top of that, users also appeared to view the existence of the knowledge hub as highly important in relation to learning the software and in a possible continued usage. Many users expressed that the knowledge hub must or should be included in the real product, as a good way of onboarding new users.

The category *user preferences* cover what to improve in the prototype based on what users asked for as well as in their usage of the prototype. First, several users continuously asked for the included sections of the tour in the prototype to be divided into smaller sections, which could be accessed whenever the user preferred to. This to both have a freedom in choosing how much of learning the basics to take on and when to take it on as well as to be able to return to each section of learning a feature again. In the prototype the first section of learning the basics is a forced flow for users, allowing no choice. The possibility of freedom in choosing was essentially the intention of the concept from start, but the forced pattern was used partly due to it being more time consuming to include more freedom of choice in how to take on the sections. The other main insight from *user preferences* was that all users asked for contextual help to be included in the real product. Most users realized that this was the intention with the knowledge hub. This gave further indications that the intention of the knowledge hub was widely accepted and appreciated by the users on a conceptual level, reassuring that the chosen path was promising. Users asking continuously for contextual help, also exemplifies the importance of being able to ac§cess assistance both for new features, but also for features which have already been addressed. This, as users memory resources for learning all basic features at once, will most likely not be enough.

When users entered the Company software, taking on the task of exploring the software by using knowledge gathered from the prototype, observations of both *missed potential learnings* and *learnings* from having used the prototype were made. One of the major *missed potential learnings* was finding the interaction area for axis interaction on a chart, even as this had been introduced to users twice during the prototype. One explicit explanation in the UI-tour and one implicit in learning the basics. This showcase the issue of having many hidden and discrete interaction points and might thus be important to highlight vital interaction areas in an even more prominent fashion. Moreover, no user displayed to have learned the drill down feature. However, as users were only asked to explore the Company software for five minutes, it was hard to know if this was something users might have achieved in a continued exploration. Furthermore, users located the drag and drop functionality, but failed to locate the drop targets, which had also been introduced explicitly, but briefly in the prototype. A few users did not understand the recommended visualizations window, which was the entry point in learning the basics in the prototype. Users who understood the recommended visualizations window, tend to start exploring recommended visualization with a question in mind. They also explored and tried different categories and charts before a decision was made which to add. This could be a result of several things combined. First, they got to know

the data allowing them to recognize the category name. Further, the data panel was introduced in the UI-tour as well as the start in the recommended visualization window being explained more in detail.

Some user behavior of using the Company software could be considered as potential learning outcomes from having used the prototype. Users generally located the filter icon in the toolbar and explored the included options in the filter panel. Thus, users appeared to have an understanding of what they could achieve when interacting with different filters. The color by function, was used by several users and the option was accessed in the chart, rather than using drag and drop. Some users appeared to have an easy time locating the chart menu option, requiring a rollover to be visible, but did not explore any of the functionality like details visualizations. This was also a feature which was introduced in the prototype.

6Results

Three main parts emerged as a result from the process of this project. First, the quality framework which resulted from the literature study and was used in the benchmarking expert evaluation. Second, recommendations for designing the onboarding process for analytics software. Third, a conceptual design solution for designing the onboarding process for an analytical software, created as a proposed way of meeting the recommendations.

6.1 Quality framework

A result of the literature study was the quality framework (see figure 6.1). This framework is considered most beneficial when used to evaluate the onboarding process of self-service software, as was done in the benchmarking expert evaluation of this project (see section 5.3). By using the qualities in this way, as heuristics, the framework is also considered to be beneficial in the design process when evaluating design solutions for the onboarding process. The framework could also be used for ideation in the design of the onboarding process for analytics software, for example as a starting point for ideation, as was done in the design workshop (see section 5.6.1). When applying the framework, it is best considered a tool for assessment. It can also be considered a vehicle for communication, when designing and evaluating, rather than strictly trying to meet each specific quality in a design solution.

Figure 6.1. The goal qualities, core qualities and supporting qualities that constitute the quality framework.

A summarized description of the framework is made in this section to provide an overview of this result. In this version of the framework the background qualities have been revised and renamed to *Supporting qualities*, to better describe how to consider these qualities when being applied. A full description of the *goal* and *core qualities* is accounted for in the section 5.2.

The qualities are divided in three main parts; goal qualities, core qualities and supporting qualities. All qualities are aimed at improving the onboarding process and be used to identify crucial shortcomings or frictions in the onboarding process. The qualities in the quality framework follows:

Goal qualities

The main goal is for users to reach value insight in the onboarding process. The subordinate goal of designing a well curated path is a means for reaching value insight, from a designers perspective.

Value insight

The onboarding process should include a goal of users reaching insight of what value the service may provide.

Well curated path

Create an overarching well curated path during the onboarding process to make users reach value insight.

Core Qualities

The core qualities are viewed as the foundation of creating a well-organized onboarding process and do not function in isolation. Each quality is expected to improve users chance to successfully onboard a service and reach value insight.

Quick wins

Provide users with quick wins to boost the sense of accomplishment and achieve progress in the onboarding process.

User assistance

Users should be assisted with their needs throughout the onboarding process as an inherent part of adopting the service.

Remove points of friction

In the users path to reach understanding of a new service, no friction that confuse or interrupts the flow should exist.

Remove points of disconnect

In users flow, when onboarding a new service, no points diverting the user's attention should exist.

Provide progress feedback and drive

Users should be provided feedback in the progression of being onboarded, with a clear way forward.

Provide value proposition early

Users should as early as possible be introduced to insight of the potential value of the service.

Add product priming

Users should be primed of the product look and feel early on, to provide a sense of familiarity when starting to use the product.

Make use of learning by doing

Users should be taught through action in order learn important parts of the interface by actively carrying out vital interactions in the interface.

Supporting qualities

The supporting qualities should continuously be regarded to see if present in the onboarding process. Thus, they are overarching and support the holistic perception of the onboarding. These qualities should be considered to occur as an effect of meeting the core qualities. The qualities of *Help me, Know me, Value me* and *Perceived usefulness, Perceived ease of use, Perceived risk* reflect users perspectives of onboarding a new software. The quality of *Consistent, Optimized, Collaborate, Orchestrated and Seamless* reflect users perspectives of included channels in the onboarding process.

Help me, Know me, Value me

Help me, know me and value me are aspects to deliver a good user experience independently of which channel is used. As qualities help me, know me and value me acts as guiding notions to check if users are supported, understood and valued throughout the onboarding process.

Perceived usefulness, Perceived ease of use, Perceived risk

Perceived usefulness, perceived ease of use and perceived risk are used to evaluate users perception of adopting new technology. As qualities, they serve the purpose of reminding the designer to take in the perspective of how users are perceiving the usefulness, ease of use and risk toward the new service, in the onboarding process.

Consistent, Optimized, Collaborate, Orchestrated and Seamless

The aspects in C.O.C.O.S, includes important notions on how to focus on the appropriate experience for each channel. These aspects can thus be used, to check if they are fulfilled in and between each channel in the onboarding process. By successfully making use of these aspects, the user experience a streamlined onboarding process, providing users with a greater chance of reaching early value.

6.2 Recommendations

Throughout the course of this project, knowledge has been acquired of how to achieve a well-designed onboarding experience including omnichannel aspects. A series of recommendations of important notions to consider when designing onboarding for analytics software have emerged as a result of this process. The recommendations are structured with a title followed by an explanation and are divided into the two categories; *approaching onboarding* and *user assistance in onboarding*.

6.2.1 Approaching onboarding

As was seen in the benchmarking expert evaluation, a lack of an intended path for the user in onboarding was evident in many cases. It is therefore important to have an intended path in mind when designing the onboarding process, to know and foresee what the user will encounter. Set up a clear goal and identify all parts to include in the path, encompassing users whole onboarding process to ultimately achieve a well curated path. If the establishment of an intended holistic path is not possible, start by identifying the most crucial weak point (e.g. cliff of faith) to approach the onboarding design work.

Define an area of responsibility for onboarding new users within the company.

A common source for a failing onboarding process, described in the literature study, is the lack of coordination of responsibility between departments within an organization. Therefore, defining a clear area of responsibility for onboarding would serve to coordinate and share vital knowledge and information within the organization.

Identify relevant channels for the onboarding process

The omnichannel perspective of this project has provided insight of the importance of including relevant user assistance in the onboarding process, which is made available in different channels. It is therefore of importance to know which these channels are, in order to use them in a holistic manner.

Identify and remove points of friction and points of disconnect in each included part in the path

Removing points of friction and disconnect in the onboarding process will prevent users from leaving their first time usage. The importance of this notion has been fortified in the user testing phase as well as in the benchmarking evaluation. Furthermore, removing friction and disconnect will also ensure providing a continuous flow for the user when onboarding the software.

Define a set of basic features to introduce in the first time usage

Throughout this project, the approach of teaching a set of learning basic features has been explored and promising results have been shown. It is therefore of significance to identify a set of basic features that should be introduced in the first time usage, allowing for users continued exploration of the software. The design of the defined basic features should also be prioritized to be adapted for learning in a first time usage.

Provide the possibility to choose when to access parts of the onboarding process

Being able to choose when to access and return to different parts in the onboarding process, and especially when learning basic features, has proven to be highly important for users in this project.

Data

If using sample data, make the data relatable for users

Making the data relatable to users in the onboarding process has, in this project, proved to be potentially beneficial to increase motivation and interest of understanding the data.

Describe the conceptual connection between raw data and visualization

Explain the underlying structure of how a visualization is constructed by showing the connection between raw data and visualizations, to better support users understanding of the value of visualizations and analytics.

6.2.2 User assistance in onboarding

A significant insight which was drawn from the user testing manifests the importance of providing users with assistance which is accessible in the context of use. This to support for users own exploration of the software and exercising knowledge of features gathered in the onboarding process. Make use of different relevant channels, allowing for users to assimilate information and acquire assistance in a preferred way.

Make the onboarding as little intimidating as possible but account for a steep learning curve

The importance of introducing the software in a simple way to ease users into their first time usage has become evident in user testing. However, users also to a high degree seem to accept a steep learning curve if knowing they will be provided with proper assistance and guidance in the process of onboarding. Thus, accounting for the learning curve will place users in the right mindset, preparing them for taking on a more complex software.

