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Bias in research for design

Considerations for designers when conducting user experience research

Master's thesis in Interaction Design
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Abstract

This study investigates how user experience (UX) practitioners consider bias in their research by reviewing and analyzing published materials in tandem with ethnographic methods.

Research bias refers to the ways in which the researcher influences the systematic investigation towards a specific outcome away from the objective truth. The subject of research bias is under-discussed in user experience design (UXD) which can be problematic when awareness is key to mitigating the effect of bias. This should be concerning for UX practitioners because user research is a central element of user-centered design.

Preliminary research of recommended texts for UX designers found that when bias is discussed in relation to UXD, it is commonly connected to the cognitive bias of the user. Brief mentions are made about response bias, with little to no mention of the designer or how they impart bias upon their research. To investigate the considerations UX practitioners afford to research bias, eight semi-structured interviews were conducted with participants from four UX teams working in Norway. In addition, autoethnographic journaling was used to record and reflect on personal experiences of design education and UX work.

Through thematic and comparative analysis four cases were developed. The analysis shows common methods used in UXR along with factors that affect research in practice. Some participants were more aware of research bias than others, most were able to identify different types of bias related to research but not clearly articulate the consequences or how to mitigate them. It was therefore concluded that the topic of research bias does not currently receive adequate consideration from the interviewed teams. Finally, activities and tools are recommended to raise awareness and address the potential for bias in user experience research and design.

Keywords

Research bias, user experience (UX), user experience research (UXR), user experience design (UXD).

Preface

This thesis research project is the cumulative study and final work for a Master's Degree in Interaction Design (IxD) through NTNU Gjøvik's Department of Design. A common goal of academic research is to add knowledge to a field of study. As a thesis project is a prescribed portion of the program, I was interested in adding knowledge to the gap that seemed to exist for research related to user experience design (UXD).

Various topics within or related to UXD processes were explored such as selecting tools for designers and biases in remote data collection. Focus came to rest on the considerations that UX practitioners give research conducted for design purposes.

The two primary external influences for selecting this topic were past research on the topics of design processes and management and the current state of UX design in Norway. There were also two internal reasons for selecting this topic, the first reason stems from sage advice from a past professor who recommended working with a topic that increases your attractiveness to future employers. I am of the opinion that a better and more holistic understanding of how designers work and conduct research is knowledge that makes me more employable as a UX designer. Secondly, the more altruistic purpose is to work with a topic where the findings can contribute to improving the field with knowledge and learning. In this case, to help other designers better consider, plan, and execute their research for design projects.

In the context of 2020

2020 was a year of tipping points.
A year of declared global pandemic.
A year of protests for human rights and equality.
All of which continued into 2021.

As Okse's Design in Norway, 2020 report reads "2016 blekner dog i forhold til 2020 som i mars ga oss en knallhard uppercut med påfølgende kombinasjoner." This roughly translates to 2016, however, pales in comparison to 2020, which in March gave us a very hard uppercut with subsequent combinations.

While writing this thesis, it has been over a year since the World Health Organization declared the outbreak of COVID-19 a *pandemic* on 11 March 2020. A year since George Floyd was killed by police in Minneapolis MN USA on 25 May 2020, but only days since his killer was convicted on 21 April 2021.

I am not "one of the lucky ones" because luck did not play a role – I acknowledge the privilege I hold – being able to continue my education, find employment and not have to grieve the loss of someone close to me due to COVID-19, conflict, or police brutality. But I know that 20/20 cannot not only be our hindsight. We, collectively, must do better.

Acknowledgements

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List of Abbreviations

DEI Diversity, Equity and Inclusion	SaaS Software-as-a-Service
B2B Business to Business	SD Service Design
B2C Business to Customer	UCD User-Centered Design
HCI Human Computer interaction	UI User Interface (design)
IxD Interaction Design	UX User Experience
IxDF Interaction Design Foundation	UXD User Experience Design
NN/g Nielsen Norman Group	UXR User Experience Research

1 Introduction

> "The point of research is to influence decisions with evidence."
> – Erika Hall, Just Enough Research (2019, p. 59)

1.1 Research topic and explanation

Design bias is harmful, and in some cases may be lethal reads a headline published by The Economist in April 2021. The subheading continues, The world is designed around white men. They share it with everyone else.

After working with the topic of design bias so closely, these statements were alarming but not surprising. An accompanying article published 8 April 2021 in the *Science & technology* section emphasizes the importance of addressing bias in design. Titled "Race and sex bias in medicine: How medicine discriminates against non-white people and women" the article describes how medical devices and treatments have higher rates of inaccuracy and failures in people of colour and women (Fatal truths, 2021). These published news pieces present multiple examples of the negative consequences of bias in design and research.

Bias, as a prejudice for or against something, can be hard to be aware of since much of our decision making is unconscious (Kahneman, 2011). This common positioning of bias as part of our unconscious decision-making implies that one must first be aware of the bias to some degree to be able to begin to understand the impact of the bias. Awareness would then also be critical in anticipating the effect of a potential bias. The possible difficulty in concretizing the impact does nothing to diminish the fact that design bias can be harmful, and *in some cases may be lethal*.

The studies referenced in the articles present cases of design bias where the outcomes truly are life and death and the causes are known. The lack of diversity amongst the designers and research participants was a major flaw in the design of products and services. This type of flaw or systematic error is what bias is referring to. When the sample of participants is limited, the results of the research are then not representative and potentially not applicable to the entire population. And when designers work independently or with others with similar lived experiences, they are less likely to encounter or account for other perspectives. Tthis groupthink bias can reduce the validity of findings and have unintended consequences for the users. Heick comments on the effect of cognitive biases in that "a failure of rational and critical thinking is not just 'wrong' but erosive and even toxic not just in academia, but every level of society." (Heick, n.d.)

These headlines serve to highlight and convey the importance and relevance of researching biases in user experience research (UXR). Discovering and discussing why are biases not more openly addressed by user experience designers and researchers was the sustained undercurrent of this entire thesis.

1.1.1 Biases in user experience research

Research for design is the broadened term used to include all forms of research that are conducted to inform design decisions for any type of product or service. Placed in the context of user experience (UX), the research takes on the principles of UX - being user-

centered and balancing the trifecta of design/technology/business objectives. In common design processes such as Design Thinking and Double Diamond, research produces the central insights from which design decisions are made. While designing medical and safety equipment, the context of life and death may be more apparent but it remains that designers in the broadest sense have great influence over most everything we use or interact with. It is then concerning that there is significantly less scrutiny of the research practices in design.

Without careful consideration given to the research methods and questions, the resulting data and insights could be written off as biased and flawed. While potentially difficult to theorize, the consequences of design bias and subsequent biases in research for design can be far-reaching. Design is powerful enough to change the world but with this power comes responsibility. If not exposed and confronted it is likely the issue of biases will grow along with the field of UX. As more people enter the field of UX, more people need to learn about conducting research.

With six years of education at two academic institutions, both in faculties of design, there was little, if any, reference to research or design bias in the education I received. Conducting research for design projects in school was always encouraged but rarely scrutinized. The same can be said for my two years of experience working in UX for three different Norwegian companies. If designers are not learning about biases from their formal education, will other sources be adequate to bring awareness to the issue? Plenty of guides and textbooks explaining best practices for design research but sometimes fall short on accounting for what happens in reality. For school projects when one does not have enough participants, peers and family often become participants. In the context of a class project where the outputs are not put into production, the potential consequences of biases such as sampling or acquiescence are not likely to be encountered. However, in a commercial setting the consequences of bias will impact people in real life. This lack of understanding about research for design in practice was the starting point for this project.

Inquiry: Why are biases not discussed nearly as much in UX work? Is it that these same issues do not affect UX work? Unlikely. Can and should UX research then be held to similar standards as research in related fields such as psychology and computer science? Why is research so different from academic to commercial settings? e.g. social sciences and user experience design. Why is there so little discussion amongst designers and researchers about their own biases or the potential for biases in their research and design work?

Topic of interest: Biases in research conducted as part of a design project or to inform design iterations. The topic is centered around research for UX design including the design of both tangible and digital products and services.

> Inherent **assumptions** with the previous statement:
> UXD, as a new field of study, does not yet occupy the same space in traditional academia or have the same drive for peer-reviewed publication, this may allow biases to go unnoticed or unchecked.
> That academic and commercial research differ significantly.
> That research for UXR is not held to the same standards of validity or scrutiny as research in fields such as medicine and social sciences.

Research on this topic should be of interest to the entire design community. There is a history of similar work on related topics for commercial design: the Design Council has

previously conducted similar research on design processes and management in the UK (2007a); a Norwegian design consultancy has, for the last four years, conducted the UX/Design in Norway survey (Hæhre, Håmsø and Maaland, 2021); and, UserInterviews has also conducted an annual survey on UX researchers (Balboni, 2021). Despite relevant related work, there is a gap in existing research about biases in research for design.

1.1.2 Research questions

This design thesis work seeks to answer the following six questions about research and biases in UXR. The work is placed in the context of Norway, in the first half of 2021.

Research question: (Q1) How do UX practitioners consider biases when planning and conducting user experience research?

> Sub questions:
> (Q2) How do UX practitioners describe and classify the research they do?
> (Q3) What types of research methods do UX practitioners commonly use?
> (Q4) What do UX practitioners consider their ideal research setup, and how does that compare to reality?
> (Q5) Are UX practitioners aware of the potential for biases in research?
> (Q6) If so, do UX practitioners do anything to mitigate the biases? Alternatively, what can be done to mitigate biases in research?

Problem statement: Describe how UX designers consider biases when planning and conducting research in practice.

Study description: This project describes how UX practitioners in Norway consider biases when planning and conducting research for design by reviewing and analyzing existing survey reports and published materials in tandem with ethnographic methods that include in-depth interviews and autoethnographic journaling.

The scope of the study was to understand biases in UXR in the context of UXD processes as used by Norwegian organizations. A mix of in-house and consultancy design teams were sought and agreed to participate. Two design practitioners from each of four organizations took part in in-depth interviews. The findings from the interviews are presented as case studies to highlight the similarities and differences among their considerations for research and related biases. Additional secondary sources were consulted and included in the thematic analysis. Key themes are presented and discussed highlighting common considerations to help other designers. Lastly, activities and resources are suggested to help address the topic of biases in research for UX design teams.

Despite this being an academic research project, it is focused on how applied research is considered and conducted by UX designers. Therefore, it is fitting to use common commercial approaches and communicate with a less formal tone.

The following chapters of this paper are structured with background information on UXD, UXR and biases detailed in Chapter 2 to set a foundation of knowledge. Chapter 3 describes the methods used in this research project. The preliminary findings from secondary sources are presented in Chapter 4. Following this in Chapter 5 is results, including case studies and findings from the thematic analysis. Discussion, Chapter 6, centers recommendations and reflection on the work before concluding in Chapter 7.

1.1.3 Remote work required

Initial interest in researching how designers have been continuing to work remotely during the global pandemic, since March 2020, and conduct user research led to material on the topic of remote data collection. Suddenly many more design practitioners were wondering how to collect *valid* and *reliable* data to inform their design work when they are unable to sit with their users.

Much of the existing material online was quickly being updated with new "best practices" for working remotely such as explaining how to conduct interviews in a video call instead of in-person and how to use digital tools like Figma and Miro to host collaborative meetings and workshops. Most of the core material was not new because plenty of literature already existed on how to conduct phone interviews and traditional workshops, instead, it was just adapted for new technology and like any new version of a textbook, updated examples were given for video conferencing. Though it should be noted that while working from home was new to many organizations, remote work existed before COVID-19.

Since remote work is not a new phenomenon, there were plenty of published use cases from before the pandemic where teams collaborated across countries and time zones. Many more examples also show the customers and end-users located oceans away from the product development team. Other users work in safety-critical settings that an observer cannot enter without specialized training. These restrictions can kibosh the ability to perform in-person observations and contextual inquiries, but that does not mean research can or should be scrapped entirely. It just means healthy research requires an alternative approach and possibly some new methods.

1.2 Central terminology and definitions

Bias

A **bias** is a prejudice in favour of or against one thing, person, or group compared with another, that can cause flaws in logical judgement. In science, a bias refers to the systematic error in judgment that causes inaccuracies in data.
Synonyms: prejudice, predisposition. Antonyms: unbiased, objectivity, fairness, impartiality.
Examples: Confirmation bias, Social desirability bias, Participation bias, Observational bias.

A **cognitive bias** is an inherent thinking 'blind spot' that reduces thinking accuracy and results in inaccurate – and often irrational – conclusions. Common biases have been named and studied, making them easier to identify, emphasize, analyze, and ultimately avoid (Heick, n.d.).

Research bias is a process where the researcher influences the systematic investigation to arrive at certain outcomes or skews the entire process towards a specific research outcome by introducing a systematic error into the sample data (Formplus, 2020).

Response bias refers to the various conditions and biases that can influence responses from participants and cause data inaccuracies (Johnson, 2019).

Context

Context refers to the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood and assessed.
Synonyms: circumstances, conditions, surroundings, factors, situation, setting, background

Intuition

"**Intuition** is a combination of experience - which is a form of research: you experience these things, you've seen these things - and confirmation bias: you want certain things to be true and you're bummed when they aren't true." As explained by Erika Hall (2021).

Research

Paul Leedy specifies that **research** is not merely (1) gathering information, (2) rummaging around for hard-to-locate information, nor (3) transporting facts from one location to another and therefore defines research "in its true sense—as a systematic process that leads to new knowledge and understandings" (2015).

Sample and Population

The **population** refers to the entire user group, in UXR this is often current and/or potential users of the product or service. **Sample** as per academic research is the portion of the population participating in the research. Sampling and recruitment refer to the selection of the sample from the population.

Stakeholder

In business and UX, a **stakeholder** is a person with an interest or concern in something, they are often a source of influential information and can provide approval and feedback.

Subjective

Subjective (adjective) based on or influenced by personal feelings, tastes, or opinions.
Synonyms: personal, individual, internal, emotional, instinctive, intuitive, impressionistic, biased, prejudiced Antonyms: objective, impartial

User

User (noun) a person who uses or operates something, especially a computer or other machine. Therefore a potential user is a person who could potentially use or operate a product or service but does not do so at the time. In customer facing (B2C) products and services the term *user* may be replaced with *customer*, however, in business facing (B2B) products and services the customers are those responsible for purchasing the product while the *users* or *end-users* are the ones interacting with the product.

User- and Human-centered

User-centered design (UCD) "is an iterative design process in which designers focus on the users and their needs in each phase of the design process." Users are involved "throughout the design process via a variety of research and design techniques, to create highly usable and accessible products for them." (Interaction Design Foundation, n.d.-a)

Human-centered design (HCD) some use these two terms user and human interchangeably, while others quantify the differences between them largely because calling someone a user tends to dehumanize them and focus solely on their value as related to their use of or interaction with a given product. It can be helpful to remember that the people at the center of the design work are human and have a life outside of the use of your product or service.

User Experience

User Experience (UX) "encompasses all aspects of the end-user's interaction with the company, its services, and its products" (Norman and Nielsen, n.d.). Don Norman is credited with coining the phrase and broadening its reach to incorporate other disciplines including engineering, industrial design, ergonomics and human factors, marketing, graphic design and interface design. Ritter, Baxter and Churchill's description of user experience states that it "goes beyond interface design to address a person's emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors, and accomplishments that occur before, during, and after use" (2014).

UX Maturity

UX maturity is a model and a measure of the quality and effectiveness of an organization's use of UX (Nielsen, 2006). High UX maturity is associated with an embedded culture of UX and widespread reliance on user research to inform not only product design decisions but higher-level business decisions as well.

Validity

Validity (noun) the quality of being logically or factually sound; having a sound basis in logic or fact; reasonable or well founded. According to Budiu (2021) a study has **internal validity** if it does not favour or encourage any particular participant response or behaviour, and **external validity** if the participants and the study setup are representative of the real-world situation in which the design is used.

2 Background

2.1 What is user experience design: Origins and context

The author considers design to be - in a very general sense - the application of creative thinking and problem solving focused on a specific object or process. Therefore, user experience design (UXD) is a form of problem solving to improve what the user experiences when interacting with a product or service. Though this definition is not unanimous amongst UX practitioners.

2.1.1 Tangled terms

The general field of study of human-technology interaction has evolved and expanded over the years as both technology and design have evolved, resulting in the many related disciplines known by many different names today. Jakob Neilsen credits Bell Labs as one of the pioneering organizations to transition from traditional human factors to a more human-centered design of interactive systems by hiring a psychologist, John E. Karlin, to design their telephone systems in 1945 (2017). Since then, a human- or user-centered approach has been applied to designing the encompassing experiences for users of all sorts of products and services.

The term *user experience* was coined in 1993 by Don Norman who joined Apple as their User Experience Architect (Nielsen, 2017). While the job titles have multiplied and been modified since then, the term UX as an abbreviated form of User eXperience is prevalent in the realm of technology and design today. User experience design (UXD) and user-centered design (UCD) approaches are now more widely included as part of the core teachings and work practices of schools and organizations around the globe. Begnum, Pettersen and Sørum (2019) conducted a review of Interaction Design (IxD) education in Norway because the Norwegian software industry is currently reporting a shortage of interaction designers.

The field of UX shares its roots and many of its processes with other fields in the realms of social sciences and technology. The multitude of different disciplines such as Industrial Design, Architecture, Service Design, IxD, User Interface Design (UI), etc. are so interconnected that depending on whom you ask, you are highly likely to get a different answer as to how they all interrelate. Some of the discrepancies in interrelations can be seen in the following three figures. Figure 2.1 is credited to Thomas Gläser and based on Dan Schaffer's 2008 "Disciplines of User Experience Design" (2013). They place the circle of IxD within UX and include many other disciplines such as various design expertise, architecture and human factors. Not everyone agrees with the organization of the diagram, but it is in line with Norman's original intentions of UX as a broad term.

While Neilson and Norman of the NN/group hold strong to their original definition that user experience "encompasses all aspects of the end-user's interaction with the company, its service, and its products" (Norman and Nielsen, n.d.), Norman acknowledges that the term UX has been misused and become closely tied to devices and digital interfaces, instead of the entire user experience beyond the product (Nielsen Norman Group, 2016). Throughout this paper, the term UX is used to mean the larger definition of user experience and as such, "UX designer" and "UX researcher" will even encompass those that do not necessarily

have UX in their job title. The general terms of UX practitioners or simply UXers are used throughout to broadly include anyone that works with UX regardless of their role – be it designers, researchers, managers, developers, writers, etc.
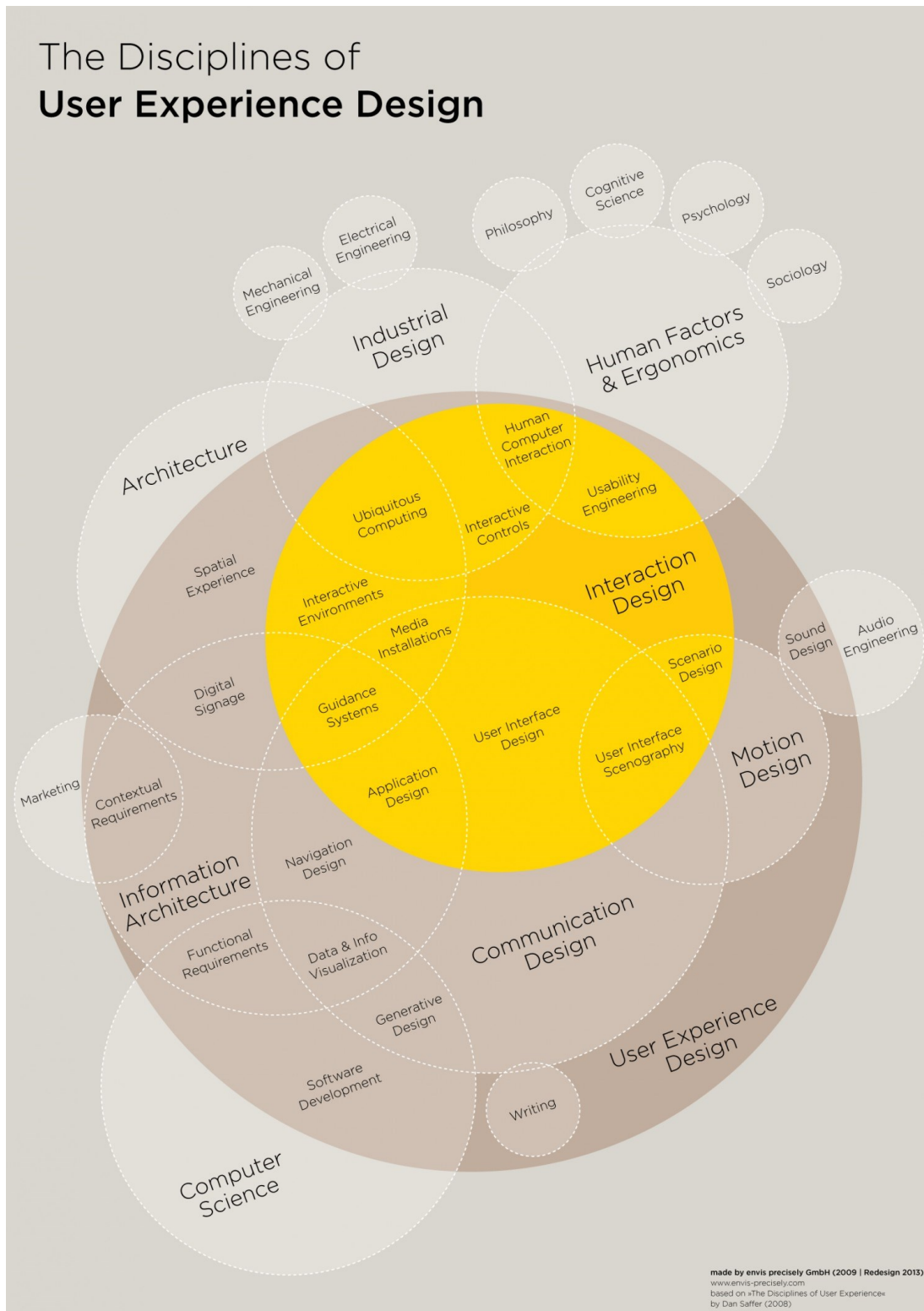
Figure 2.1 The Disciplines of User Experience by envis precisely (2013) based on work by Dan Schaffer

Figure 2.1 centers the discipline of User Experience Design (UXD) as a large field that shares commonalities with other fields including Computer Science, Marketing, Architecture, Industrial Design, Human Factors & Ergonomics, along with Audio Engineering. While it also fully encompasses Communication Design, Interaction Design, Information Architecture, and Motion Design.

With an undergraduate degree in Communication Design and graduate studies in Interaction Design, the topics I am familiar with are represented here. While I largely agree with this visualization, it is possible the smaller circles representing the topics of Philosophy, Cognitive Science, Psychology, and Sociology also belong on the border of User Experience Design. These disciplines influence how people perceive and interact with a product or service, implying that User Experience Design has more in common with Human Factors than may be indicated in this representation.

In comparison, the Interaction Design Foundation (IxDF) presents a different visualization signifying the large overlap between UXD and Interaction Design (IxD), however, as seen in Figure 2.2 UXD is not all-encompassing (n.d.-b). Specifying that "Interaction design is about shaping digital things for people's use." Perhaps the differentiation lies in Bill Moggridge's original intent from the 1980s that IxD would be a design discipline "dedicated to creating imaginative and attractive solutions in a virtual world, where one could design behaviours, animations, and sounds as well as shapes" (2007). That IxD would be to software what industrial design is to three-dimensional objects.
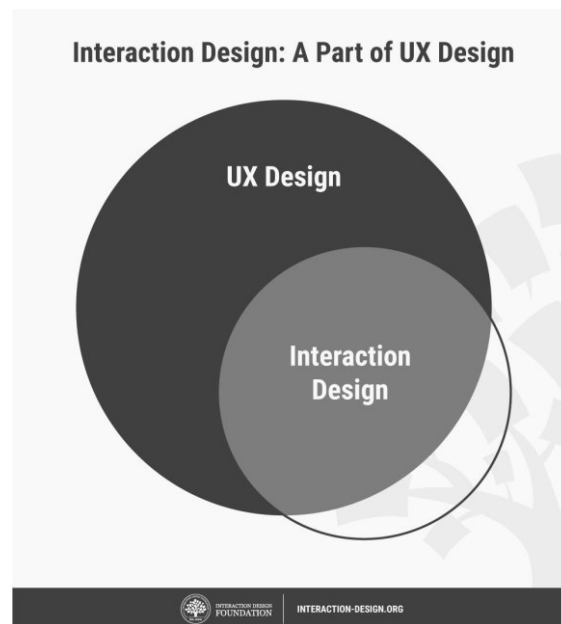
Figure 2.2 Interaction Design: A Part of UX Design, Interaction Design Foundation

When broadening to include even newer terms, Ioana Teleanu, the UX Designer behind the social media handle @UXgoodies, presents another visualization. Figure 2.3 shows the field of User Interface (UI) is wholly encompassed by User Experience (UX), which is again wholly encompassed by Customer Experience (CX) and shares significant overlap with Service Design (SD). The circles with dashed borders represent disciplines of work, of which Research is highlighted as a discipline of design and is placed outside of UI but within the overlap of the other three fields. In the accompanying caption, Teleanu notes "Experience

design has many fields and disciplines and I always found that there's a lot of confusion around how they relate and overlap." @uxgoodies (Teleanu, 2021)
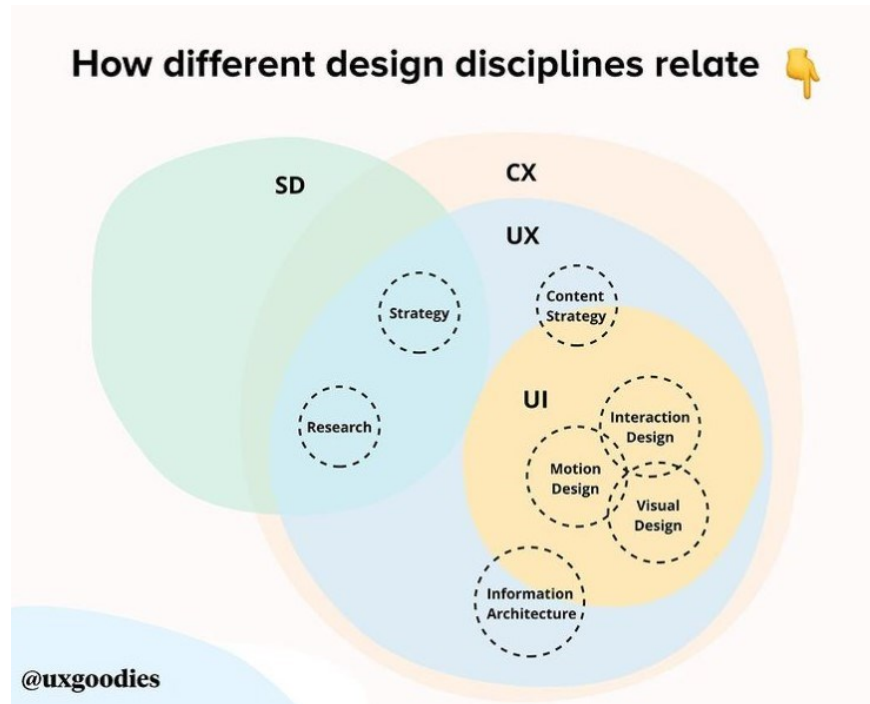
Figure 2.3 How different design disciplines relate, by Ioana Teleanu as uxgoodies on Instagram

While there is plenty of debate about the scope of the discipline, as seen in the three figures, there is at least common agreement - that the UX is founded on a user-centered approach to interactive products and services (Hæhre, Håmsø and Maaland, 2021). For being *user*-centered designers, all of these diagrams present fields and disciplines but do not represent an individual human. It is possible and even common that a single designer will possess a multitude of skills in a variety of disciplines. It is also possible that a designer is a specialist and only focuses on a single narrow discipline.

2.1.2 User-centered

User-centered design (UCD) places the user at the center of the map and draws the experience around them. However, it is important to recognize that humans as users are not raised in a vacuum, our past experiences shape our expectations and direct how we navigate interactions. So to understand the user's experience and design or re-design it, all UXD requires context. The understanding of that context is obtained through research, often specified as UXR or user research. A small distinction should be noted between these two terms as not all UXR methods involve users.

Within UXR, user involvement is typically differentiated into two categories for software development. The first being user research wherein the designer works to gain a better understanding of the user(s) and their needs, this may also be known as requirements gathering. Competitor analysis is often included here to understand trends in the market, as an extension of what already exists for the users. User testing is a subcategory of user research but the distinction remains that "user testing" is reserved for feedback and

evaluations on a design of any fidelity. This could be any number of scenarios from a walkthrough of a simple sketch to A/B testing on a live product. The distinction between user research and user testing can blur when working in a co-creation or workshop setting where users and/or stakeholders can express their needs and provide feedback on a design iteration in the same session. Therefore, the term UXR will be used throughout this paper to encompass both user involved research and testing.

2.1.3 Framework: Double Diamond

As this work includes research with designers, it is appropriate to outline and use a framework common to UXD. Built upon their own industry research, the UK Design Council's Double Diamond is commonly used by many types of designers to help communicate the design process for projects that center problem solving, are concrete in nature, and will likely result in a product or service of some type (Drew, 2019). This academic research does not result in a traditional product or service but instead treats this paper as the product.

In the Evolved Double Diamond Framework published in 2019, the four stages are titled Discover, Define, Develop and Deliver; these are paired and separated by three junctions, beginning with the challenge and ending with the outcome. The midpoint is not labelled, but consists of a solid definition of the problem or brief on the task ahead. The flow of divergent and convergent thinking is not meant to be linear, instead, iterative movement between the stages is indicated with curved arrows.