Continuously provide status feedback of the path and a clear way forward

The user testing underlined the importance of providing feedback of where in the process of onboarding users are located as well as providing an evident way forward. To properly guide users, this type of feedback should always be evident.

Have users learn to use the software by actively carrying out actions in the interface

Making use of learning by doing and forcing users to engage by actively interacting with the software will ensure users to focus on what is important in the onboarding, preventing from subconsciously clicking to proceed.

Gradually introduce complexity of the software to users

The complexity level of the software should be managed by gradually introducing it to users throughout the onboarding. Achieving this can be explored by using a layered design approach which has shown promise of being beneficial in this project.

Provide a continued way of learning features

To help users in managing complexity and function richness of the software a continued way of learning features should be included in the onboarding process. In a more complex software it is useful to consider the onboarding process as continuous rather than only covering the first time usage.

Provide users with an early visual representation of the software

Show users, as early as possible, with a visual representation of where the most important interactions with the software is going to be carried out to prepare them in the first time usage.

Consider each phrasing of instructions carefully, focus instructions on conveying the purpose of the task and prompt the user to reflect

User testing two different approaches to formulate instructions in this project showed the importance of carefully considering what is conveyed in the instructions, to facilitate the remembering of included parts and learning basic features. Prompting users to reflect has the potential of consolidating these learnings.

6.3 Concept based on the recommendations

Based on the two iterations of prototyping a conceptual design was created as a proposed way of meeting the recommendations when designing for onboarding new user in analytics software. The concept is called *the circle of data life* (see figure 6.2) and includes many of the parts which were included in the prototyping phase, but have been revised as a result from the analysis of the second iteration user testing. Circle of data life can be considered to be useful for any analytics software, it will however be described by using examples from the prototype for the Company software. It is created for users represented by the persona Asad in first time usage or having experienced the software before. Thus, some parts might be more suitable for the Company software only. In the concept, it is assumed that any previous exploration of the software landing page has been processed as well as a free trial sign up.

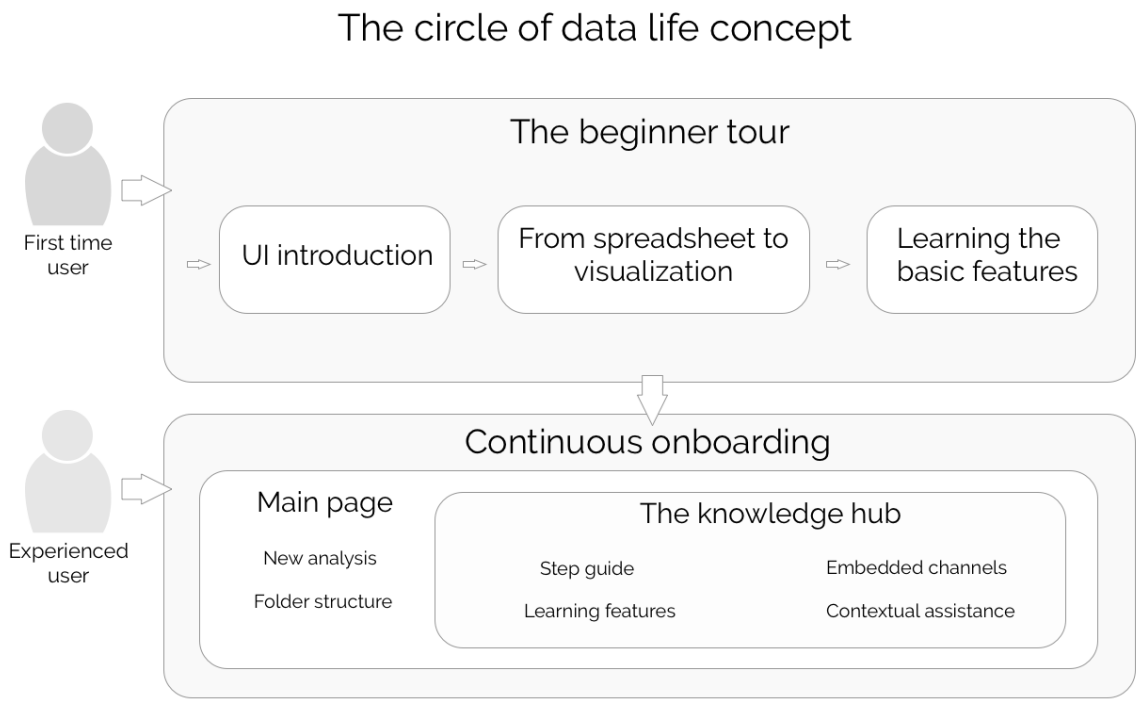

Figure 6.2. Conceptual image of the circle of data life concept.

General description

The circle of data life concept (see figure 6.2) includes two main parts; *the beginner tour* and *continuous onboarding*. The beginner tour is aimed at the first time user and includes a *user interface introduction*, *from spreadsheet to visualization* and *learning the basic features*. The continuous part of the concept includes *the main page* and *the knowledge hub* and is aimed at the experienced user, who has gained knowledge of the basic features.

The core of the circle of data life concept lies in that first time users are provided with a basic understanding of the connection between the data in the form they are usually working with and how that data is represented as well as how the data can be used in the analytics software by creating visualizations. This to make the onboarding as little intimidating as possible, but account for a steep learning curve. In the parts from spreadsheet to visualization and learning the basic features, the user is provided with knowledge of using basic features by backtracking how to build a demo visualization which has previously been displayed. In a circular fashion, users are thus provided an early understanding of how they can benefit from using the software and how this can be achieved. Learning how to use the software takes place in the knowledge hub which provide users with contextual assistance and a continuous learning of features, guiding users in their path of onboarding the software. A more detailed description of the included parts in the concept follows in this section.

The beginner tour

In users´ first encounter with the software they will land on the main page (see figure 6.3), which should be considered a reference point to which users can always turn back from using different parts of the software. The main page includes easy access to creating a new analysis with any available data connection, the knowledge hub and a clear folder structure with including knowledge hub demos, own and shared folders. The beginner tour is connected to the knowledge hub (visually and conceptually) and is offered to all first time users providing an opt out for users already familiar with the software. It includes the parts UI introduction, connection from spreadsheet to visualization and learning the basic features. To provide the possibility to choose when to access parts of the onboarding process the beginner tour can be exited at any time with the possibility of returning to the same place at any time.

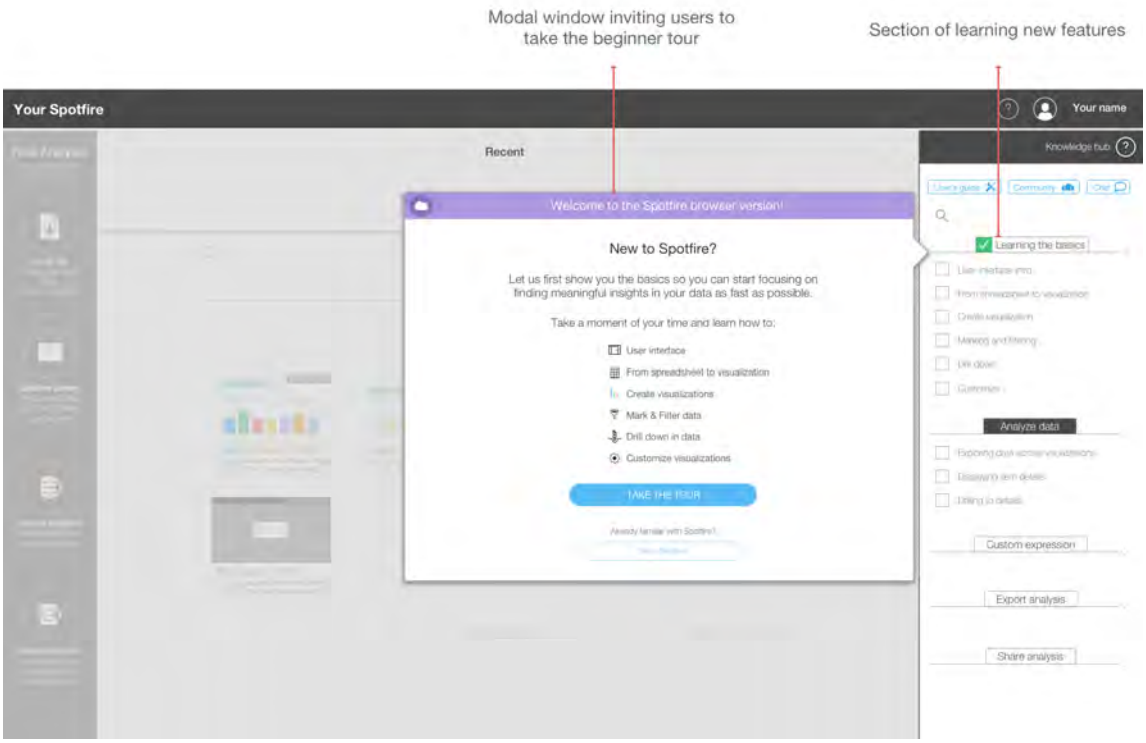

Figure 6.3. Main page with the beginner tour and knowledge hub.

UI introduction

The first part of the beginner tour is the UI introduction (see figure 6.4) which consists of introducing only the most basic interaction areas and interaction forms. An action driven tooltip pattern is used to have users learn by actively carrying out tasks in the interface. The concept includes a toolbar which has a beginner layer, which scales down the included functionality when activated, allowing to gradually introduce the complexity of the software. The introduction of the UI part of the concept should not function as a band aid for any failure in usability rather only prepare users for their encounter when starting to use basic features in the software, providing an early visual representation of the software. Including too much in this part can be considered a symptom of failing usability issues and failing of not properly incorporating the design of basic features in the overall onboarding design work.

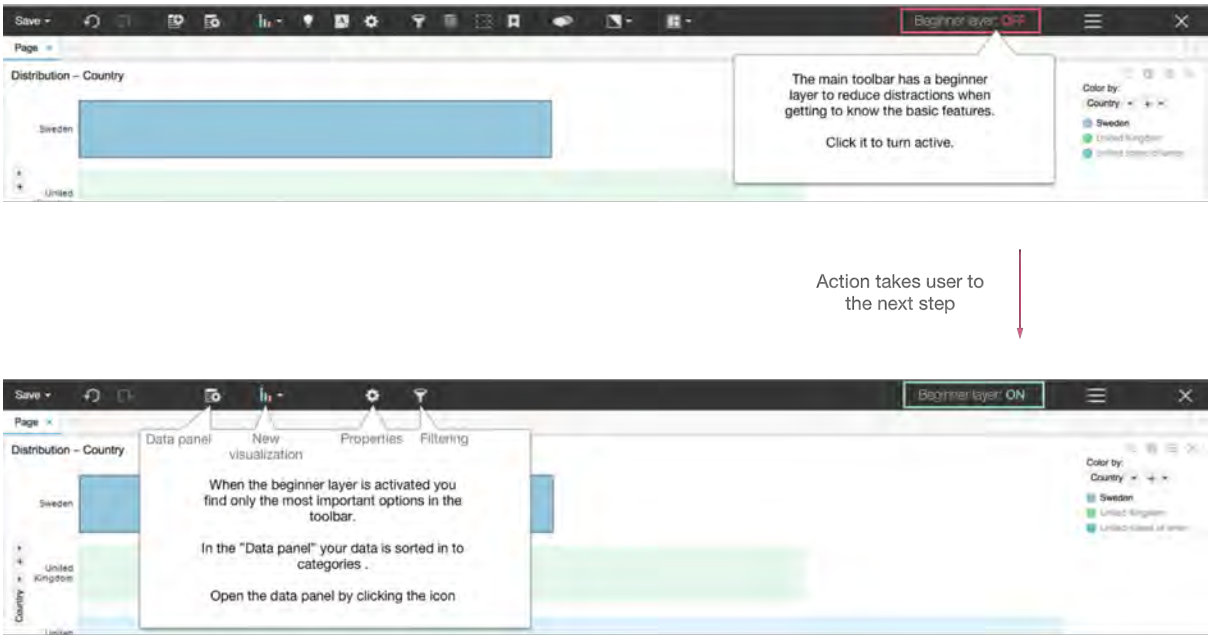

Figure 6.4. Action driven tooltip explaining the interface for users.

From spreadsheet to visualization

To describe the conceptual connection between raw data and visualization (see figure 6.5) the beginner tour makes use of data which is provided from users by asking a simple question in combination with accumulated data provided by users in the sign up form. This as a way to make data relatable to a large number of users as possible. The relatable data is then displayed in a spreadsheet data format and a question is prompted, which is highly difficult to answer by using only the spreadsheet format, but instead quite easy by using a visualization. A demo visualization is provided where the question can easily be answered. The demo visualization is built by only using a defined set of basic features which are considered important to learn early in the onboarding process, providing users with a solid base for continued exploration of the software. The idea is to start basic with the, for users, relatable data in a familiar format to later gradually introduce complexity in the form of learning the basic features by building the demo visualization.

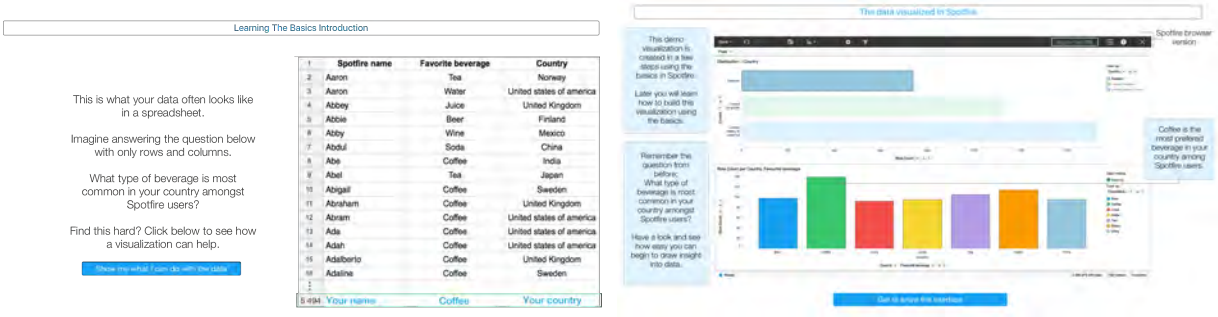

Figure 6.5. Spreadsheet data on the left and the visualization based on the raw data to the right.

Learning the basic features

To have users learn the software by actively carrying out actions in the interface, learning the basic features is achieved by using the step guide of the knowledge hub. The step guide provides users with instructions assisting them in how to carry out necessary actions included in the basic features, which in the end lead to users building the demo visualization. The instructions are focused on the purpose of carrying out the action rather than detailed description of how to interact.

Continuous onboarding

The part of the concept includes a reference point for continued learning of new features, provided to users in the main page and knowledge hub.

Main page

When users have taken the beginner tour they return to the main page (see figure 6.6). The main page serves the purpose of being a reference point for users when using the software, to provide an access point for analyses, user assistance and continued onboarding. The main page thus includes a new analysis section, providing easy access to possible ways of connecting to data for a new analysis. In the center of the main page exists a folder structure with a clear overview of the most important folders and access to recently used analyses. The knowledge hub makes out the rightmost section in the main page.

Knowledge hub

The knowledge hub (see image 59) exists to provide a continued way of learning features as well as contextual user assistance by making use of relevant channels, as a way to remove possible friction and disconnect. Moreover, it provides users with the possibility of always returning to any section of learning a feature.

In users´ first encounter with the main page after taking the beginner tour, the knowledge hub (see figure 6.6) provides feedback of their status in the onboarding path and what basic features have been learned. Further, a way forward is provided by exploration of subsequent sections of learning more gradually complex features, in an intended path for users continuous onboarding of the software. The knowledge hub includes sections of features which can be accessed for continuous learning or going back to revisit already accessed sections.

Each section of learning features can be learned by using the action driven step guide demos, which function in the same manner as for learning the basic features in the beginner tour (see figure 6.7). Each section can also be explored when creating visualizations with own data, by using information from the embedded channels and step guide, providing assistance for each specific feature or step in the context of use. Thus, the knowledge hub provides embedded assistance from channels, which are relevant for a continuous learning.

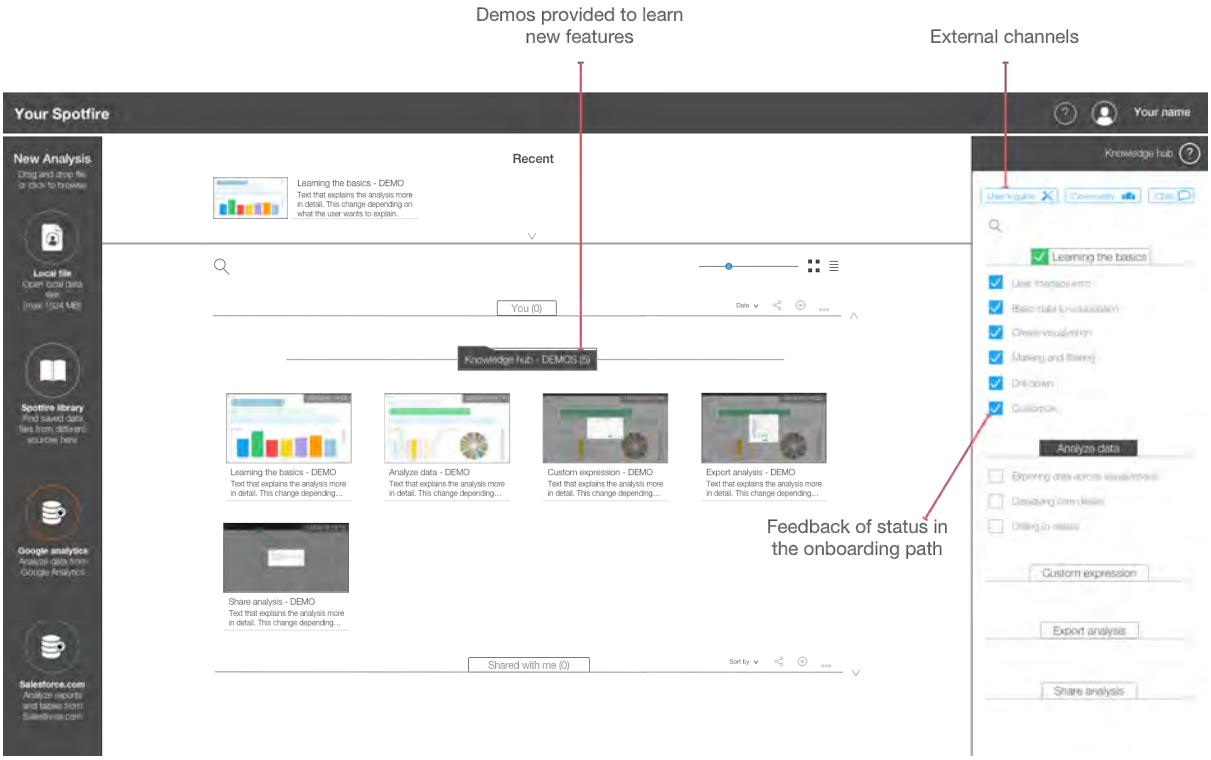

Figure 6.6. Main page displaying the folder structure and knowledge hub including channels.