In the first diamond, Discover is the initial research and exploratory phase. In product and service design this can include market research, user research and design research. Define is where the collection of data and insights are brought together to define the problem and the work ahead. Develop, the first half of the second diamond, can include other terms like sketch, design, create, prototype, iterate and problem solve to put together a solution. Research activities like testing with the sub-category of user testing are employed in the second diamond. Deliver, the final stage, when speaking of UXD is where the proposed solution is handed over to technical development with appropriate documentation and communication. One reason design work is often called a cycle is because it is important to remain open to feedback and possible changes for improvement. Feedback and evaluations can come in many forms that can also be considered research such as usage analytics or questionnaires about customer satisfaction.

While the Double Diamond as a framework for innovation is not perfect for every situation, it remains a simple way to communicate a design process to a non-design audience (Drew, 2019). There are many other models that present a process for design work. What the Double Diamond framework calls *Discover, Define, Develop, and Deliver* is expanded upon by the Design Thinking model and titled *Empathise, Define, Ideate, Prototype, and Test (Interaction Design Foundation, n.d.-b).* There are additional modified versions of both such as *Re-define, Empathize, Ideate, Prototype and Iterate* published by Fjord, a Norwegian design consultancy (Fjord, n.d.). The Design Sprint framework extends the model into a triple diamond approach with *Understand & Define, Sketch & Decide, Prototype & Validate* (Knapp, Zeratsky and Kowitz, 2016). These different models were adapted to meet the unique needs of different teams and subject areas.

Below is an image of the Evolved Double Diamond as published in 2019 (Figure 2.4). Following that is a modified double diamond representing this project (Figure 2.5), on which

common steps of the scientific approach to research are aligned with the research methods of this project and the sections of traditional academic writing.
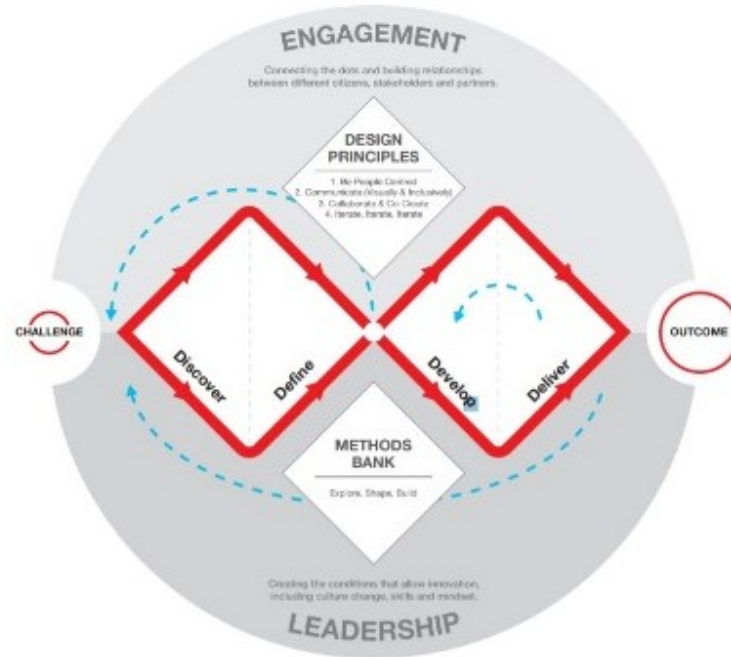
Figure 2.4 Evolved Double Diamond, Design Council (2019)
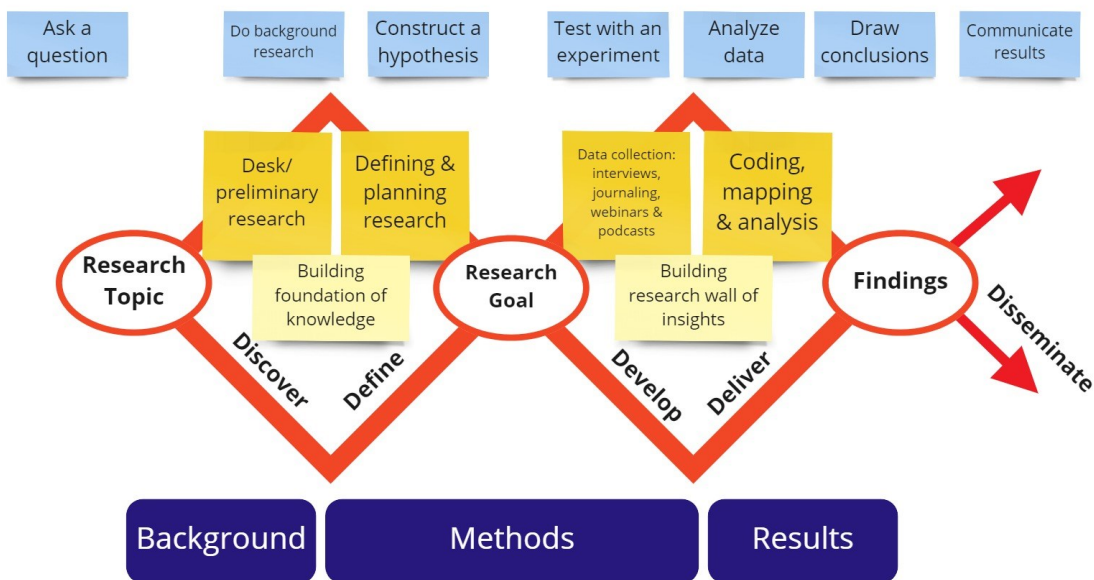
Figure 2.5 Research design and scientific approach of this project mapped to the double diamond

Figure 2.5 shows the research plan for this project overlaid on top of a modified double diamond. While the four stages of the double diamond remain the same, the three junctions have been renamed to *research topic*, *research goal* and *findings*. Following the second diamond is an added stage common to scientific research and implored by the H2020 research council: Disseminate, i.e. make the work and results available to others. The UX methods and activities (yellow sticky notes) that populate this framework are the ones done in this project.

2.2 What is user experience research

> "Research is simply systematic inquiry. You want to know more about a particular topic, so you go through a process to increase your knowledge. The type of process depends on who you are and what you need to know."
> - Erika Hall, Just enough Research (2019, p. 5)

The term user experience research (UXR) can be broken down into three parts. It is a type of **research** or systematic investigation into the **experience** perceived by the **user** of a given product or service. The user's experience is the subject of the research therefore the research methods adopt the user-centered or human-centered approach of UX. UXR may be any research done for the purpose of UX design work, while user research is typically only referring to research conducted with the end-users of the product or service.

Research can take place at any stage in the design cycle, but the methods and activities should always be tailored to the research goal and the context of the research project(Hall, 2019). When fitting research in with an existing design process, product cycle or development schedule research commonly happens at the beginning and the end of a project cycle. Exploratory research happens early on with an idea and feature development, while evaluative research is conducted on a prototype or live product to evaluate the design decisions and collect feedback typically for the next round of iteration.

Objections and criticisms

Research in the design industry is assumed to be complex, time-consuming and expensive – or at least those are the objections raised to thwart UX practitioners in their mission of conducting research to inform their design decisions. While criticisms are typically aimed at invalid and poorly conducted research, it can be difficult to get buy-in to the UX approach from others. This difficulty has been recognized and a model built of the different levels of maturity to an organization's adoption of UX processes (Rukonić, Kervyn de Meerendré and Kieffer, 2019). As illustrated in Figure 2.6, the six steps move from (1) Unrecognized up through (2) Interested, (3) Invested, (4) Committed and (5) Engaged to the top level of (6) Embedded wherein "UX is in the fabric of the organization; not discussed separately" (Hæhre and Håmsø, 2019).

A UX maturity model can be viewed as a tool to bridge the communication between designers and business minded people, typically the leaders of organizations, when discussing the value and goals of UX. It is implied that the higher up the model an organization is, the more saturated the entire organization is with UX principles.

Figure 2.6 UX maturity model, as included in Hæhre and Håmsø (2019)

2.2.1 Important standards for research

Ethics

Under ethical considerations, Baxter, Courage and Caine (2015) include considerations relating to the validity and reliability of the data along with honesty and informed consent. There is a lot of ethics consideration for academia, though Begnum, Pettersen and Sørum (2019) do note that the topic of legal and ethical accessibility responsibilities is lacking in IxD education in Norway.

The research and also the findings produced from the research should be both worthwhile and beneficial to the user and society. Design, with its broad application, has the power to change the world but this power comes with responsibility and inherent risks. Any potential risks or consequences of the research should be clearly disclosed to the participant along with the intended level of confidentiality and use of the data (Baxter, Courage and Caine, 2015). The participant should be aware of all of this for their consent to be truly informed.

The influence of the business and other existing teams, such as marketing, often dictates how consent is described and collected. In addition, new tools and platforms to aid with research have templates or existing consent agreements. Here UXR typically takes a business and marketing approach to data collection over an academic approach, owing to the commercial context of the applied research.

Honesty and validity

Honesty and validity are important to research beyond their moral standing. Honesty helps build rapport between the facilitator and the participant. While valid research ensures that the research findings are applicable to the target. Carol Barnum summarizes that "the validity of the findings comes from the validity of the research plan, the engagement of real users, and the skill of the moderator or interviewer in executing the plan" (2019).

According to Pannucci and Wilkins (2010) and Budiu (2021) study design errors can be found both in internal validity and external validity. Internal validity refers to the reliability or accuracy of the study results. Errors that bias participants towards a certain response or behaviour reduce internal validity. External validity deals with the degree to which findings can be generalized to other groups or populations. Errors that capture behaviours or situations which are not characteristic for the target audience reduce external validity.

Validity works in tandem with reliability to give credit to accurate and applicable non-random findings. Internal validity relies predominantly on the researcher and their execution of an appropriate study design to ensure consistent (non-random) results across participants. For higher external validity it is important that participants are representative of the target audience (that the sample is representative of the population) and that you can replicate as best as possible natural settings. Raluca Budiu, Director of Research at NN/g points out that there are situations like user testing with paper prototypes or mobile testing in a lab setting that cannot achieve high external validity but remarks that "some testing is better than no testing" (Budiu, 2021).

Despite educating and advocating for user research and testing in every project, Frank Spillers does make an argument for when not to do UXR (n.d.). He indicates the validity of the results is of utmost importance thus if the validity will be compromised by restraints in time or resources, the research might not be worth it. He presents consequences as the *best case* time is wasted, and the *worst case* is that the insights do not represent the users where these inaccurate insights go on to cause harm through important design decisions.

2.3 Biases

In its neutral form, a bias is a tendency in favour of or against an idea or thing, however, the colloquial connotation of bias is usually negative, that of being closed-minded, prejudicial, or unfair. In science, technology and research methodology, a bias is a systematic error (Gerhard, 2008). In IxD, cognitive biases and *laws* or *effects*, as some of them are called, are rendered into guides and recommendations to work within. Note that "biases" is used throughout to refer to multiple forms and/or examples of bias. Steinhauser (2020) remarks that in comparison to explicit biases it is the implicit (unconscious) ones that "are the most concerning because they are the ones we don't recognize we have."

In my six years of formal design education to date biases were only ever discussed pertaining to the participants or the users in the form of research bias (e.g. convenience sampling or leading questions) or as the implications of unconscious cognitive biases on user interactions (e.g. anchoring or IKEA effect). This is supported by a finding from the work of Begnum, Pettersen and Sørum (2019) on evaluating IxD education in Norway that states "few programs include universal design expertise. IxD graduates are as such not necessarily conversant with legal and ethical accessibility responsibilities." Bias should also

belong in the list of responsibilities and be specified as a future topic of study in design education.

2.3.1 Biases in research

Existing research on bias in research related to other subjects presents multiple categorizations of biases and the effect each bias can have on the outcome of the research (Nederhof, 1985; Podsakoff, 2003; Gerhard, 2008; Steinhauser, 2020). There is agreement that bias can happen at any stage of the research, in the planning, data collection, analysis, and publication alternatively summarized as before, during and after data collection (Pannucci and Wilkins, 2010). It is suggested that there are three main avenues in which bias can enter research – via the researcher(s), via the participants, and via confounding variables. Gerhard (2008) and (Simundic, 2013) address that bias from participants (response bias) and confounding variables should be accounted for in the study design, implementation and analysis. Furnham (1986) also stated that these should be recorded as known limitations of the work. Simundic describes the bias in research, as relevant to scientific work specifically in biostatistics, and defines bias as any trend or deviation from the truth in data collection data, analysis interpretation, and publication that can cause false conclusions. What they fail to mention in these articles is that researchers also impart their own personal bias in the initial selection of research topics, often stemming from positivity and confirmation biases.

Because researchers bring their personal bias into their work from the start, the selection of topics and research questions is susceptible to implicit or unconscious cognitive bias. The researcher remains the primary source of bias, especially in qualitative studies because the interpretation of findings is filtered via the researcher. UX designers that also conduct their own research perpetuate this further and carry those biases directly into their design work. While there is no complete immunity to bias, awareness is the leading factor to mitigate the effects of biases (Gerhard, 2008; Hall, 2019; Pannucci and Wilkins, 2010).