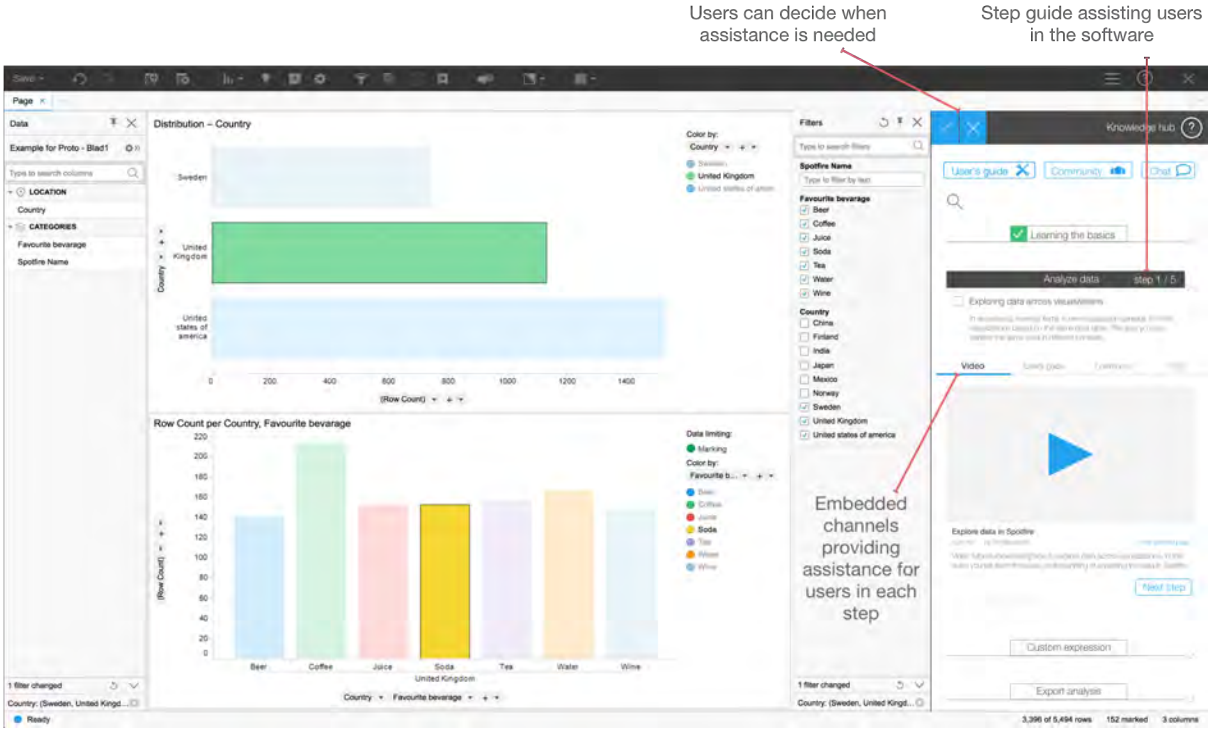

Figure 6.7. The knowledge hub including the action driven step guide and the embedded channels users can interact with to be assisted.

7 Discussion

The discussion section is divided into two main parts; the discussion of the process and the discussion of results. In the process part, the discussion regards how the process of this project was carried out and what could have been changed. This is structured in small segments, explaining the process in a temporal order. In the results part, the discussion regards the results of this project as well as the generalizability of the results. At the end, ethical issues and future work is discussed.

7.1 Discussion of the process

From the start of this project a detailed plan has been followed, explaining the outcome and purpose of the different activities that were to be carried out. In the beginning of each activity, an even more detailed plan was formed. This to remind each other of the activities purpose and outcome, and revise the activity if necessary. This functioned well, especially to deliver each activity in time as well as to continue on the given path to fulfill the goals of this project. After completing the projects all included activities were considered relevant in reaching the project goals. All this combined has made it possible to complete the project in time, with a purposeful outcome. However, some activities were terminated early in the process, due to time limitations, even if the project outcome would have benefitted from exploring them further. Completed all included activities within the time frame was considered more important.

7.1.1 Literature study

Initially in the literature study, the scope had to be narrowed and an orientation of target group was made. The persona Asad was chosen and this allowed to focus on self-service users. It was of great importance that this choice was made so early in the project. Defining the target group made it much easier to locate relevant literature, conducting a specific plan for the continuous work and defining when the onboarding process ends in relation to analytics software. On top of that, using a persona as an intended user helped communication between project members.

During the literature study, it became obvious that onboarding or omnichannel were not primarily terms used when discussing interaction design, which made it troublesome to identify one clear definition for each term or what direction to take in the project. A wide range of different sources had to be investigated and analyzed, many were non-academic such as blogs and e-books from industrial actors, due to the subject being reasonably new in the field of interaction design. This could make it difficult to extract the most relevant features and important aspects in the literature to be able to draw valid conclusions, which can affect the whole project. However, academic and non-academic sources were explored and compared to cover the ambiguity of the onboarding and omnichannel terminology. This made it possible for us to strive to fulfill the goals, based on one common view.

7.1.2 Onboarding

In the beginning of the project, a holistic approach in regard to the design problems of the onboarding was to be taken. However, due to that Asad represented the target group and the project had a fixed time limit, a realization had to be made which resulted in that the onboarding process would only include first time users. Further, a proposed value insight for the company software was formulated which was based on the qualities discovered during the literature study. This made it possible to set a defined end point in the onboarding process of the software. However, during benchmarking a specific entry point for the prototype emerged, the cliff of faith, which could not be unexplored. This shaped the project immensely, but has been considered extremely important for the project's outcome.

The initial limitation of the onboarding process resulted in that the channel perspective was not explored ta any great extent and for the second iteration the scope was expanded, to include the relevant channels in the prototype. This was mainly a consequence of the results from the first iteration user tests, where users made it evident that it was still difficult to onboard the Company software with the prototype in place and that users required extended assistance. Further, as was known to us before it requires some effort to understand and fully grasp the intended purpose of an analytics software, making it troublesome to assume that users can be onboarded in a first time usage.

A question which has been discussed during the entire project regarded when the onboarding process ends. As described in the literature, an onboarding process ends when users reach value insight. However, most of these descriptions are based on software that are rather non-complex with few features and not fully covering more complex software. This description of when the onboarding process ends was the initial orientation of the project, but the realization that the Company software was much more complex made it troublesome to continue on the given path. Therefore, an assumption was made that users are never fully onboarded in complex software, as new features are added and insights realized gradually. Later in the process of the project a defined set of features was identified and used as intended learning outcome in the first time usage.

7.1.3 Metrics

A major part in the onboarding process that was left out in this project is the use of metrics to track users´ behaviors. This was something that intentionally was meant to be included as a lot of the literature mentioned metrics and the importance of it. However, as the Company does not track metrics and it was difficult to investigate the use of metrics in the Companies evaluated in the benchmark, a change in the plan had to be made. It would be interesting to explore how metrics could be used and the impact they would make if a full scale onboarding solution was to be carried out, in the Company software.

7.1.4 Quality framework

The final framework that is presented in this report was the result of several iterations trying to figure out the best possible way to explain and construct a quality framework. Initially all the qualities that constitute the framework were arranged hierarchically. This made it possible to define the most important qualities, but made it difficult to define the subordinate

qualities and arrange them accordingly. As this made the framework difficult to interpret, skipping the hierarchical structure and focusing on the temporal aspects in regard to the onboarding process, proved to function better.

The framework was effective in assisting us, by making it possible to define thoughts and discuss design solutions. However, a framework needs to be solid and stable with clear definitions to function in general usage. As was seen in the workshop which was conducted in the Company, the framework was not self-explanatory and some of the participants did not understand the purpose or how to interpret the framework. This resulted in that some participants did not grasp the idea with a framework, leading to misunderstanding the qualities.

The omnichannel qualities (C.O.C.O.S and Help me, know me, value me) were difficult to add to the framework, where many approaches were explored in each iteration. This was mainly due to omnichannel being viewed holistically and had no defined place in the framework. By making the omnichannel qualities supporting qualities, ensuring users to reflect during the entire process when evaluating or creating the onboarding, a placement in the framework could occur. All this made us realize that it takes long time and lots of resources to generate a well-defined and stable framework which can be used by many users. Time and resources which were not available in this project.

7.1.5 Benchmarking expert evaluation

In the benchmarking expert evaluation, several software were chosen to be evaluated, ranging from complex to less complex software. The division between complex and less complex was based on the features offered to users. The complex software had to be analytics software. This to explore and evaluate how software in the same domain had designed their onboarding process. The less complex software were chosen based on reputation of their overall good onboarding process with the requirement that we had heard of the software beforehand. This approach worked well for this project, but can be viewed as the software were chosen randomly with no basis why, making the data less useful. Further, by defining the end of the evaluation based on hypothesis instead of a fixed time could be seen inappropriate, due to lack of knowledge in regard to the software. This was done, due to that it was impossible to know when users are considered to have reached value for each software as well as that the length of each software's onboarding could not be predicted. However, the benchmarking expert evaluation was conducted to extract samples and ideas of well-organized onboarding processes independent of software, which the result showed. In future benchmarking expert evaluation sessions, a more detailed outcome of why a software is chosen as well as a more precise end point of the evaluation would be preferable.

7.1.6 Brainstorming

The ideation resulted in two defined paths. These paths were identified relatively early in the brainstorming phase, making it difficult to explore other solutions more in depth. In retrospect, it would have been better to explore the design space more before settling on the two paths as different solutions could have been beneficial and complementing each other to reach a better result. A question that has been asked during this project is if a better structured brainstorming phase could have benefited to further explore the design space. For instance, by taking a wider approach in the brainstorming, discussions between group

members with an iterative process could minimize the scope automatically. Further, by excluding the defined four starting points for the brainstorming session and instead incorporate these as material to use when coming up with new ideas, exploration of the design space could be possible. Structuring the brainstorming this way could have been beneficial to explore the design space or including more iterations making room to explore lots of design solutions before settling on a few.

7.1.7 Prototyping

During the low-fidelity wireframing sessions, it would have been purposeful to evaluate the sketches in a more structured way. This could have been done in a quick and dirty manner, to minimize the rough edges of the design solutions. Further, these sketches could have been evaluated by other participants than the target user group, which would have made it less cumbersome to construct an evaluation session.

When creating the prototypes the problem of users not understanding possible interaction forms was solved by creating animations with GIF:s. The problem was that users could not perform some interactions due to limitations in the prototyping software. By creating GIF:s which displayed the interaction, users could see how to interact with the software and hopefully learn. This did not work as well as predicted. Users did not fully understand what was happening when an animation was displayed. However, it was an interesting way to solve a problem which incurred due to shortcomings in the prototyping software, but would need more time to be fully incorporated.

The remote user testing worked well and provided useful results. It was also considered to save a lot of time as tests results were returned within a day. However, additional methods could have been used to extract data from users. Preferably a moderated user test to discover other aspects in usage of the software. But due to the difficulty in finding users who fulfill the requirements for the target user groups, the usage of remote user testing was most suitable in the given timeframe.

A comparison between the first and second interactive prototype was conducted. However, as these prototypes with complementing tests were so separated in execution, little comparison could be made. This resulted in few assumptions based on weak unreliable data. Therefore, the comparison part was removed from this report.

7.2 Discussion of results

The results which emerged from the process of this project were divided into three parts; the quality framework, the recommendations and the concept. The process can be considered successful in fulfilling the goals which were set when starting this project. Important and interesting aspects regarding these results are covered in this section as well as generalizability in regard to the result.