2.3.2 Cognitive biases for design

Work by Daniel Kahneman and Amos Tversky in the 1970s found that people make decisions that are far from rational, often by using mental shortcuts to assess the outcome. Known as heuristics, these mental shortcuts help to solve problems more quickly but may also lead to errors in thinking. Gil Bouhnic defines cognitive biases as "systematic errors in our thinking process that affect our decision making" before going to present how to use these cognitive biases in design (2019). Bouhnick published an article describing 84 cognitive biases with over 40 visual examples encouraging the awareness and use of biases to improve the design of product interfaces

Various cognitive biases are also called effects (eg. Hawthorne Effect) or laws (eg. Law of Instrument) are occasionally discussed in IxD educational settings but only in relation to the users. The collection of cognitive biases displayed in the codex below "underscores how commonly our thinking fails us – and a result, where we might begin to improve" (Heick, n.d.). Other resources such as the Catalogue of Bias help collect, name and describe these errors in thinking (2017). This list of over 180 cognitive biases is categorized into four categories. The biases within each category relate to 1. Too much information, 2. Not enough meaning, 3. Need to act fast, and 4. What should we remember? Deduced from the

content of each category, the main factors affecting cognitive bias are 1. existing information and opinions held, 2. overcoming gaps in information, 3. the need to decide quickly and confidently and 4. limitations of the human memory.
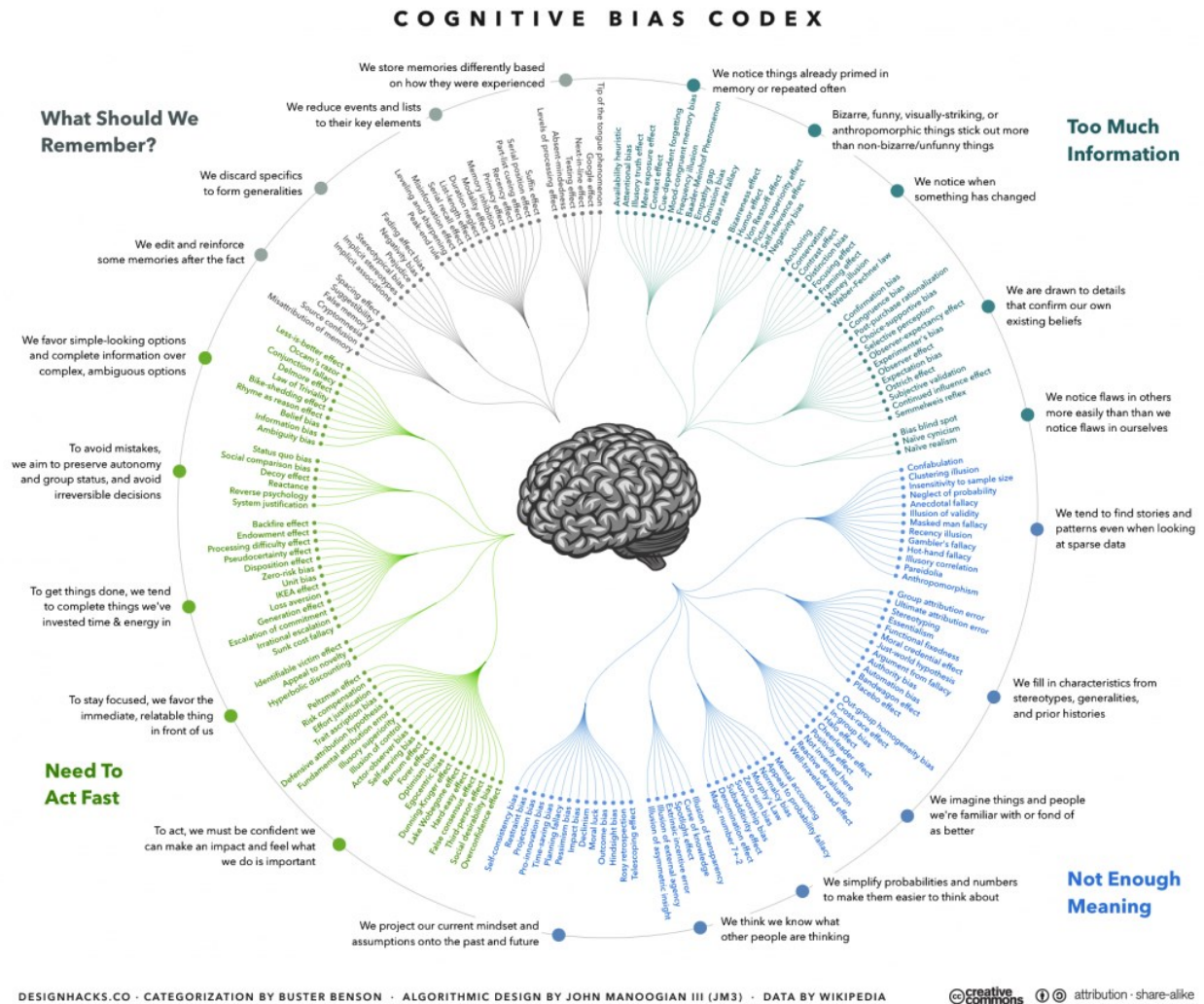
Figure 2.7 The Cognitive Bias Codex: A Visual Of 180+ Cognitive Biases

Arranged and designed by John Manoogian III. Categories and descriptions originally by Buster Benson. (2017) For easier viewing see https://www.teachthought.com/critical-thinking/the-cognitive-bias-codex-a-visual-of-180-cognitive-biases/

2.3.3 Bias blind spot

As described in works by Daniel Kahneman (2011) and Scopelliti et al. (2015) an effect of our unconscious judgment-forming processes means that people are often unaware of their own biases despite being able to identify the same biases in the judgments of others. Scopelliti et al. measured the bias blind spot of individuals and concluded that "people exhibit a tendency to believe they are less biased than their peers." The consequences of which impact judgments and behaviour towards others, including decreased receptivity to

useful advice and in turn affects decision quality. Psychologist Adam Grant also calls this the "I'm not biased bias" - the tendency to recognize the flaws in other people's thinking but continuing to assume you are immune to those same biases (2021).

2.4 Related studies in UX design and research

Previous work related to bias in research exists for other fields such as medicine and social sciences but published academic studies for UX are limited. The field of psychology is filled with work on the topic of response bias dating back to the 1950s. With a 40-year head start it is difficult to compare the publications of psychology and UX design but even in the design work, a gap is noticeable. Rarely does the mention of response bias go beyond accounting for biases in the methods of a case study. A search at the beginning of October 2020 of the following query: "response bias-" and ("user experience" or "UX" or "interaction design") returned only 45 results on Google Scholar. Compare this to the about 467,000 results for the query "response bias-" and psychology, of which over 4000 are from 2020 alone.

There is UX specific information available, but it does not live in academic or scholarly published work. Instead, many books and commercially published articles contain a wealth of information. For an area of study that is relatively young and highly commercial, UX practitioners seem fond of creating their own by conducting surveys and presenting work as case studies. This is unsurprising as research is a predominant feature in UX processes.

There is a history of applied or practical research in design. One example of this is the study of design processes and management by the UK Design Council. Their findings were presented in 11 case studies after interviewing staff members from 11 design departments at highly recognized international (though predominantly English and American) companies.

In lieu of existing academic research on UX topics, many commercial organizations have conducted research in response to their own interests and inquiries. The Nielsen Norman Group (NN/g) is one such example that fills the gap with research-based user experience. Recognized as an industry leader, the full length reports of their independent research are behind a paywall but summary articles and videos are freely available, highly informative and based on the same data. Recent work includes considerations and best practices for remote work, the crossover between UX design and product management roles, along with appropriate handling of UX data. These articles can be found on their website.

Taylor Palmer began running the UX Tools survey to collect input from other designers about the tools that they use. Since 2017, the project has grown substantially, the 2020 edition had over 4000 respondents from around the world. Similarly, three separate organizations continue to conduct annual surveys on the state of design in Sweden (Wedin, 2020), UX/design in Norway (Hæhre, Håmsø and Maaland, 2021), and the state of user research (Balboni, 2021). In 2015 a Swedish design agency began researching the state of design in Sweden, asking a wide variety of questions to design professionals. Inspired by the Swedish counterpart, a Norwegian consultancy produced their own survey in 2017 interested in understanding the existing market and UX work done by design professionals in Norway. The third example given is the State of User Research survey conducted by the team at User Interviews. For the past three years, this survey has been aimed at people who do research as at least part of their job. With 525 responses from around the world, Norwegian respondents account for 0.3% in this year's report (Balboni, 2021).

3 Methods

3.1 Research planning

Research does not happen in a vacuum, it requires context. The research scope and methods of the project are dependent on the available resources and possible constraints. Selecting appropriate research methods is possible when the research goal(s), available resources and constraints have all been considered.

The research goal of this project was to describe how UX designers consider biases when planning and conducting research. The resources available to me were my professional and educational network of designers and researchers in Norway. The constraints on this project were a roughly five-month timeline, limited (non-existent) budget and travel/contact restrictions due to COVID-19.

The sum of the above necessitated a qualitative approach to the attitudes and behaviour of designers working in Norway, wherein the research must be conducted remotely, in a timely manner, and with minimal cost. This project was conducted from January to May 2021 semester, with some planning the previous semester. Allocating time for planning and writing left roughly three months to work on data collection and analysis - so time was not an intense constraint, but neither was it unlimited. Instead, travel restrictions and budget were the primary constraints on the project. Thankfully, many methods can be converted to work remotely and can make do with time instead of money.

A formal research plan was submitted to obtain the necessary ethics and data handling approvals. A description of the planned study with an explanation of data handling and example consent form was required for approvals from the NTNU faculty and the Norwegian Center for Research Data (NSD).

3.2 Methods

This section describes the three methods used for data collection to answer the research questions. The methods are outlined, and the associated activities and tools are detailed.

3.2.1 Desk research

The term desk research is a broad term given to the work done in advance of "actual research" like fieldwork and meeting the users (Stickdorn *et al.*, 2018). Preparatory work and secondary research are included in this category. Desk research may also be known as background or preliminary research as it sets the base for continued study, often using existing research and secondary sources. Findings from preliminary research are presented in Chapter 4 to give a foundation of knowledge based on existing available materials. Typically, this form of research is conducted at a desk in front of a computer with access to databases and libraries of knowledge, thus the term "desk research."

Literature reviews are commonly used "to gain a broad understanding, and description of the field" (Jesson, Matheson & Lacey, 2011). Unlike its systematic counterpart, a literature review with no defined path allows for exploration from one resource to the next. Preliminary research for this thesis included an unstructured literature review of academic

and scientific material along with white papers, grey material, and additional media produced by organizations and UX designers for the broad research and design community.

The preliminary research for this project included:

• Literature review of scholarly work that discusses biases in research design, surveys and interviews from social sciences, to better understand existing related academic work on the topic.

• Review of survey reports related to UX design and research from multiple design industry sources: Okse (local consultancy), NN/g (international consultancy), User Interviews (service provider) and UX Tools (independent designer).

• Review of recommended texts targeted to UX and UCD practitioners, including textbooks gathered from course syllabuses and a selection of the list generated from Okse's design surveys over three years.

• Review of materials related to user research provided by recognized industry leaders such as the IxDF and NN/g. These included a variety of digital resources such as articles and encyclopedias on the topics of planning and conducting research

• Review of additional alternative materials targeted to UX practitioners using emergent sampling to follow new leads (Stickdorn *et al.*, 2018). The full list of materials includes articles, case studies, survey reports, blogs and opinion pieces, white and grey papers, videos, podcasts, webinars and network meetings.

Secondary sourced interviews of UX professionals and industry experts were also collected and included as a type of supplementary material to the eight primary sourced interviews. This provided perspectives outside of Norway and additional experiences to consider. Like the primary interviews, transcripts of the secondary interviews were prepared for analysis. These were gathered from podcasts, videos of conference proceedings, topical webinars and network meetings.

3.2.2 In-depth interviews with UX practitioners

Interviews are amongst the most common UXR method to gather information from users (Balboni, 2021; Hæhre, Håmsø and Maaland, 2021). Hennink et al. notes that interviews can be particularly helpful in examining people's beliefs and perceptions – and – in examining the context surrounding people's lives (2011 as referenced in Harding, 2013, p. 22).

Snowball sampling through existing networks granted starting to collect data from known connections, then relied on them recommending other organizations and people to contact. Aware that snowball sampling can produce self-consistent samples, a variety of organizations were intentionally contacted (Baxter, Courage and Caine, 2015). I purposely sought out UX practitioners at a variety of organizations to account for differences in the application of UX processes, specifically in-house and consultancy. While the primary profile of interviewees was UX Designers, the sample parameters were expanded to connect with teammates. The interviews were conducted with eight UX practitioners, to give them a more general term. This included people who work with user experience as designers, researchers, developers, product owners, and managers.

Accounting for the lack of budget, no monetary incentives were given. As Wilson explains "If the subject of the interview is going to have a direct impact on the person or their organization or cause you might get people without providing any type of direct material or financial incentive" (2013, p. 116) Presenting myself as a peer, and asking to learn from them was usually taken as a compliment without setting a prestige bias.

The main objective of interviewing UX practitioners was to better understand if and how they consider biases in their research work. To access and contextualize this information, much of the conversation revolved around how they plan and conduct the research they use for design purposes. Past and current projects were used to elicit and discuss concrete research examples. A semi-structured approach to the interviews allowed for further in-depth discovery when necessary. The interview guide was planned and reviewed thoroughly through using the do's and don'ts guide from Baxter, Courage and Caine (2015), peer review and pilot testing. The interview guide was reviewed by two other designers and piloted twice to improve the phrasing of questions, ensure a logical order, test the duration of the interview, and uncover if any explanations were required.

To conduct and sustain the 45-minute semi-structured in-depth interviews, it was important to know the questions well enough to keep the flow of the interview while allowing for further discussion on areas of interest that appeared throughout. The use of storytelling techniques and verbal prompts were used where appropriate. The participant's preferred terms were clarified in the beginning then used throughout the interview to not impart my own preferred terminology. The exception to this was the descriptive attributes *academic* and *commercial,* as they were used in the wording of questions.

UX practitioners were contacted via their work email. The initial email included the project description, a request for the interview and a Calendly link. Calendly was used as a scheduling tool to allow participants to book a time that worked for them, cutting out much of the back-and-forth communication needed to schedule a meeting. Once a session was booked, a confirmation was sent back along with the formal project plan and consent form. After the participant had agreed to be interviewed, background research was done to become familiar with the available material about their company and practice the interview guide before each session.

Participants were met at the agreed upon time via the remote video call. Interviews were conducted in English. Pleasantries were exchanged to build rapport before discussing the project and collecting consent information, including permission to audio record. Recording the audio of the interviews allowed for accurate transcription following the conclusion of the interview. When recording was allowed, only simple handwritten notes were made during the session to remain focused on staying engaged with the participant and asking follow-up questions. As one participant did not wish to be recorded, more detailed notes were taken of their responses and key points were clarified regularly to create usable and accurate data.

Averaging 45 minutes, all interviews were between 35 and 50 minutes in length. They were recorded and transcribed with the interviewee's permission, allowing coding and analysis along with other materials. Post-interview processing included typing up the handwritten notes, listening through the recording once to grasp the general tone and topics, listening to the recording a second time to transcribe it and listening through a third time to verify the transcription before moving on to the coding and analysis. The topics discussed were not sensitive in nature, however, names and discussions of work were anonymized in the transcripts. All interviews were transcribed by the researcher to accommodate the data

handling agreement. While time consuming, the benefits of this were a thorough understanding of the material and all the data was processed in the same manner by the same person. Although there are subjective elements, for example in the editing and punctuation of transcriptions, they were consistent across the whole project.

3.2.3 Ethnographic journaling and reflection

Baxter, Courage and Caine (2015) recommend method triangulation to access the same topic from multiple perspectives and create a variety of raw data. Typically, this is done to compare what participants say and do in various contexts. The self- or auto- approach to ethnography is meant to put the researcher in the shoes of the people they are researching.

> "Besides "real" (i.e. rather academic) autoethnographic research where researchers immerse themselves for months within an organization, service design often applies shorter versions of this: team members explore a particular experience themselves in the real situational context, mostly as customers or as employees. Variants of this include mystery shopping, mystery working, service safaris, explorative service safaris, or diary studies." (Stickdorn *et al.*, 2018, p. 119).

Auto-ethnographic, unstructured, participant observations, recorded as reflective journaling was used to explore my own perspective of research for design in academia and work experiences. This was a 'live and work' approach to ethnography (Logan, n.d.) documenting observations along with my thoughts on the events, topics and themes. Auto-ethnography as outlined by Cho Chang in *Autoethnography as method* encourages the understanding of self in the web of culture that we exist in (2008).

Journaling is a way to put thoughts to paper and leave space for reflection and further learning. This meant I could reflect on the opinions and beliefs that I hold and compare them to the findings from other sources. A notebook in OneNote was dedicated to this section of the project. OneNote was used because it is accessible and synced across devices. This meant that journaling was possible when and where the inspiration or relevant topics struck. Often this was after work meetings and discussions with peers, however, it was also regularly before bed after reading design and research related materials in the evenings.