7.2.1 Complexity implications

No clear definitions of what a complex software is was used in this project. Analytics software were considered as more complex software than many other self-service software,

as per their function richness. Thus, it was in theory assumed that analytics software would require more of users when onboarding than when onboarding a less complex software. On top of that no literature covered this aspect. Throughout this project, it has become more evident that this is a notion which requires much consideration. We thus believe that the need to manage the complexity of the software when onboarding new users is of great importance. That being said it was also discovered that users appeared to accept the complexity and a high learning curve if knowing they will receive proper assistance. It is therefore also considered of importance to address the learning curve to users early on in the onboarding.

All resulting parts in this project includes attempts of addressing the complexity. For example, some recommendations are specifically directed towards managing this issue. On top of that the layered design approach specifically served the purpose of managing the function richness and complexity. However, as the layered design was only explored to a small extent not much can be said about the approach, more than it showed some promise and should be considered of interest to explore further. Moreover, the layered design was not encountered in any of the included software in the benchmarking evaluation and could therefore provide a new innovative take on designing the onboarding process for function rich software. Furthermore, it would be beneficial to know more of where the complexity lies in the software, to better be able to manage the complexity in onboarding.

7.2.2 The quality framework

The version of the quality framework in this report should not be seen as a finalized version but a draft which has shown promise and which could be improved.

The quality framework proved very beneficial throughout the course of this project both when used in the benchmarking expert evaluation, the design workshop and as a vehicle for communication regarding the design of an onboarding process. This supports the view of the framework being useful in several ways, mainly as an evaluation tool which lead to the discovery of the common onboarding process weak point labeled cliff of faith. The communication aid was evident as we entered a new knowledge domain going into this project, providing a useful technical language for new occurring notions.

To know exactly how purposeful the framework is for evaluating the onboarding process of self-service software is difficult to say at this point. This project has shown promising result regarding the use of the framework as an evaluation tool but further testing of using the framework in this way is needed to establish its validity.

The framework should be considered useful, not only for onboarding analytics software but considering any software. If the usage for any type of software could be purposeful would require a deeper exploration and testing of the framework. However, as the qualities were based on the literature study, which had a general focus of the onboarding process, would support that the framework could be used in other domains.

7.2.3 The recommendations

We consider the resulting recommendations to have much potential benefit if used when designing an onboarding process for analytics software and especially for the Company software. A first indication of this applicability was the facile, and purposeful, use of the recommendations when describing the final concept.

When initiating this project a goal was to produce both general recommendations for how to design the onboarding process in analytics software, as well as specific recommendations to the company for the same purpose. However, as the recommendations were compiled and formulated, only general recommendations for analytics software emerged. This, as all the recommendations which were produced could be viewed as general and that they were considered useful enough to fulfill the purpose of guiding the design work of an onboarding process with an omnichannel perspective, for analytics software as well as the Company software. It should be stated that when considering an analytic software in this project, this only covers the software which were included in the benchmarking. This is a weak point when considering the generalizability of the recommendations to all analytics software as conclusions are based on a small sample.

We believe that the recommendations cover the entire onboarding process, as the recommendations are based on knowledge gathered from all included activities in this project. As much focus was put on addressing the weak point of cliff of faith in the project this is reflected in the recommendations. However, also using the knowledge gathered from the literature study as well as from the benchmarking evaluation we believe all relevant parts of the onboarding process are covered in a good way.

The division of the recommendations into two categories was made to highlight that some can be considered more general and process oriented and some are considered more concrete in how to address design work. Although this division appears satisfactory, the applicability has not been tested, and it is thus unclear if this division best describes their interrelations when they are to be applied in design work. This should be taken into consideration if using the recommendations.

The recommendations emerged as a result of exploring a design solution which was directed toward the onboarding process specific to the Company software and for the persona Asad. This is something which should kept in mind if using the recommendations for designing an onboarding process in another software.

7.2.4 The concept

The concept was created with the purpose of providing a possible design solution for how to meet the recommendations in an onboarding process for analytic software. We consider several parts of the concept worth exploring if designing an onboarding process for analytics software. Making use of the concept has the potential of ensuring not missing out on parts which are of high relevance when designing the onboarding process analytics software and especially the Company software. The parts from spreadsheet to visualization, learning the basic features and the knowledge hub are considered of particular interest to use when exploring concrete design solutions for the onboarding process.

The core of the part from spreadsheet to visualization originated early on in this project, and its relevance is considered to have been supported throughout the process. We believe the benefit of exploring design solutions for this part lies within its potential of connecting the dots for users, in regards of understanding what value visualizations might have for them. To make this part truly useful would require exploration of how visualizing the connection in an interesting and comprehensible way could best be achieved. We believe this would be recourses well spent as it provides the user with a solid start for further exploration of the software.

The part learning the basic features reflects the importance of first identifying what is important to teach and communicate to first time users early on in the onboarding process, providing them the foundation to further explore the software. A possible benefit with identifying the relevant features and including them in the onboarding process ensures that the designer takes the perspective of first time usage. Another important notion the concept tries to cover is the aim to get users to reflect on what they are achieving in the onboarding process. We believe that making use of this notion has much potential to better consolidate what is learned in the onboarding process, leading to more competent users early on when onboarding the software. One thing which could be explored further is how to find new ways of making use of learning by doing in the onboarding process that also promotes users reflection of their actions.

The knowledge hub is viewed as a promising way of providing users with relevant assistance when onboarding the software as well as in a continued usage. The user testing provided good indications of the knowledge hub being purposeful in providing contextual user assistance. The knowledge hub, in its conceptual form, is an all-inclusive solution which would of course require a vast amount of resources to implement. However, we believe that providing contextual assistance in some form to users, especially early in the onboarding process, is highly important. Moreover, a strength with the knowledge hub is the embedding of relevant channels which would, again, require a vast amount of resources to implement. However, one could start with embedding the channel which is considered the most relevant to the onboarding process, to prevent users giving up on the account of too much disconnect, in the fragile first time usage. The knowledge hub thus includes a possible design solution for taking an omnichannel perspective on the onboarding design. We believe this perspective is useful and should be considered when designing an onboarding process.

When looking at how applicable the concept would be for other analytics software than the Company software, it should be used as inspirational and nothing else. As the concept originates from prototyping in this project, it has a clear connection to included parts of the Company software.

7.3 Ethical issues

No major ethical issues were encountered in the course of this project. However, as in any user testing, the privacy of participants should be considered carefully and the responsibility of not revealing any potentially damaging personal information. This might be of particular importance when using remote user testing, as users record their screen in their home environment and might accidentally leave windows and tabs open. There is also the risk of overhearing conversations with non-participants in the recordings.

Another ethical issue revolves the collaboration with a company in a project like this. While many benefits come from conducting the work onsite at the company, it might not always be clear how one is affected in the decision making, a notion which should continuously be evaluated to avoid bias.

7.4 Future work

Future work would concern developing the prototype further and user test recurring usage, not only first time usage. This to better understand the effect of the prototype, simulating a real free trial usage. Also, to better understand how users consolidate learnings from the onboarding and handle complexity over time. Continued prototyping would further explore design solutions for the concept.

Regarding the quality framework, it would be interesting to explore how to apply the framework in onboarding process design work both in regard to how to use it for evaluation and ideation work. This would require to iteratively apply the framework and evaluate its effectiveness and included qualities.

It would be interesting to further develop the knowledge hub by including new features. Another aspect would also be to identify what channels users would find most interesting to be contextually provided with in the exploration of the Company software.

Of interest would be to explore how the recommendations could assist when designing an onboarding process for any type of software. Even though the set of recommendations are directed toward analytics software, many of them could definitely be advantageous considering the onboarding process for any type of software. Formulating a set of recommendations could potentially be created for this more general purpose. This would require identifying which recommendations could be included in such a general set as well identifying any other recommendations needed, having the potential of serving the design of any onboarding process.

As was seen in the literature study, a clear definition of what onboarding is in the domain of user experience was not encountered. Further, no widespread academic research on the topics of onboarding and omnichannel was encountered in the domain of user experience. The potential benefits of providing users with a well-designed onboarding process has, to some extent, been shown in this project. Therefore, design research should focus on these topics as they have a clear connection to user experience and interaction design.

8 Conclusion

This project was set out to answer two research questions related to onboarding new users for analytics software while taking an omnichannel perspective. These research questions were:

"In order to best assist users, what should be considered when designing the user onboarding process for analytics software?"

"How can taking an omnichannel perspective benefit the design of the user onboarding process?"

A series of activities, each with a purpose and outcome directed toward answering the research questions, were undertaken in this project. In the initial literature study, knowledge was gathered to understand important factors for designing a purposeful onboarding process including an omnichannel perspective. A series of qualities were identified and compiled into a framework that was used in a benchmarking expert evaluation which led to the discovery of a common weak point in the onboarding process of the more complex software, labeled the *cliff of faith*. This defined the starting point for what to prototype in the onboarding process. Two iterations of prototyping and user testing explored how to best assist users in the onboarding process starting from the cliff of faith in the Company software as well as how an omnichannel perspective could be beneficial.

Based on the knowledge gathered from all activities in this project we have proposed a quality framework and a set of recommendations which can be applied when designing an onboarding process for analytics software. These address the issue of how to best assist users in the onboarding process. We believe that if the recommendations are applied they will have the effect of creating an onboarding process which assist users through the entire onboarding process including first time as well as continuous usage, for analytics software. As the recommendations are directed toward analytics software they address aspects of complexity and how to handle data. However, several recommendations could be beneficial for any type of self-service software. Furthermore, a concept for how to meet the recommendations was proposed to provide applicable design solutions for an onboarding process in an analytics software.

As much user assistance exists in external channels, it is considered important to make use of these channels to assist users in a good way when onboarding an analytics software. In this project taking an omnichannel perspective led to a design solution (e.g. the knowledge hub) where relevant channels were provided to users in the context of use. We consider this as the most beneficial implication of including the omnichannel perspective. However, to better explore the potential and possible beneficial implications of the omnichannel perspective it should have been included to a higher degree.

To summarize, this project has yielded results for how to approach the design of the onboarding process for analytics software with taking an omnichannel perspective. We would like to emphasize the importance of focusing design work on the onboarding process

for these types of software as this has the potential of being highly beneficial for users´ continuous exploration of the software.