3.3 Analysis

3.3.1 Thematic analysis

The data produced from the above methods were examined for commonalities, differences and relationships through thematic analysis "involves identifying themes that emerge from the data" (Dawson, 2009 as referenced in Harding, 2013). Each document, irrespective of its origin, was read at least once before it was uploaded into Nvivo for analysis. It was read a second time in Nvivo to highlight topics specific to that document, then read a third time while applying new codes and reviewing the list of existing codes to reach full saturation. Long texts were read all the way through and highlighted, highlighted sections were copied to a document and that document was then coded along with other data. All audio and visual media were converted to text data, some like videos on YouTube and certain podcasts provided transcripts. Transcripts of all alternative media such as interviews, podcasts,

videos, and webinars were used to unify the data types into text. The steps for analyzing the documents came in addition to the steps required to source and create the transcripts. All of the data was used for the thematic analysis but the data relevant to each case was used in the comparative analysis.

The creation and application of codes is subjective, though as the only researcher undertaking this process the application of codes was done so consistently across data. An initial list of themes was made from preliminary findings and the interview guide. While analyzing each file, unique inductive codes were created for each document, many fit as second codes under a larger theme. After analyzing a related group of files e.g. all interview transcripts from the same team or multiple annual survey reports from a single source, the unique codes were compared across the files and unified if related. Reviewing the new codes and categorizing them into themes was done via a digital version of a research wall, as a means to collect all of their important data points and findings. The final list of codes, also known as the codebook, can be found in Appendix A.

The source material was gathered into five groups:

> (1) Industry texts
>
>> • Quotes from recommended texts and articles on research and bias.
>
> (2) Survey reports
>
>> • 16 survey reports (4 from Norway, 6 from Sweden, 3 from User Interviews and 3 from UXTools).
>
> (3) Interviews (primary)
>
>> • 8 interviews, two team members from each of four organizations.
>
> (4) Interviews (secondary)
>
>> • 6 podcast transcripts (as secondary source interviews from NN/g, The Innovation Series, Awkward Silence, User Knows).
>> • 10 live webinar or recorded video transcripts (*some content is behind a membership paywall like IxDF and others like IxDA sessions has location-based membership).
>
> (5) Journal entries
>
>> • While valid and insightful, personal observations and reflections were analyzed separately from the other data.

3.3.2 Comparative analysis

As a continuation of the thematic analysis, a comparative analysis was conducted with the data from the in-depth interviews. A comparative analysis involves "comparing and contrasting data collected from different respondents until no more new themes or issues arise" (Dawson, 2009 119-125 as cited in Harding, 2013). The descriptive nature of the research means that to fully understand the findings, they must be presented in a format that allows for qualitative description. When the factors that influence the phenomenon are unknown or difficult to differentiate from the subject Harding recommends case studies to present qualitative research that is descriptive in nature (2013). Subsequently, a multiple case study design was selected to present and compare findings across the four design teams. The transcripts from each of the participants belonging to the same organization were included along with publicly available background information about the organizations.

4 Preliminary findings

4.1 Research on design

4.1.1 Design Council: Design processes and management

In 2007 the UK Design Council conducted research to uncover and better understand the design processes used in companies that were considered to be industry leaders in using design for their products and services. In-depth interviews were conducted with members and management of the design teams at 11 organizations. The findings were presented as case studies in a report called *Eleven lessons: managing design in eleven global brands (2007b; 2007a)*.

Inspired partially by the Design Council's work on focusing on the management of design, this research instead focuses on the research conducted within those design processes.

The Design Council is also responsible for publishing the Evolved Double Diamond in 2019, which their Chief Design Officer, Cat Drew, referred to as the NEW Framework for Innovation. She explains that the Double Diamond was originally created because "designers were using design as a problem-solving tool and wanted to make visible this process, and in particular the importance of spending time (and money!) on understanding the problem that the eventual design was trying to solve" (Drew, 2019). Frameworks like this can provide structure to the design process, but one of the main value points is to simply communicate a design process and what design can do in a clear, succinct and understandable way, especially to a non-design audience.

Do you need a formal framework to do design - no - but the reality is that a defined framework makes it easier to communicate the goals, expectations and outcomes when each of the phases, stages or grouping of actions that you do has an assigned title or heading. UCD, Design Thinking and other similar approaches put the user at the center of the problems and invite routinely testing ideas and concepts. These are expanded upon by the UK Double Diamond for general application of problem solving.

4.1.2 Okse: Design in Norway

Inspired by the Swedish *State of Design* survey, the founders of Norwegian consultancy Okse wanted to better understand the local market because Norway represents a very small fraction of the global population, equivalent to 0.07% of the total world population (*Norway Population*, 2020). In the *State of User Research 2021* survey Norwegians represent 0.3% of respondents which is likely a single respondent (Balboni).

Over the course of the four years that Okse has run the survey, responses have more than doubled from 141 in 2017 to 350 in 2020 (Hæhre, Håmsø and Maaland, 2021). This sustained growth is likely predominantly related to the awareness of the survey but is an indicator that people are interested in the topic of the state of UX and design in Norway. Unlike the *UX Tools* survey (Palmer, 2021), the data is not made available meaning the readers are unable to judge the interpretation of the data for themselves. The structure and questions are based on similar existing work which allows the results to be compared to

other studies. Notably, the researchers clearly acknowledge their position, assumptions and the limitations of the work in their reports.

The questions have been modified over the years with feedback from external sources. In the 2017 and 2018 reports (which were called the UX in Norway), respondents were asked to rate the UX maturity of their organization (Hæhre and Håmsø, 2019). The corresponding summary statement prefaces the change from 2017 to 2018 with the admission that the validity of the answers can be questioned because it was only relevant for 56 of the 171 respondents. This consideration and statement encourages the reader to evaluate the findings in their own opinion.

4.1.3 User Interviews: The State of User Research

This is the closest work to the topic of interest of this study. It provides some insight into the wider population of UX researchers.

UX researchers and people who do research as part of their job were surveyed by User Interviews about the research they do. Run annually since 2019, the third iteration of the report was published in early 2021. Balboni and team collected data from 525 user researchers in 44 countries (2021). As a team that supports a digital tool/service called User Interviews, the organization has a vested interest in understanding current trends in UXR. Adjacent topics related to the pandemic and remote work were new inclusions in the most recent survey, along with questions about the current diversity, equity, inclusion and accessibility efforts among the UXR. Key insights include a shift from 21% to 90% working entirely remotely accompanied by new tools and processes to organize notes and findings.

Core topics of interest including organizational structure, processes, methods and tools, and research "in the COVID-19 era" were used to inform the interview guide. As they are a team of UX researchers presenting work on the same field that they also work in, there is the potential for bias and at the same time, an expectation that as experienced researchers they will present valid findings.

4.2 Research methods and activities

According to the State of User Research survey (Balboni, 2021), the most popular form of research is user/generative interviews, nearly half (46%) indicated it was the form of research they do most often. Following that ranked moderated usability tests (19%), surveys (15%), unmoderated usability tests, and field/ethnographic research.

Baxter, Courage and Caine's (2015) list of suggested methods for understanding users includes diary studies, interviews, surveys, card sort, focus group, field studies and evaluation methods. Each then has its own dedicated chapter in the book that details the activities and protocols for the method. This distinction between methods and activities is clear and created specifically for research. While the text presents a practical guide to user research methods it does not necessarily take into account the additional methods that designers from other disciplines may use. Nor does this list account for the development in technology over the past six years.

In contrast, Okse's 2020 report (Hæhre, Håmsø and Maaland, 2021) presents the responses from Norwegian designers about the methods that they use in their work (Table 4.1). It can

be assumed that this list is therefore a blend of research and design methods. However, the list of "methods" could be considered a mix of methods, activities and tools associated with UX design and research. Some like personas for example may fit into multiple categories. This is because it can be an activity, for example in a co-creative workshop or amongst the design team, but it is also commonly an output, a deliverable to help communicate and identify with users. Even with the broad definition of methods for design, the data on how many of the respondents used these methods are interesting. As the survey was conducted in Norwegian, the original terms for the methods are presented in brackets.

Table 4.1 Methods used in the job (Metoder brukt i jobben) Design in Norway 2020

#	Methods (Metoder)	Share (Andel)
1	Prototypes (Prototyper)	83.1%
2	Workshops (Workshops)	78%
3	*User tests (Brukertester)	74%
4	*Interviews (Intervjuer)	70.3%
5	Wire sketches / wireframes (Trådskisser/wireframes)	64.9%
6	Customer travel (Kundereiser)	63.7%
7	User stories (User stories)	46.6%
8	*Observation (Observasjon)	38.6%
9	*Surveys (Spørreundersøkelser)	36%
10	Personas (Personas)	32.3%
11	Guerrilla testing (Geriljatesting)	28.6%
12	*Data analysis (Dataanalyse)	27.1%
13	Business value mapping (Business value mapping)	20.3%
14	Service blueprints (Service blueprints)	19.7%
15	*A/B testing (AB-testing)	16%
16	Jobs to be done (Jobs to be done)	14.6%
17	Storymapping (Storymapping)	14.3%
18	Design studio (Design studio)	8.9%
19	Empathy mapping (Empathy mapping)	8.6%
20	Effect mapping (Effektkartlegging)	5.1%
21	Other (Annet)	2%

NN/g adds another level of categorization because the activities are associated with methods that are organized by stage in the design cycle (Farrell, 2017). According to the NN/g some of the most commonly used methods, and the stage they belong to are:

- Discover
    - field studies/user interviews
    - stakeholder interviews
    - requirements and constraints gathering
- Explore
    - design review
    - persona building
    - task analysis
    - prototype feedback and testing
    - user stories
    - card sorting
- Test
    - qualitative usability testing
    - benchmark testing
    - accessibility evaluation
- Listen
    - search log analysis
    - usability bug review
    - feedback review
    - FAQ review

The complete list of *UX activities in the product & service design cycle* (Farrell, 2017), otherwise known as the UX Research Cheat Sheet from NN/g can be found in Appendix B.

4.3 Attributes of research

There are many attributes of research that may also be referred to as types, specifications, or considerations for research. Here attributes are descriptors for the differences between types of research. They may or may not apply to one or all three levels of research approaches, methods and activities. Preliminary investigation into the topic of UXR revealed many dichotomies that exist within as attributes of the research. Upon further investigation, not all of the attributes are mutually exclusive as some of the attributes could be mapped to a spectrum or more of a ven-diagram with some overlapping qualities.

Baxter, Courage and Caine present their recommended list of methods and activities then follow with the differences amongst them the methods (2015, pp. 102-105).

- behavioural versus attitudinal
- researcher and participant roles
- lab versus contextual
- qualitative versus quantitative
- formative versus summative and
- the number of users

Other sources including NN/g have published examples of this before. Rohrer presents a 3-dimensional framework arranging user research methods based on Attitudinal vs.

Behavioral, Qualitative vs. Quantitative and the Context of Use, as shown below in Figure 4.1 (2014). The dimension called Context of Use is related to the use of the product during data collection and is categorized as natural, scripted, decontextualized or a combination/ hybrid of the others.

A LANDSCAPE OF USER RESEARCH METHODS

BEHAVIORAL

●/■ Eyetracking
● Clickstream Analysis
● A/B Testing

■ Usability Benchmarking (in lab)

■ Usability Lab Studies   ■ Moderated Remote Usability Studies

■ Unmoderated Remote Panel Studies   ■ Unmoderated UX Studies

● Ethnographic Field Studies   ● True Intent Studies

◆ ←— Concept Testing —→
● Diary/Camera Studies

◆ Participatory Design   ● Customer Feedback
▲ Focus Groups   ◆ ←— Desirability Studies —→   ● Intercept Surveys
▲ Interviews   ▲ ←— Card Sorting —→   ▲ Email Surveys

ATTITUDINAL

QUALITATIVE (DIRECT)   **QUANTITATIVE (INDIRECT)**

KEY FOR CONTEXT OF PRODUCT USE DURING DATA COLLECTION
● Natural use of product   ▲ De-contextualized / not using product
■ Scripted (often lab-based) use of product   ◆ Combination / hybrid

© 2014
Christian Rohrer

Figure 4.1 A Landscape of User Research Methods, Cristian Rohrer as published by NN/g (2014)

The IxDF (n.d.-c) presents user research methods on the axis of Setting (Natural or Laboratory) and Type (Observation and Experimentation). The largest method bubble, Semi-Structured Qualitative Interviews, spans nearly the entire diagram (Figure 4.2) as it can range in both setting and type, for example, if the interview takes place in the users' home and the questions are based on observation and context versus if the interview is conducted in a usability lab with versions of a product available as prompts or probes to the interview.

Comparatively, Erika Hall uses a target-like visualization of the approaches to research (2019, p. 44). Shown in Figure 4.3, the white circles include the topics of the research question; the subject of inquiry can be the users, the organization, the product, or competitors. The yellow inner circle displays the nature of the research such as generative, descriptive, evaluative and analytic options which help point towards the suggested research activities that are listed in the outer ring. Of the research activities listed, interviews and usability testing show up in multiple quadrants as they can be modified to meet the research needs.
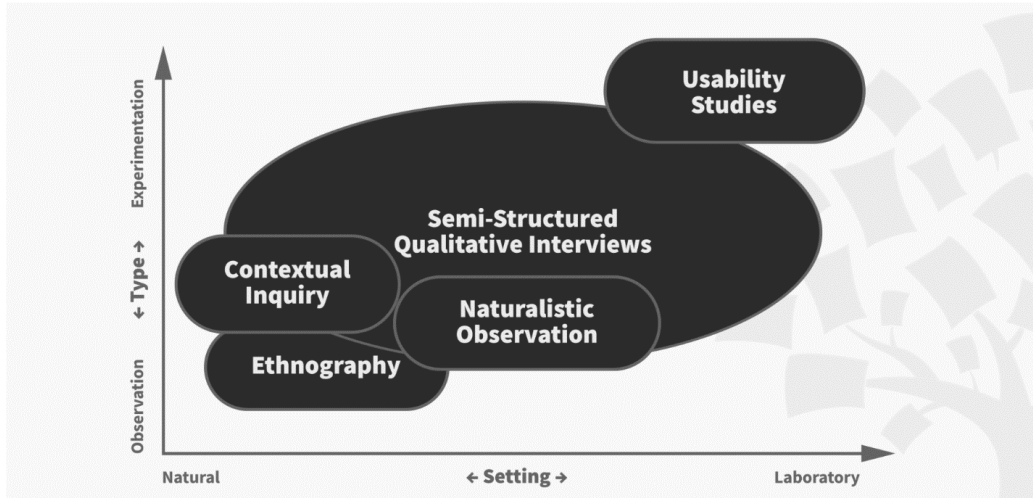
Figure 4.2 User research methods vary by type and setting, IxDF
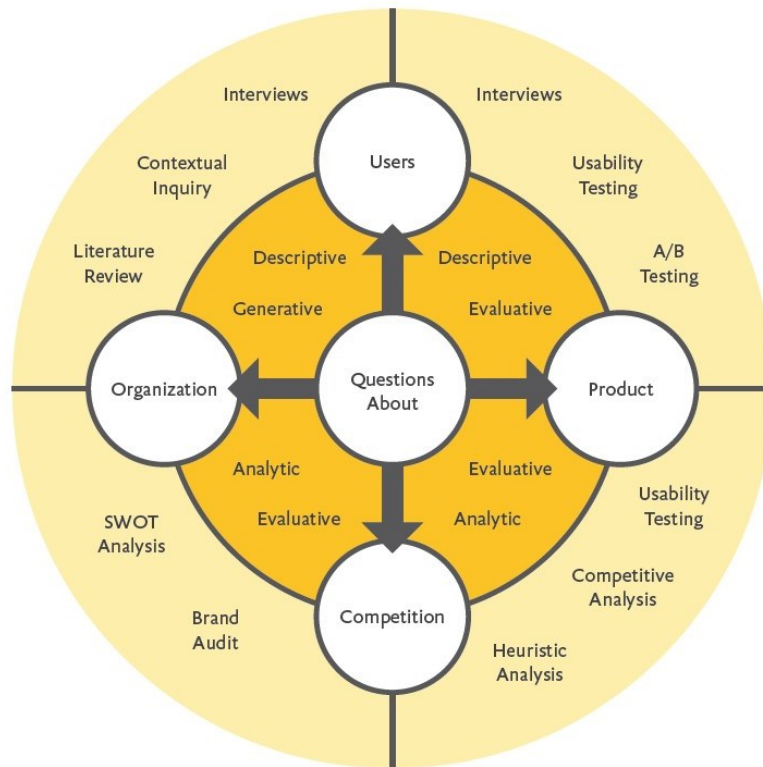
Figure 4.3 Erika Halls guide to the choice of research activities, Just Enough Research (2019, p. 44)

4.3.1 Definitions and examples of research attributes

To better differentiate and define the various attributes of UXR, multiple of them are detailed in the following sections. Researchers should endeavour to consider these research

attributes early on in the planning of their research project.

Academic or commercial

Table 4.2 Attributes of research: academic or commercial

Type	**Academic Research**	**Commercial Research**
Explanation	Research with the goal of answering questions and making new discoveries for the scientific community, or adding knowledge to a field of study. aka. Scholarly, pure, theoretical	Research with the goal of solving problems and or providing insights for an organization, often a business, or its customers. aka. Applied, professional, industry, non-academic
Example	A systematic literature review of material on any given topic.	A survey to gather customer opinions on a new product.

Academic work strives for reproducibility while commercial work strives to solve a problem. There are more similarities than differences between the two, though typically academic research is reported in a formal and rigid manner while commercial research usually takes a different approach to convincing others of its value. In either case, the goal is always the reliability and validity of findings. In publication we begin to see a bit of a divide from the scientific/academic world which seeks to publish in peer-reviewed journals and typically follow standardized processes. Commercial work more commonly presents its findings in a variety of formats including, but not limited to reports, white papers, blog articles, videos, podcasts and social media posts - mostly with the intent of sharing content and information. UX research is almost exclusively commercial, though findings could be submitted to journals for academic publishing if they wished.

Generative or evaluative

Table 4.3 Attributes of research: generative or evaluative

Type	**Generative Research**	**Evaluative Research**
Explanation	Research with the goal of generating ideas, concepts or new research leads. Can also be called exploratory.	Research with the goal of evaluating an existing idea, concept, prototype or product.
Example	Interviews to better understand users existing struggles.	Some variety/variation/form of observation or usability test .

Generative attributes are highly valued at the beginning of the design process and the evaluative more so towards the end. Note – generative is sometimes used to mean user research, and evaluative to mean user testing.

Attitudinal or behavioural

Table 4.4 Attributes of research: attitudinal or behavioural

Type	**Attitudinal Research**	**Behavioural Research**
Explanation	Research to discover and explore the thoughts, feelings, needs, attitudes and motivations users have towards an experience, as self-reported by the user.	Research to discover and explore what users do, either self-reported or more ideally observed in context. Can also be quantitative data from interactions.
Example	A survey on preferences of travel destinations.	On-site observation of employees and analysis of their swipe cards.

It is important to clarify if the research is looking to uncover users' attitudes or behaviour as they typically require a different approach and methods. This is evident and dictated by the research question. Because people tend to say one thing and do another, method triangulation is recommended.

Primary or secondary

Table 4.5 Attributes of research: primary or secondary

Type	**Primary Research**	**Secondary Research**
Explanation	Research you, as the researcher, conduct directly with the source.	Research with existing published materials, typically involves the summary or synthesis of data and literature that has been published by others.
Example	Your own interviews, observations and experiments that create new data.	Articles and studies published in journals, newspapers, blogs and other media. Interviews conducted by others, published as podcasts or videos.

Somewhat humorously "secondary research" typically comes first as a way to understand what else exists on the topic, before conducting primary research. Secondary research may also be called desk research (TISSD) as most published work can be found in books or online via a computer.

Observational or experimental

Observational or experimental: relates to the treatment/intervention/effect of the study

Table 4.6 Attributes of research: observational or experimental

Type	Observational Research	Experimental Research
Explanation	Conduct and record observations. Only recording what happens, but not introducing new factors.	Conduct an experiment with a control group and a testable group. The experiment is introducing a new factor to measure reactions.
Example	user observations in their actual environment, ideally where the researcher is not interfering *however it has been proven that observation can alter behaviour and change the outcome.	A/B testing can be an example of this, where different groups of users are given different versions of the product but tested on the same parameters.

*Hawthorne effect: When individuals modify an aspect of their behaviour in response to their awareness of being observed." (Mahtani and Spencer, 2017)

Ethics come into play here. The research must be evaluated to address if: it is reasonable for you to observe the phenomenon; will you be allowed to; are there implications to the observations or proposed interventions; and is it acceptable for you to manipulate test groups of people.

Quantitative or qualitative

Referring to the type of data being collected.

Table 4.7 Attributes of research: quantitative or qualitative

Type	Quantitative Research	Qualitative Research
Explanation	Numbers, quantifiable measurements that allow direct comparison and statistical calculation. Typically requires a larger sample size to convince of a confidence interval and statistical significance.	Words and stories that express the quality of the experience, often used to describe needs or articulate problems. Conducted until saturation is reached - a smaller sample size can produce rich data.
Example	A quantitative usability test with time on task and countable success rate.	Qualitative user testing with think-aloud protocols and descriptive feedback.

As Pernice says in a NN/g video "numbers or stories." There is a big kerfuffle about how these are handled but the reality is – they answer different questions – How fast do users complete a task vs How do they complete a task. It is a balancing act because a survey with thousands of responses might outweigh the 10 interviews but in either case, the wrong questions might have been asked or the sample could be unrepresentative of the population.

Moderated or unmoderated

The presence, or lack thereof, of the facilitator during the research activity.

Table 4.8 Attributes of research: moderated or unmoderated

Type	Moderated Research	Unmoderated Research
Explanation	A facilitator is present throughout the research session. May also be called synchronous, meaning everyone is working together at the same time.	The participant is not supervised while they complete the activity. Similarly, asynchronous is the term for working on their own time, to contribute to the session.
Examples	Interviews or in-person observations.	Surveys, diary studies – multiple methods can be conducted this way.

Moderated and synchronous may be used to describe activities that are supervised and collaborative, while unmoderated and asynchronous can be used to describe activities that have been completed by an individual on their own separate from the facilitator or other participants. However, the terms synchronous and asynchronous are more commonly used to describe internal work sessions with the design team, rather than refer to research activities.

In-person or remote

Where the researcher or facilitator is in relation to the participant.

Table 4.9 Attributes of research: in-person or remote

Type	In-person Research	Remote Research
Explanation	Research activities conducted with the researcher in the same space as the participant, sometimes referred to as face-to-face.	Research that is facilitated or conducted when the researcher and participant are not in the same space. Now commonly via digital tools.
Example	Interviewing a participant by visiting their workspace and sitting in their office.	Interviewing a participant over the phone or on a video conferencing service.

Noting the benefits of modern technology, we have moved away from mail-in surveys and telephone conferences, but all of the past learning still applies. The benefits of in-person research such as recognizing body language or making additional observations are weighed against the benefits of remote research such as more flexibility to schedule and reduced cost of travel.

Field or laboratory

The location or physical context in which the research takes place.

Table 4.10 Attributes of research: field or laboratory

Type	Field Research	Laboratory Research
Explanation	Research is conducted in the participant's / phenomenon's natural context. May also be called in situ (on site) or contextual.	Research that takes place in a laboratory or some modified setting that is not the natural context.
Example	Interviewing a stakeholder by visiting their space sitting across from them.	Bringing participants into a usability lab or even an office which is not where they will use the product or service you are designing.

Rohrer further differentiates field and laboratory research in terms of whether the study participants are using the product or service in question, and how (2014). "The Context of Product Use" distinction asks if the participant is using the real product, a form of prototype or just discussing the product or an aspect of the product. Also considered, is the research scenario natural, scripted, or somewhere in between - which Rohrer calls a hybrid.

Number of participants

Many sources advise on the number of participants for various research activities and Baxter, Courage and Caine (2015) have collected multiple into a chart to recommend the number of participants per research method. An interesting UX rule of thumb for usability testing developed by Don Norman is 5 users per test, per user segment. But the best answer I have come across for UXR in a commercial setting is – how confident in your answer do you need to be? Because there comes a point where you have sufficient confidence to make that decision (Hall, 2021).

4.4 Additional factors to consider

4.4.1 Growth and maturity in UX

According to Jakob Nielsen, there are three factors for the growth of user experience: 1. More UX staff within your company 2. More companies doing UX and 3. More countries doing UX (Nielsen, 2017). The first two factors can be seen in the expanding teams here in Norway and the many job postings looking for senior and heads of UX - experience is (highly) beneficial when introducing or maturing the state of UX in an organization. It can be argued that the third point can also be seen in the UX Tools and User Interviews surveys that have respondents from around the globe.

Using the same model as Figure 2.6, the State of Design — Swedish Edition (Wedin, 2020) asked their 468 respondents: What maturity level do you think design is in your organization? Their take on the matter is as follows:

> This year "4. Committed" and "5. Engaged" went up which is good. But on the bad side "1. Unrecognized" and "2. Interested" also went up with a small decline for "3.

Invested". Our take: These numbers are always hard to interpret. The study shows there is a movement to the right which is good. If you look at the trends from 2015 we now can see a positive trend this year in many segments. (Figure 4.4)
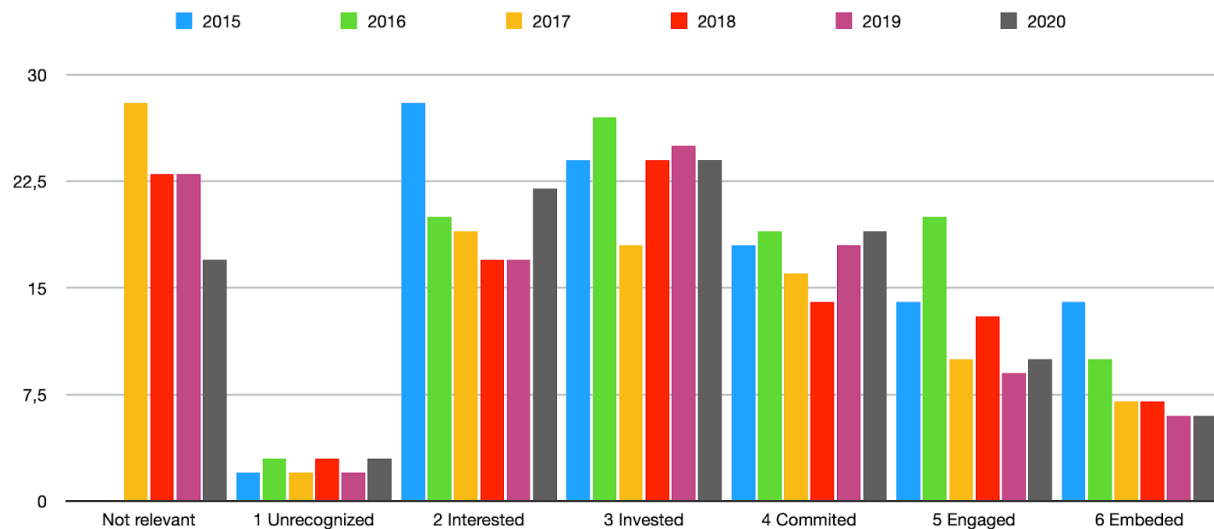
Figure 4.4 Maturity trending from 2015-2020, State of Design, Swedish Edition 2020

4.4.2 List of recommended resources for UX research and design

In some models and texts design is the doing aspect (Stickdorn *et al.*, 2018) – it is a practice, but not all of the knowledge required to do it well is explicit or always easy to share. This type of tacit knowledge is largely why senior designers are considered so valuable. To each new project they bring with them a wealth of experience, insights, and a fair dose of intuition. Hall equates intuition to the combination of experience and confirmation bias. At the same time, there exists many sources, communities and platforms dedicated to sharing ideas and information amongst UX practitioners.

The following are a list of recommended resources for UX practitioners and people who do research (pwdr) collected from existing lists and recommendations.

Free

The Catalogue of Bias Collaboration has, since 2017, maintained a catalogue of https://catalogofbias.org/about/

Nielsen Norman groups articles and videos https://www.nngroup.com/articles/

The interaction design foundation's open source encyclopedia of human computer interaction second edition which is an assembled form of textbook for their education platform. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed

Borrow from a library or buy for the shelf beside your desk

Understanding Your Users, Second Edition by Kathy Baxter, Catherine Courage and Kelly Caine. Published by Morgan Kaufman, this textbook covers a broad range of topics but is detailed enough to help you researchers succeed.
https://www.elsevier.com/books/understanding-your-users/baxter/978-0-12-800232-2

Just Enough Research, Second Edition by Erica Hall. This guidebook too trusted research methods his published by A Book Apart. https://abookapart.com/products/just-enough-research

Thinking, Fast and Slow by Daniel Kahneman. It sneaks onto Okse's list as well, but it is worth mentioning twice. https://www.penguin.co.uk/books/563/56314/thinking--fast-and-slow/9780141033570.html
In addition to Thinking Fast and Slow, other books about psychological principles that affect our minds are Biases and Heuristics by Henry Priest, Everyday Bias by Howard J. Ross, and The Art of Thinking Clearly by Rolf Dobelli.