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Appendix 1

Interview template

Introduction
We are two students from the master's programme in interaction design who are doing our thesis work at the Company software Gothenburg office as a part of the UX-team.

Our overall focus is to look at the onboarding process for new users in the Company software cloud version. We are also taking in the perspective of how assisting the user through different channels work in this process. We are using the persona Asad representing the target user group. Therefore we focus on the self service aspect and individual customer.

The primary purpose of this interview is to get insight in different perspectives of how work with onboarding is carried out. By collecting different perspectives within the company we strive to get more knowledge of both the product and the user.

Name:

Role / Title:

Department / Team:

Questions:

1. **How would you describe your daily work briefly?**

2. **From your perspective, how would you describe user onboarding?**

    a. **And more specific in relation to the Company software?**
    b. **In relation to cloud version?**
    c. **How is onboarding present in your work?**

3. **How would you describe the self service user group represented in Asad?**

    a. **What do you think drives them to start using the Company software cloud version?**
    b. **What value do you think they find in using the service?**

4. **What do you think is most important to learn first when onboarding new users to the the Company software cloud version?**

5. **What do you think is most the critical aspect, for the user, of the entire onboarding process?**

6. **From your perspective, what channels or touchpoints are relevant to make use of in user onboarding?**

7. **How is that fulfilled today in the user onboarding process?**

8. **What do you think is the most important aspects to improve in the Company software regarding the onboarding process? Both considering overarching and specific aspects.**

9. **Do you have any examples of good onboarding that you can share with us?**

Appendix 2

Written answers from user testing

User testing first iteration with tour

1. **What frustrated you most about the tour (prototype)?**
    a. I forgot where some of the tools were and couldn't finish the task even though I knew the tools were available.
    b. Lack of familiarity with toolbars / menus and icons functions.
    c. too long and it didn't match visually with the product it self
    d. I found the prototype tour somewhat confusing. I feel like I need a lot more practice to be able to use this application effectively.
    e. IT WAS HARD TO SEE THE HIGHLIGHTED AREAS, MAKE THEM A LITTLE MORE NOTICIBLE WOULD HELP
2. **If you had a magic wand, how would you improve the tour?**
    a. Add hints / tool tips and optional explanations of why a particular tool or choice would be useful for the visualization
    b. I'd start it with a more basic introduction to what the toolbars are called and functionality. And introduce terminology used in the software to get the user quickly comfortable with the basics.
    c. make it shorter have a video then walk through basic steps
    d. It wasn't always clear what I was being asked to do in the tour. I think the terminology should be more logical and the tour more user-friendly.
    e. I WOULD HIGHLIGHT THE SPOTS BETTER THAT NEED TO BE PRESSED OR USED NEXT, IT WAS HARD TO FIND WHAT I WAS SPPOSE TO DO BECAUSE THE BUTTONS WERE NOT HIGHLIGHTED AND I WSANT SURE WHERE TO GO NEXT
3. **What did you like about the tour?**
    a. I learned more about how to add data to a visualization and the concept of drilling down.
    b. Icons highlighted to indicate to user where tasks were referring to.
    c. it taught me how to use the product.
    d. I liked that it gave me an overview of what the application can do for me.
    e. I LIKED THAT IT HELPED ME STEP BY STEP AND I DIDNT HAVE TO USE THE SITE WITHOUT A TUTORIAL.
4. **Would you like this tour to be included in the product?**
    a. Absolutely!
    b. 100% would want it included and possibly another more basic tutorial tour on basics of software too.
    c. I would expect it to be, I would've been lost in completing the tasks if it weren't included.
    d. An improved version of this tour should definitely be included in this product. As well as access to practice tutorials.
    e. YES

User testing first iteration without tour

1. **What frustrated you most in your first time usage of the product?**
    a. I was completely unfamiliar with the product having been using excel for a very long time
    b. I found the learning curve too steep - maybe you could start new users off with a 'lite' version and allow them to 'garduate' when they understand the basic concepts.There were simply too many options for me to take in on the first attempt.
    c. I may have missed something, but to add data, I felt I had to "start over" with creating a new document.
    d. I wasnt sure if I should use the desktop or web version. 2. I didn't know how to get back to my home page.
2. **If you had a magic wand, how would you improve the product?**
    a. a tutorial may have helped me
    b. You could hide some of the more advanced features until the user asks for them to be made available. Videos, videos and more videos - from basic to advanced.
    c. When you hover over icons on menu, make text to say what icon does.
    d. I would have helpful pop-ups for new users. However, I would give the end user the ability to not show them at all.
3. **What did you like the most in your first time usage of the product?**
    a. importing data was very easy
    b. Very easy to import data. Recognisable fields down the left hand side. Icons were 'standard' and recognisable. Colours were neutral and business-like.
    c. I really liked how easily it created charts from Excel data! This could be a lifesaver for me in the future!
    d. I liked the depth of options. I didn't explore them because it would have taken a lot of time and I wasn't specifically told to. It looked very intense though.
4. **What type of assistance would you prefer when experience difficulties solving the tasks?**
    a. i found it difficult to find the data i had imported to subsequently manipulate it
    b. The possibility of offering context-sensitive help. "What you can do from here is..." giving pictoral examples.
    c. I'm a visiual learner, so clips of video showing "how tos" are great for me. Or screenshots "how tos" as well.
    d. Just the popups for new users. Other than that it looks great and useful.

User testing second iteration with tour

1. **What frustrated you most about the tour (prototype)?**
    a. No updated progress bar/status along the way.
    b. Nothing was frustrationg, it was a little overwhelming at first but it helped alot in the end!
    c. It was way too long and complex for me to take everything in. It started getting into details before I had a good understanding of the high level features.

d. There wasn't anything that caused a sense of frustration while walking through the tour.
e. Some of it was a little unclear, but it was fine otherwise.

2. **If you had a magic wand, how would you improve the tour and the Knowledge hub?**
    a. Add progress bar or status markers along the way of the tour. Make sure knowledge hub is contextually aware of where you are and what you are doing, looks like it already is to some extent.
    b. I might would break up the intro like the others in the knowledge hub but I understand the intro is more general and there may not be a good way to break it up.
    c. Have a shorter tour that is very basic. Then have multiple tours for the various features, increasing in complexity as you go along.
    d. Although the tour was fine, it would be great if the following was possible: Break the tour into building blocks. Hence the first four features the tour guided me through, that would remain in place; however, the platform would stop the hand-holding guide and have me use a new data set to accomplish the same task without help. Then after I have successfully completed the task, it congratulates me and it moves on to the next building block of task/features. I only mention the above because the platform is so robust and detailed that giving me the tour in bite size chunks - to include the handholding (walk through) aspect, and adding a do-it-yourself would greatly cut down on my forgetting what I learned during the tour. It would also reinforce what I just saw. During the second part of the user testing stud, I ran into the issue of forgetting how to view specific data sets that I chose.
    e. I would like the Knowledge hub to be available next to data, as it is in the prototype -- I missed that in the second version.
3. **What did you like about the tour and the Knowledge hub??**
    a. Tour was very useful and detailed, helped to explain what the product is and some of the features and depth of product. Knowledge hub would be very useful for learning about the product and getting more information on features used.
    b. I like to guided access and the hub options for video, chat, etc.
    c. I liked that there were multiple demos.
    d. First, I am extremely thankful that there is a tour. With that being said, having video, articles, chat and a community is beneficial. It would also ensure that I could get help, if needed.
    e. It gave an introduction to what you can do with the product and how you would go about doing various things with data. I liked having the knowledge hub available to access more help.
4. **Would you like this tour and the Knowledge hub to be included in the product?**
    a. Yes, both of these features should absolutely be included in the product as they added a much needed layer of training and user help for this complex product.
    b. I think so. It was very informative and it's an option they can or don't have to use.
    c. It is a necessity. I can't imagine providing this product without providing significant assistance.

d. Yes - Without it, there is a large learning curve. With it, there is a greater chance of adoption (by a user or institution). Of course when that happens, the platform becomes indispensable.
e. Yes, I thought they were very helpful as a new user. Once you were familiar with the product, I would want to be able to minimize or exit out of the knowledge hub, but it's very helpful when becoming familiar with the product.

Appendix 3

Tasks for user testing

Tasks for user testing with prototype in the iteration

Introduction

This test consists of two sections. First you will use a prototype and then the actual product. We would like you to imagine that the prototype is a part of the product. Preparation: Please download the Excel file with data from this link to your desktop before starting the test, it will be used in the tasks: https://www.---------. You do not have to sign up for Dropbox to download the file. Use the Download button in the upper right corner.

Tasks:

1. Look around the home page briefly to get a notion of what the Company does.
2. Sign up for a free trial of the Company. Please write Test after the name you use to sign up. Example: John Johnson Test
3. Select the browser version of the Company on the Welcome page.
4. You will now start to use the prototype. Please imagine that this page would appear after selecting the browser version.https://invis.io/3DAYS86BV#/224180697_New_To_the Company software- (In the prototype, please make sure to scroll down, so that you don't miss anything at the bottom of each page).
5. Please select "Take the tour"
6. When using the prototype, imagine that coffee is your favorite beverage and that you are from Sweden.
7. Follow the tour until complete, when you see the message "Congratulations!"
8. Please share your thoughts about the tour you just completed. What did you learn? What did you think of the level of difficulty and the length of the tour? If you could change it, how would you improve it?
9. Please close the prototype and go back to the browser verion of the Company software. You will now start to use the actual product.
10. Create a new analysis and load the data set that you downloaded before starting the test.
11. Create a bar chart to show how many gold medals are won each year.
12. Please create a details visualization (bar chart) from the year 2012. Select country on the X axis.
13. What five countries won the most gold medals in 2012?

14. What features would you use to explore this data set further? What questions would you like to answer?
15. Please rate your experience of using the Company software, how much in control did you feel when solving the task?
16. Please describe your experience of having used the tour in the prototype before using the product. To what extent did it help you solve the tasks?

Tasks for user testing without prototype in the iteration:

Introduction

Preparation: Please download the Excel file with data from this link to your desktop before starting the test, it will be used in the tasks: https://www…..

You do not have to sign up for Dropbox to download the file. Use the Download button in the upper right corner.