Okse's list

Also the long list of books suggested in response Okse's study (in Norwegian: https://okse.no/artikler/ux-i-norge-anbefalte-boker-alle-ar)

Table 4.11 A collection of all books recommended in the survey "UX in Norway" 2017, 2018 and 2019

Author	Title	Number of recommendations
Steve Krug (2014, 3rd Edition)	Don't Make Me Think, Revisited: A Common Sense Approach to Web (and Mobile) Usability	73
Don Norman (2013, 2nd Edition)	The Design of Everyday Things: Revised and Expanded Edition	60
Jake Knapp , John Zeratsky , Braden Kowitz (2016)	Sprint: How to Solve Big Problems And Test New Ideas In Just Five Days	30
Marc Stickdorn, Jakob Schneider (2014) **	This is Service Design Thinking	28
Jeff Gothelf, Josh Seiden (2013)	Lean UX	23
Erika Hall (2019, 2nd Edition)	Just Enough Research	16
Mike Monteiro (2012)	Design is a Job	12

Leah Buley (2013)	The UX Team of One	11
Susan Weinschenk (2020 2nd Edition)	100 Things Every Designer Needs to Know About People	10
Mike Monteiro (2019)	Ruined By Design	6
Alan Cooper (2004)	The Inmates Are Running the Asylum	6
Daniel Kahneman (2011)	Thinking, Fast and Slow	5

** The authors published a new version under a new title. This is service design doing : applying service design and design thinking in the real world : a practitioners' handbook by Marc Stickdorn, Markus Edgar, Adam Lawrence, Jakob Schneider (2018).

5 Results

5.1 Comparative case studies

To compare, contrast and present the findings, case studies were created for each of the four teams that were interviewed. In addition to the data from the in-depth interviews, background research investigated published work from and about the organization.

5.1.1 Summary of cases

All four organizations are Norwegian based with clients and customers from a broad range of industries. There is variety amongst the four cases in their organizational structure, goals and processes, therefore it can be difficult to compare directly, like apples and oranges. Instead, the experiences of each can be extrapolated and presented as examples of potentially useful ideas, processes and solutions.

Two team members were interviewed from each of the four teams. The cases outlined below examine the UX teams and their organizations across:

- Age and size of organization based on the number of employees.
- The placement of the team within the organizational structure.
- Product or services they support.
- The use of a standardized design process for the team to use.
- Research methods the teams have used, as described and discussed in project examples.
- Constraints that have affected research.
- Considerations for bias.
- Types of bias identified.

Where possible, each employee described their process for the same project. Narrative responses of project examples that included research were used to collect the list of

A summary of the cases is presented in table 5.1 to allow for comparison across a condensed version of the qualitative data.

Table 5.1 Summary of cases

	A	**B**	**C**	**D**
Placement of UX/ Design team in the organizational structure	In-house UX team, adjacent to marketing and development teams	In-house UX designer, part of product team, separate and above development teams	Consultancy, UX and design, all employees are designers	Consultancy, IxD and development, approximately half of employees are designers
Age and size of organization based on number of employees	Just over 10 years, medium with 100+ employees	Approximately 5 years, small with >50 employees	Approximately 5 years, small with approx. 10 employees	Just over 10 years, medium with approx. 50 employees
Users and the product or service they provide	B2C and B2B, digital interfaces for their own physical product	B2B SaaS, niche software tool	Design solutions for clients	Technical web solutions for clients
Standardized design process as used by the team	Yet undefined, adopted product development cycle	Recently introduced and defined a lean UX process, aligned with lean software development	Knows the standards and has been working to defining their own	Loosely follows existing framework (DD or DT) and is in the process of redefining to make their own
Considerations for bias in research	Bias is not questioned or explicitly discussed by the team	Aware of types of bias, bias is occasionally discussed, noted that consequences are difficult to anticipate	Aware and reflective of assumptions and limitations, but do not explicitly discuss bias	Aware of cognitive bias as a tool for in design and a few are actively challenging assumptions

The case that got away

Unfortunately, interviews with an additional team fell through. They initially agreed to participate in this research, but eventually backed out after struggles with scheduling. They were in the process of expansion and feeling strained. The organization is a large international design agency, the Norwegian offices (plural) belong to a large global network of consultancies. As such they have a well-defined (and even branded) approach to design, and a work process that is anchored in the human-centerd design and research. Three other teams did not respond. Overall, the positive response rate to direct emails was roughly 50%.

Local and national growth

An interesting commonality amongst the five companies is that they have all hired for UX design positions in the past 12 months. These five are not the only ones, the growth of design is easy to see on job boards where Norwegian companies and consultancies have opened hundreds of design roles in the last year – Stavanger alone has had at least 20 positions open in the first half of 2021. As one designer said, "It is a pretty good time to be a designer in Stavanger." There are lots of opportunities and plenty of work to do.

5.1.2 Case A

A is an in-house UX team working on both the business (B2B) and customer (B2C) facing digital tools that accompany their range of physical devices. With over 10 years on the market, product design processes have existed within the company for a few years, but previous use of consultants for design work meant they only started their internal UX team approximately 2 years ago with a single designer. As such, their internal UX design processes are not yet defined. Collaborative work is still relatively new for the UX team mainly because they are experiencing growth and now have more colleagues to work with.

The individuals on the UX team have a variety of skills under the umbrella of UX design. The Product Analyst is new to the team and has the responsibility for much of the user research and data analysis. The Product Designer focuses on feature design tasks and is planning user testing for an upcoming project. With international customers, their research methods included surveys and video call interviews before remote work was required in 2020. Both participants expressed the diminished ability to collaborate with teammates when working from home as the main consequence of working remotely.

The UX team works with other teams in the organization including those responsible for marketing, sales and customer service. Existing and potential customers have been recruited for research activities through marketing and customer service channels, for example, newsletters and on-page surveys.

- CP: could you possibly elaborate or maybe give your opinion on why you think that biases aren't as discussed in your workplace?
  A2: "Um … I think it's really hard because I don't know if it's not being discussed or that we're not just using the word bias. And I'm also like trying to define bias in my own head... I wouldn't know how to define bias to be honest."

5.1.3 Case B

B is an in-house Product Team that includes a single UX Lead responsible for all creative and UX work. Their products are B2B software-as-a-service (SaaS) tools marketed to other commercial entities that they refer to as clients or customers. Their tools are for a niche market that is experiencing rapid growth.

The company is less than five years old and the current UX Lead has worked there for less than a year, though the Product Manager has been with the company for three years. The hiring of a UX designer, after a period without a dedicated UX practitioner, has meant that they recently re-defined their product development workflow with UX processes integrated.

B differentiates their research into four groups: competitors, (internal) stakeholders, clients/customers, and end-users. The clients are the business representatives that manage the subscriptions to the tool while the end-users are the employees that work with the tool. One participant referred to their research as being "broken" because they do not have direct access to their end-users for qualitative research. The closest they get to the users is through usage data from an analytics tool or via regularly scheduled video meetings with a client representative. Contact with existing and prospective clients is considered one of their primary research methods while competitor analysis also ranks highly as a day-to-day task.

With less than 50 employees the organization is considered small, however, the employees are located in different countries. The product team is, under normal circumstances, co-located in the Norwegian office and relies heavily on collaboration between the UX Lead, Product Manager and Product Owners. The ability to work together in the same room has been sorely missed this past year – though it has opened the rest of the business and external clients to be willing to take meetings and calls on a more regular basis according to the Product Manager.

5.1.4 Case C

C is a UX and design consultancy that is less than five years old with approximately 10 employees. They have worked primarily with regional companies and organizations to evaluate and improve their services and products.

It was suggested by a senior staff that all team members know the typical approaches to design process like Double Diamond and Design Thinking. For the past year and a half, they have been working to align and define their own branded model for how they work. While not yet standardized, they do strive to conduct a variety of research and design methods dependent on the needs of the project. Both participants emphasized uncovering the needs and goals of the client in order to best deliver an appropriate solution.

The team has produced internal materials where those with a specific skill or experience present the topic to support further development of the rest of the team. Topics are often case studies of methods and tools. The company culture of "really down to earth and informal"(C1) is apparent in their community oriented actions and collective consideration of skills and limitations. "We're not special in any way, we just try do what we do and include everyone." Multiple team members are also actively involved in the local design networks.

Neither participants recalled explicitly discussing biases with their team however they do acknowledge project related limitations and assumptions while remaining open to being wrong or taking the project in another direction.

5.1.5 Case D

D is a technology consultancy offering design and development of web-based solutions. Approximately 20 of the roughly 50 employees are designers, the majority of which are graphic and interaction type designers. With ten years under its belt, it is again experiencing the growing pains of adding more employees and widening the scope of work that they offer. They are beginning the process of aligning the departments and defining a process that is reflective of their strengths and style of work.

Team structure within projects can differ depending on the client and stage of project. Both interviewees are currently contracted to the same client but are working on different projects. This is common in this organization as the designers may support the technical development on multiple projects at one time. A benefit of this setup is the ability to scale and move resources between projects, "if we need another designer, we can just add another designer to the team for X amount of time and then when we don't need them anymore they can go back to another task or another project" (D1). **D** was the only case with this example of this flexibility in regards to team structure.

Both participants reported a preference for collaborating with other designers and D2 added that work goes quicker and is usually closer to "bulletproof" when reviewed by another designer. Despite the possibility and preference for working with multiple designers, there are projects with a single designer. The team has identified that if a single designer is assigned to a project, they are less likely to consult other designers for review and feedback. This lead to the creation of monthly meetings to encourage the designers to sync and get feedback across teams.

Within **D**, the main differentiation of research is between that which involves people and research about things. Stakeholder and user research are grouped together while related research or desk research includes competitive research, data analysis, and information gathering such as reviewing potential partners and data sources.

- "[if you] base everything you do on your experience and assumptions then you'll definitely have bias kicking in pretty quickly both conscious and unconscious - I hate doing work based on assuming." D1

This response expresses unawareness understanding and disdain for bias related to their work. The last portion "I hate doing work based on assuming" implies that they have previous experience doing work based on assumptions.

5.2 Addressing the research questions

5.2.1 Classifications and descriptions of the research

Addressing (Q2) How do UX practitioners describe and classify the research they do?

The attributes of research used by the interviewees when describing project examples included qualitative and quantitative, stakeholder or user involved methods, indirect (user feedback), observational or experimental. Academic, scientific and commercial are not included in this collection as these terms were used in the questions, therefore, are over-represented in the responses.

All eight participants agreed that user testing is a subcategory of user research, and substantiated that the differentiation of user testing is presenting a concept or product to the participant.

Only teams B and D reported differentiating between users and stakeholders. Though C1 agreed that they do requirements gathering from their clients but do not usually call it stakeholder research.

5.2.2 Common methods

Focusing on the types of research methods commonly used (Q3), all four teams reported using interviews, surveys and user testing as a regular part of their design process. All of the interview styles described by participants could be classified as semi-structured but some also noted that they do additional information gathering in ad hoc, on-the-fly and informal interview settings. There were more distinctions or alternative terms used for interviews than any other method. Seven qualitative methods were represented in comparison to two quantitative.

Table 5.2 lists the terms participants utilized when asked about their most commonly used research methods and when describing their research project examples. Alternatives to the most used term are placed in brackets. The second column displays how many of the 8 participants referenced the research method and which team they belong to.

Table 5.2 Terms for research methods used by participants

Terms for research methods and activities used by the participants (with alternatives)	Number of the eight participants that referenced it
interviews (user)(on-the-fly) (semi-structured) (one-to-one session)	8, AA BB CC DD
User (usability) testing (with prototype)	6, AA B CC D
Surveys (NPS)	5, A BB C D
Workshop (collaborative meetings)	5, AA B DD
Product / data analytics	4, A BB D
Client or customer feedback	2, A B
Desk research	2, C D
Competitive analysis	2, B D
Participant observations	2, CC
Diary studies	1, C

5.2.3 Ideal setups and the gap from reality

When describing the concept of their ideal research setup (Q4), the participants often referenced examples of what had worked well for them previously. B1, B2 and D1 referred to examples from previous workplaces while C2 and D2 gave examples from previous projects at their current workplace.

In comparing the ideals to how they conduct research in practice, a common thread of the discussions was the desire for a sustained relationship with users. Reasons cited for wanting to conduct research with the same user over a period of time were: building rapport in the relationships (x4) understanding their goals in a larger (longitudinal) context (x3), and to allow for follow-up or revaluation of new iterations of the same solution (x5). Multiple respondents implied a more representative sample as part of their ideal research setup, without using terminology related to participant or sampling bias.

Almost all of the ideal research settings that participants described involved better direct and/or in-person contact with end-users. In regards to direct access to users, all four teams reported that recruiting or gaining access to users is moderated by others.

- For team A, users for interviews and testing sessions are accessed through customer service representatives, while surveys are distributed via the marketing team.
- B reported there is no direct access to their users, and instead settled for regular contact with a customer representative.
- C did not express any difficulties with recruiting but noted the regular occurrence of needing to convince clients that research with users is necessary.
- For team D, access to users within the client organization is organized by or approved by the project's Product Owner or another employee with connections.

Despite all teams acknowledging the indirect nature of their access to their users, access to users was only listed as a constraint on the research by three participants from two teams. However, there were other constraints in this same vein of recruitment, such as willing engagement from participants and subsequently their availability or difficulty with scheduling sessions.

Working remotely

All of the teams conducted research and design while working remotely this year. Though in three of the four cases, the COVID-19 era of remote work was not the cause for the remote research. Teams A and B are accustomed to remote research with their users because they have global customers/clients that are not reasonably accessible to them. Team D has both local and global users meaning that they are also accustomed to using mixed methods that account for remote research. It was the collaborative analysis of findings and related design work that was more negatively impacted by working remotely.

- "We all wish we would just be there in person of course. Yeah, I think worshops are a lot more awkward online." A1 referencing the difficulty in having productive discussions in large virtual meetings.
- "There is some pushback on it, yeah, but others found that it was suddenly reasonable for them to ask for two hours of everyone's time and get them in a Teams meeting together. And they actually got things done that kind of maybe

wouldn't have happened before. So there's been some positive and some negative."
B2's reflection on remote collaboration.

All four teams also reported working collaboratively with at least one additional team
member when planning and preparing interview questions or tasks for user testing.
However, three of the more senior UX practitioners mentioned they rely heavily on their
experience when directing the flow of an interview.

It is important to note that the above responses do not negate the preference for
conducting research in person. All four participants from B and D remarked on missing the
personal elements of being in-person with users and stakeholders especially reading the
participant's body language. Others included having more social conversations (D2) and a
better sense of the interviewee's engagement (D1, B2).

Common constraints encountered

Participants were asked to describe some of the common constraints they face when
conducting UXR. Many of the constraints or restrictions related to where research fits in
their organization's design process and being given adequate resources. This supports the
preliminary findings that the hurdles to plan research might be as high or higher than
conducting the research. Time was the constraint referred to by most participants (x6),
followed by money, buy-in from the organization, and engagement from the participants.

Table 5.3 Common constraints for research as reported by participants

Constraints on research as expressed by the participants	Number of the eight participants that referenced it
Time - including availability and scheduling	6, A BB CC D
Money - budget	4, A B CC
Buy-in - convincing	4, A C DD
Engagement - anchoring	4, A B C D
Access to users	3, A BB
Other business priorities	2, A B
Existing politics	2, B D
Technology	2, C D

5.2.4 Considerations of biases

This section addresses the primary research question of how UX practitioners consider
biases when planning and conducting research for their design work (Q1), along with
(Q5) Are UX practitioners aware of the potential for biases in research? And

(Q6) If so, do UX practitioners do anything to mitigate the biases? Alternatively, what can be done to mitigate biases in research?