Tasks:

1. Look around the home page briefly to get a notion of what the Company software does.
2. Sign up for a free trial of the Company software. Please write Test after the name you use to sign up. Example: John Johnson Test
3. Select the browser version of the Company software on the Welcome page.
4. Create a new analysis and load the data set that you downloaded before starting the test.
5. Create a bar chart to show how many gold medals are won each year.
6. Please create a details visualization (bar chart) from the year 2012. Select country on the X axis.
7. What five countries won the most gold medals in 2012?
8. What features would you use to explore this data set further? What questions would you like to answer?
9. Please rate your experience of using the Company software, how much in control did you feel when solving the task? What could help you feel more in control?
10. What type of assistance would you prefer when using the Company software for the first time?

Tasks for user testing in second iteration:

Introduction:

This test consists of two sections. First you will use a prototype and then the actual product. We would like you to imagine that the prototype is a part of the product and try to act as if you would have to learn this tool for a real purpose.

Preparation: Please download the Excel file with data from this link to your desktop before starting the test, it will be used in the tasks: https://www….. You do not have to sign up for Dropbox to download the file. Use the Download button in the upper right corner.

Tasks:

1. Look around the home page briefly to get a notion of what the Company software does.
2. Sign up for a free trial of the Company software. Please write Test after the name you use to sign up. Example: John Johnson Test
3. Select the browser version of the Company software on the Welcome page.
4. You will now start to use the prototype. Please imagine that this page would appear after selecting the browser version. https://invis.io/9RB68BZAZ#/227014801_New_Tour_Start (In the prototype, please make sure to scroll down, so that you don't miss anything at the bottom of each page).
5. Briefly look around the page and reflect on what you see. Then make the selection to enter the tour for new users. When you have entered the tour go the the next task.
6. When using the prototype, imagine that coffee is your favorite beverage and that you are from Sweden. Follow the tour until complete, when you see the message "Congratulations!"
7. Please share your thoughts about the tour you just completed. What did you learn? What did you think of the level of difficulty and the length of the tour? If you could change it, how would you improve it?
8. Please go to the main page. The main page is a conceptual prototype of a starting point for the browser version of the the Company software software. First, we would like you to look around this page and reflect on what you see.
9. Now, please share your thoughts of the "knowledge hub". How would you use this section in a continued usage of the Company software? What would you expect from it? Is there anything you would change or add to the section?
10. Click the headline "explore data across visualizations". Explore the subtitles and then click step guide icon.
11. As you clicked the step guide you are now viewing a screen where the "knowledge hub" has followed you into an analysis in the the Company software tool. Please share your thoughts about the knowledge hub in this context.
12. You will now enter the second part of the test where you will use the real product. First we would like you to go back to the dowloaded data set and briefly get to know the data. Look at what rows and columns you have, to better know the data sample.
13. Go back to the browser version of the Company software where you first created an account. Create a new analysis and load the data set that you downloaded before.

14. Please try to use the product by using the knowledge you gathered previously in the tour. Do this for about five minutes and see what you can achieve and what insights you might be able to draw. Please remember to share your thoughts and reflections.
15. Please rate your experience of using the Company software, how much in control did you feel in your first time usage?
16. Please describe your experience of having used the tour in the prototype before using the product. To what extent did it help you in your first time usage of this product? Please describe how you think it would affect your onboarding experience in the product.

Appendix 4

Workshop presentation

(27 slides)

User onboarding

Agenda

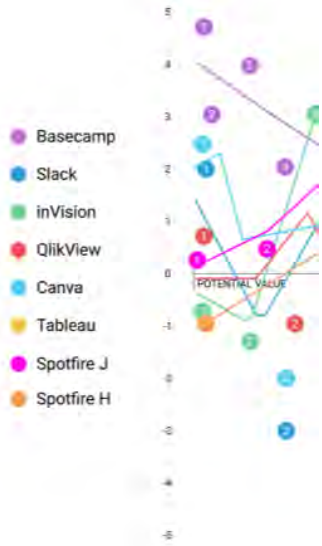
- Method
  - What we have done and how we did it?
- Qualities
  - Examples
  - Framework
- Benchmarking Evaluation
  - UX-Curves
  - Spotfire-Curves
- Workshop
  - Plan and execution

What we have done and how we did it?

- Literature study
  - Mainly on onboarding and omnichannel
  - Resulted in qualities
  - Summarized in a framework

What we have done and how we did it?

→ Benchmarking - Expert evaluation
- 3 analytics & 4 less complex services
- How are qualities met in these services?
- Plotting graded activities in UX-Curves
- Identifying patterns and extracting examples



Goal: Value Insight

The onboarding process should include a goal of the user reaching insight of what value the service may provide.

Goal: Well Curated Path

Create an overarching well curated path during the onboarding process to make the user reach value insight.

Core Qualities

- The foundation of creating a well organised onboarding process.
- Aims at improving the user's chance to successfully onboard a service to reach value insight.

Quality: Quick Wins (Achieving Quick Milestones)

Provide the user with quick wins to boost the sense of accomplishment and achieve progress in the onboarding process.

Example: Basecamp step-guide

Quality: User Assistance

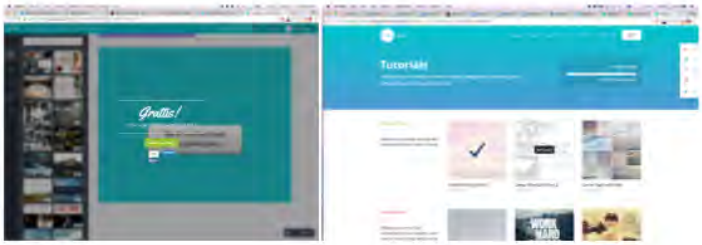
The user should be assisted with their needs throughout the onboarding process as an inherent part of adopting the service.

Example: Slack sign up flow

Quality: Provide Progress Feedback and Drive

The user should be provided feedback in the progression of being onboarded, with a clear way forward.

Example: Canva user feedback



Quality: Provide Value Prop Early

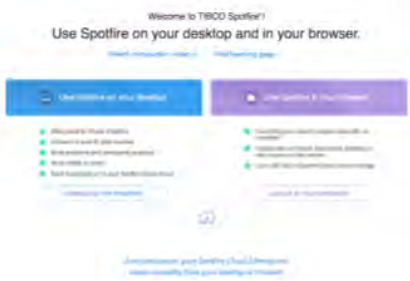
The user should as early as possible be introduced to insight of the potential value of the service.

Example: Basecamp landing page

Quality: Remove Points of Friction

In the users path to reach understanding of a new service, no friction that confuse or interrupts the flow should exist.

Example: Spotfire welcome page



Quality: Remove Points of Disconnect

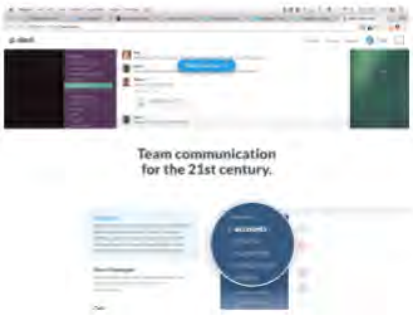
In the user's flow when onboarding a new service, no points diverting the user's attention should exist.

Example: inVision embedded help

Quality: Add Product Priming

The user should be primed of the product look and feel early on to provide a sense of familiarity when starting to use the product.

Example: Slack product page

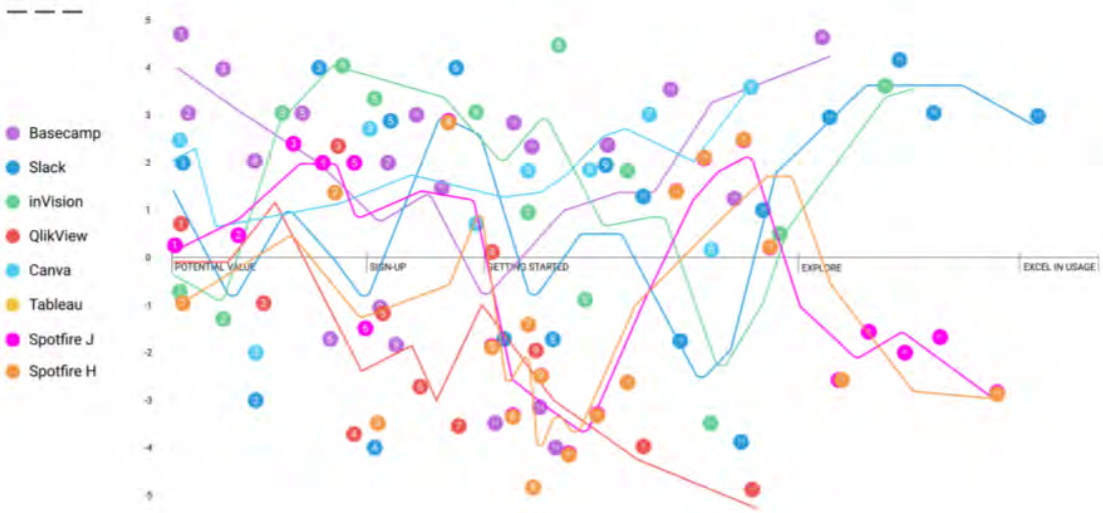


Quality: Make Use of Learning by Doing

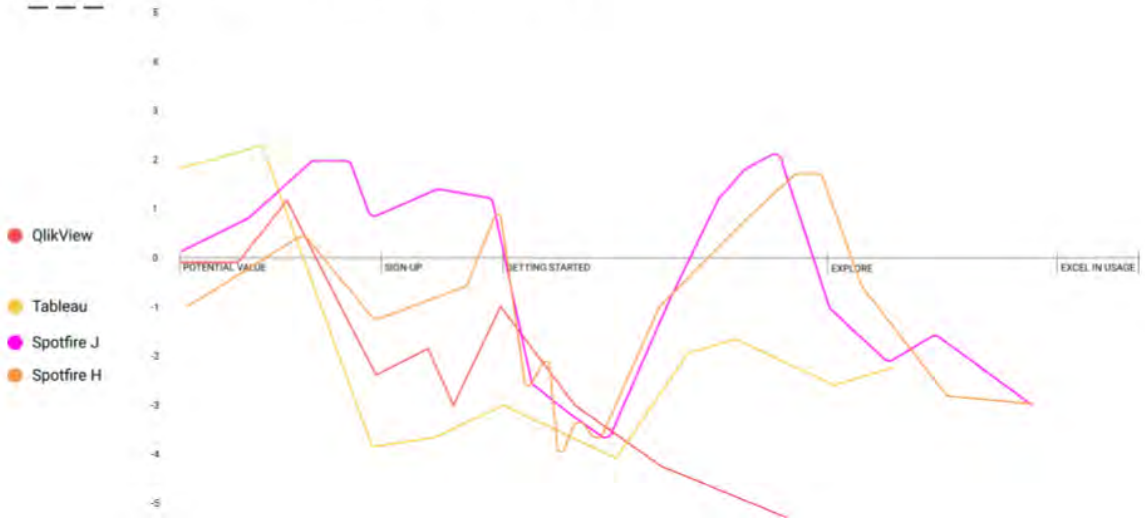
The user should be taught through action and in order learn important parts of the interface by actively carrying out vital interactions in the interface.

Example: Canva getting started guide

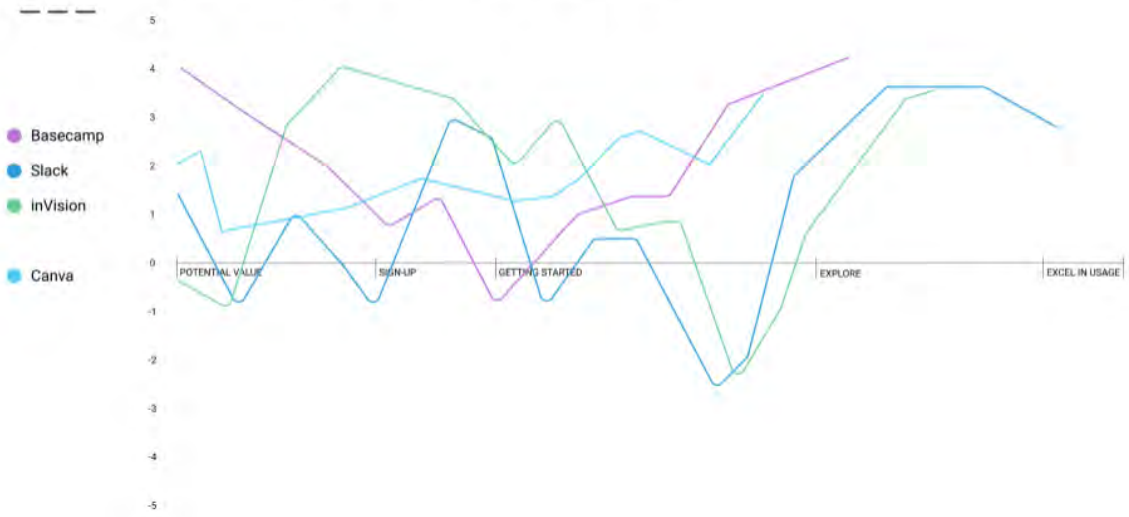
UX-Curves



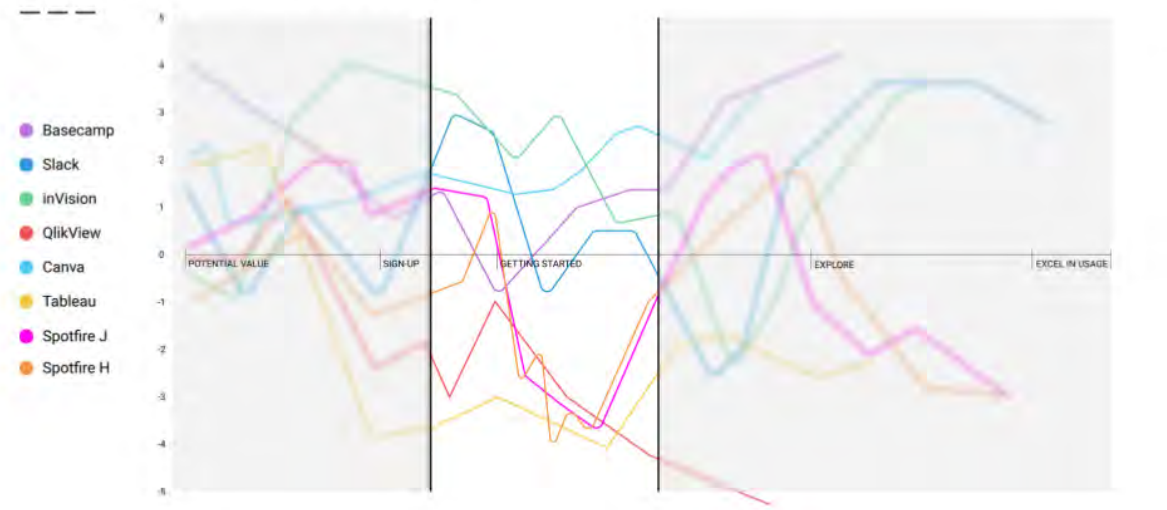
UX-Curves - Analytics Software



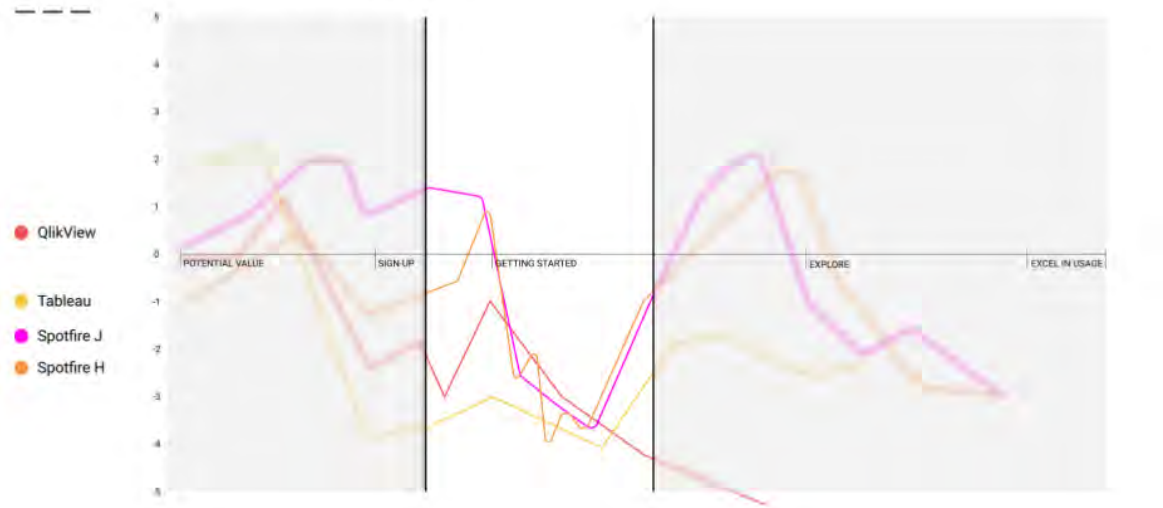
UX-Curves - Non-Analytics Software



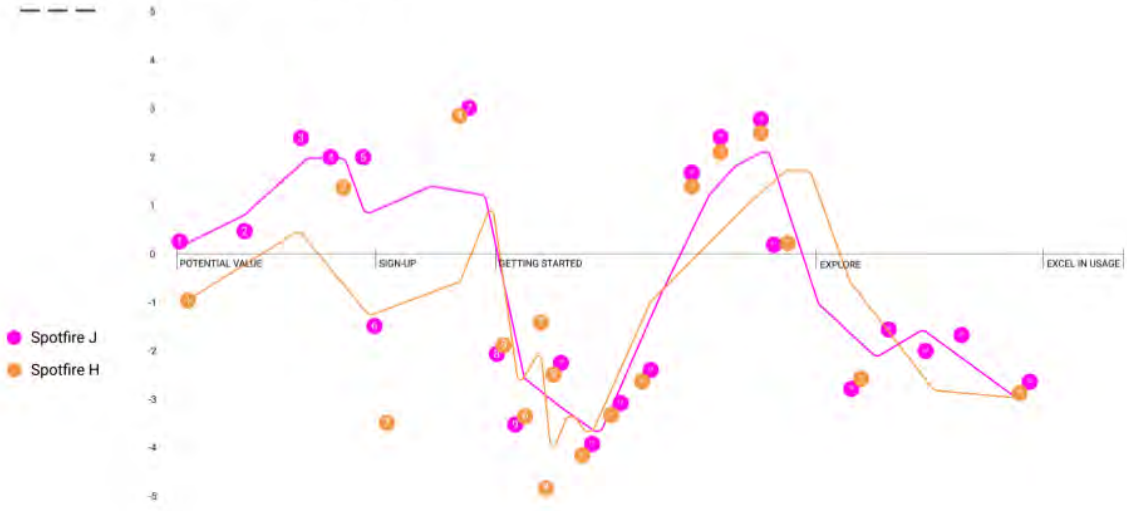
UX-Curves - Cliff of Faith



UX-Curves - Cliff of Faith



UX-Curves - Spotfire



WORKSHOP - Plan

- Groups of two or three
  - Take a note with group number
- Low-fi paper prototyping

Two iterations

- Quality extreme
- Best possible way

Time Plan - Workshop

First iteration

Low fi prototyping	25 min
Explain and share ideas between groups	15 min

Second iteration

Low fi prototyping	25 min
Explain and share ideas between groups	15 min

Workshop - Extreme quality - Iteration One 30 min

Goal: For the user to learn the basic features of Spotfire. (basic feature from your perspective)

Task: How can the path forward be designed, guided by one quality in order for Asad to reach the goal to learn the basic features?

Use of Qualities: Choose one core quality as an extreme, and try as much as possible to meet this quality in the design.

(if this feels difficult, add one more quality)

Workshop - Second Iteration

Goal: For the user to learn the basic features of Spotfire. (basic feature from your perspective)

Task: How can a well curated path be designed in best possible way, in order for Asad to reach the goal to learn the basic features?

Use of Qualities: Optional.

Storyboard

Asad is trying Spotfire for the first time.

He finds the website via google and sees that he can test the product in a free trial.

Asad lands on the free trial page and chooses to try now.

He fills out the requested information in the sign up form and continues to access the free trial.

A welcome page appears and Asad quickly realize that he wants to try the service in the browser.

Where to next?

Asad is now about to start engaging with the product...