When asked if the potential for bias was ever considered or discussed regarding the research project example, there were a wide range of answers.

- It was not discussed. (A1)
- Um, yes I would say so. I can't remember using the word bias, but I guess we do talk about personal bias. (A2)
- Probably, I don't remember. Potential for any biases… I'm sure they accounted for that, but I don't remember from my perspective. (B2)
- Not to a large extent, but I think it's more like we.. because we're a bit trained in doing research like I assume it's always in the back of our heads. (C1)
- Yeup. Yeah. The thing is that usually when you do the first [user] test, you give a report for the day. When I'm done with the test, I will have report for the whole team saying okay this is what you found out. Those things [that they thought], you... you kind of kill those biases. (D2)

A1 asked to define bias before fixing on convenience sampling and commenting "And I should probably know more right now." When asked why?, they replied "Because I do UX, I should really be able to think of these more and they are important." Despite A2's similar comment that they "wouldn't know how to define bias, to be honest" they were able to identify examples of both personal and sampling bias in their own project work.

In comparison, B1 clarified that when working as a team to fund solutions, "Yes, we are acutely aware of our own subconscious bias when developing features. ... And there's been lots of conversations around how we can best solve that without our own bias influencing [the solutions] - because I think it always would - but at least accounting for that and trying to mitigate that as best we can."

C1 expanded on their initial response of "Not to a large extent" by adding "but I think it's more like we.. because we're a bit trained in doing research like I assume it's always in the back of our heads. Just because someone suggests something, we don't just go with it. And we try to consider validity [and] how we design the research. But I don't know if it's a yes or no, it's probably more of a greyish answer."

5.2.5 Awareness of bias and the potential implications of bias

A post-analysis assessment of the participants' comments on the potential for biases in research is presented in the table below. The references to bias were organized into four categories based on the variety of responses given. Research bias related to the researcher (themselves), personal bias in others that affect their research, response bias related to their participants and cognitive bias related to designing for end-users. Besides defining bias in research as the influences of the researcher on the research that introduces a systematic error into the sample data (Formplus, 2020), no examples of bias were given.

Comments were evaluated on the following scale: 0 = did not mention the type of bias, 1 = the bias or an example of the bias was mentioned, 2 = the bias was mentioned and named and/or described, 3 = the bias was named and an example was given or the possible effect was identified. It is difficult to evaluate awareness based solely on this because not mentioning a bias does not necessarily equate to not being aware of that bias.

Sampling bias is considered a research bias but, for the purposes of analysis, references to engaging with voluntary participants were included under response bias because the respondents did not take ownership of the responsibility for sampling.

Table 5.4 Assessment of mentions of bias by participants

Participant	Research bias (in themselves)	Personal bias (in others)	Response bias (in participants)	Cognitive bias (for end-users)
A1	1	0	3	1
A2	2	1	3	0
B1	2	2	1	0
B2	0	0	2	0
C1	2	1	3	0
C2	0	0	1	0
D1	3	2	1	1
D2	0	2	1	3

To summarize, the majority of the UX practitioners interviewed did not mention all four categories. There was minimal awareness of the potential effects of bias in research. Sampling and participant biases, listed here under response bias, were the most commonly mentioned. There were also two references to validity in connection with research planning and recruiting. Five participants named a bias and either gave an example of it or a possible effect. The two A participants, that have a focus on product design, were able to identify potential consequences such as participant bias resulting in a product that meets the needs of a small segment of engaged and vocal users. Without prompting, three noted that they would want more information/knowledge/research on the consequences of bias related to their work.

Some are more broadly aware of bias and reflective on their research processes, particularly the two in leadership roles with roughly a decade of experience. Due to the limited sample size and ranges of work experience, no correlation could be identified. Two of the respondents struggled to articulate or had a limited understanding of biases related to research or design. One focused intensely on cognitive biases as guides for design work (D2) and the other on personal biases (B1).

Due to the low level of awareness across the cases, primary research was unable to thoroughly answer Q6 related to the mitigation of biases in research.

D1 responded to a query about using to using tools for documenting biases stating "the challenge I think, for the consultant, would be very hard to get support. If you're in-house you can definitely rationalize the use of tools to help you be aware of your biases because you've bought into the company. But when you're a consultant, they will consider you spending time on those types of perspectives, at that level as burning money." While they

acknowledged that it could be a hard sell, they also pointed out that for some projects such as those with AI, it would be appropriate to explicitly discuss ethics and biases. Other suggested mediums for documenting and disseminating findings included Medium articles (B1) and engaging informative videos similar to Netflix is Explained series (A7).

5.2.6 Relevance of scientific research standards for design

There was general agreement amongst the participants that scientific research standards (read: objective, valid and reliable) are relevant to design research, however, the context and constraints of design work may limit the ability to maintain the scientific standards. Two examples of this are seen in the responses from participants to the question: Do you think that scientific research standards are important to the design?

> I think so yeah, it is important to design… especially when dealing with user behaviour, [to] not to be stuck in too many confines. In true science, like if we're right there in a lab, sometimes I feel like people are black or white, but we also need to be careful with the gray areas too when we're dealing with humans.
> … I'm not a scientist. I'm not very familiar with the standards. But again, I think anything can be drilled down to the scientific process and that we should always try to just take those types of approaches to everything that we do - especially yeah, especially in design. (B2, removed filler words for clarity)

> I definitely think it's relevant. … I guess in design research, it's like a short or easy version of scientific research, and it might be because of project budgets and time limitations and all of that. As design consultants, we always work within a set of constraints. Constraints can be either time or money or technology or something else. And we also have a mandate of what we're supposed to focus on. So we have to design and perform the research within those boundaries. So that might be some of the reasons why design research is the way it is. (C1)

To the follow up question: Do you think research biases are equally important in the scientific and academic world or in the commercial world? A1 responded by mentioning the expectation that scientific and academic work will inform standards that can be used in industry.

> I think they should be more emphasized in the research and scientific community. Because I think that's what the commercial world should base themselves off of. Yeah, I think that's also because our devices have all of these different measurements, and that has to be very much based on the [standards set by] scientific community. So therefore, I'm just like, OK if that works - maybe this will work for us. (A1)

Beyond awareness and towards understanding bias, there was general acknowledgement that more education and information on the topic of bias would be appreciated. D1 reflected that in UXD " Unfortunately, oftentimes I think you're stuck kind of touching surfaces and trying to just catch an obvious thing that might be showing up and presume that others somewhere would fit into that finding." This comment triggered a journaling response: that perhaps bias in design is something like the tip of the iceberg - but more so that it sits just below the surface and can therefore be easy to miss in both a quick-skim and a deep-dive (CP). Therefore awareness, openness and trained perception are needed to identify bias.

5.2.7 Organizational and team structure

An original hypothesis was that there would be a significant difference or at least a notable difference between consultancy and in-house UX teams. This was not the case but they seem to struggle with the same or similar factors and other factors such as buy-in or UX maturity and team size are much more indicative of the resources and constraints allocated to research for design.

> **Journaling thoughts on the differences between in-house and consultancy**: You're typically in a different position as a consultant coming in on a project or into a company because either the project leader and or head of the company has acknowledged that they are lacking a competency and sought out a specialist in that topic. - so yes there is some sales required to get that initial buy-in just to get a designer (or a team of designers ideally) through the door, the work actually begins with analyzing the company and the team dynamics to build those relationships and all-important rapport. They need to trust that the designer actually knows what they're doing, and can deliver on their promises. (CP)

> Working inhouse can be from either angle – an existing employee in a different role introduces and begins to champion the value of design with the gaol of integrating UX processes into the existing workflow OR the organization has hired someone into a UX position because they see the need and lack the skills within their company. The latter was the case for B, the UX lead was positioned above and outside of the development teams and development process and given the flexibility to implement a design process that fit the needs of the company. There are many alternatives to this organization/placement, for example in A the UX team is on par with the development teams in the company hierarchy which may allow them to offer good product development but is unlikely to allow more expansive research and development outside of the products that already exist. (CP)

(A1) also noted that it can be difficult to fit UX research and design into an existing development timeline where the supposed user needs are predefined and provided to the UX team without adequate time to perform user research and instead rely mostly or very heavily on their user testing.

> Basically, if UX is not positioned (or anchored) high enough within the company's hierarchy it will be less effective so that mandate for design thinking and human-centred design has to be accepted and promoted by higher-ups to allow for it to seep into all levels of the organization. (CP)

Responsibilities

The structure and positioning of teams were not consistent across the cases. In one team the product analyst was responsible for the majority of the user research. In the other three teams, the designers were responsible for the research and design. Project team size, rather than organization size seems to be the main factor there. In that, if three or more UX personnel are working collaboratively on a project it is likely that the roles and responsibilities will be assigned. The exception to this is when a UX designer works as the only UX resource A commonality in all but one participant is that the UX team operates separately from the development teams. In organization **A** the UX team is between marketing and development but works collaboratively across departments. **B** has a single

UX designer in their product team of four. Depending on the scope of work, the UX team-of-1 may share responsibilities such as research and requirements gathering with other product staff. A diverse skillset and good communication supersede the need for a large team. Though no matter the size of the team it is important to agree upon who is key responsible for the research.

5.2.8 Data visualizations

Analyzing data in Nvivo allows for convenient data visualization. A word cloud was created for the entire collection of data as well as for two groupings of data types. Using the top 100 words with 3 or more letters, the visual representations of word usage are presented and briefly discussed below.

Figure 5.1 Word cloud of all collected data

Representing all of the analyzed data, this visualization of the project terms (Figure 5.1) centers research and design around people, users, think, know, work, product, time and year. Research and design are likely overrepresented in these figures has the terms featured heavily in both the questions and answers.

Figure 5.2 Word cloud of survey reports

Research and design remain at the core of the word cloud for the survey reports (Figure 5.2). Additional terms like user, year, working, respondents, products, using, tools, survey, and teams all feature more prominently.

Figure 5.3 Word cloud of primary interviews

Again research is front and center, this time from the primary interviews. The word research is mentioned over 1000 times in the eight interview transcripts. As seen in Figure 5.3, "like" is likely overrepresented because it can be used as a comparison but is also a common filler word. Design, people, user, know, just, think, work, product, year and time were all mentioned over 300 times in the approximately 360 minutes of interviews.

5.3 Mitigation of biases in user experience research

Awareness is regularly considered the first step in reducing bias. After acknowledging that biases exist, that everyone has them, and that they affect what one thinks, says and does it is then possible to work to eliminate them. Existing literature currently agrees that biases can never be fully eliminated, only controlled for. The first step is being aware - but as Alita Joyce says on the NN/g podcast – "just because you are aware does not mean you are immune."

Diversify

Center diversity, equity and inclusion (DEI) wherever you are. Work to increase DEI in whatever it is that you have influence over. This can be understanding the target population and going above and beyond to make sure that the sample is representative of the population as a researcher and hiring diverse new employees as a manager. Top level management has the power to ensure a diverse, equitable and inclusive work environment that encourages UX to seep into everything that they do including research and design.

> One way we can combat [researcher bias] - other than being aware of it - is having multiple researchers and not just multiple researchers but researchers from different backgrounds, who come from different places, have different upbringings, different life experiences, and with that different world views! and I think that's a really important aspect into ensuring that your research actually is objective and that you are identifying as close to the real truth as possible so that's my little soapbox pitch.
> - Therese Fessenden, EP.9 NN/g podcast

Education

Be open to learning about bias. Be open to acknowledging and disclosing your own biases. Investigate resources on the topic and work to identify them and their potential consequences. As is common with UXR this comes in the form of asking and answering a lot of questions to get to the root of the matter. Learn to challenge existing assumptions and remain open to the opinions of others. Document and track assumptions so that they may be investigated when the opportunity arises Erica Hall comes at this from an appropriate angle:

> Just reset the whole organization's expectations that you're ever done researching. If you went to a software company and you ask okay when are you done coding? When can the engineers just stop? The answer would be never because you're continuously improving. Continuously improving. So I'd really like organizations to reframe research as continuous learning. If you're making stuff, if you're producing or delivering, if you're making decisions, learning accompanies that every stage."
> – Erika Hall, UXSR webinar

Discuss openly

At the beginning of every project, it is beneficial to discuss ideas, assumptions, goals and expectations with the entire team that will be responsible for the deliverable. Communicate this beyond the team such as with relevant and interested higher-ups. Spreading the beneficial impact of UXR can help anchor future work or iterations.

Set standards

As a designer, as a team and as an entire organization there is the possibility to set standards of what is expected and considered appropriate. Add bias and accessibility to the checklist of things to consider when designing for humans and actively engage in conversations on these topics with team members. Diversity and inclusion apply to both the users and the designers. The UX team of 1 - a single designer/researcher - can work to ensure diversity of participants when testing products based not only on demographics but abilities, experiences and mindsets. Repetitive use and exposure are known to be beneficial in changing perceptions.

Share knowledge

Some companies produce internal conferences where staff can present topics they are knowledgeable in. Others run routine meetings such as Friday mornings (often coffee and breakfast will be provided) or Friday afternoons (with a snack and a drink) to gather and share current work, and others still maintain a library or catalogue of past work, methods examples, and shareable resources to help build the internal level of competence, share knowledge and get feedback from the community. An unexpected benefit to mandatory working from home is that *everything* is remote meaning local meetings became webinars and a few opened these proceedings to the public. This seems to be a hallmark of the UX community the willingness to share knowledge and support each other's development.

Planning

Many research biases can be accounted for with adequate planning and study design. Gerhard points out that "if confounding factors are known and measured with sufficient accuracy, their effect can be controlled for either through study design or analysis" (2008).

"I always start with what my goal is" said C2. Asking: What do I want to find out? What do I need answers to? And discuss what do they use it for in order to set a clear direction – "otherwise, you can ask everything and after the interview, you have nothing useful." Hall added to the idea that if you have a good research question set, your goal should be to answer that question as quickly and confidently as possible. To do this, use the resources available to you. UXers rarely work alone, so while working, have other team members review your work.

> "It's sort of like you're doing your peer review and you're like okay what was the question? Does this answer the question? Why should I have confidence in this or not? Cultivate an attitude of skepticism, assume that everything is super biased and then look for evidence it's not. Start from the assumption that it's not trustworthy. That's a good exercise to try." Erika Hall, UXSR webinar

There is a huge variety in the way in which research can be conducted and it depends on the research questions and research goals. It will also change depending on the constraints appropriate to or affecting the research. The ultimate decision for research in both academic and commercial settings is to use methods that are appropriate and possible based on the needs and constraints of the project. The type of methods used in research for design depend primarily on the type of information you are seeking.

Anyone with knowledge of the domain and/or experience with design can probably give feedback on work including research plans and interview guides. And offer to do the same for others. Doing this while the item is still in progress allows for smaller course corrections. As is said in design it is easier to fix something with an eraser on the drawing board than a hammer once it's built.

Factors such as research questions/goals and population/sample size or will narrow down the types of research methods used and constraints like time and money will often determine how the research activity is to be conducted. Remember what you originally plan for is not set in stone and should remain malleable throughout the project.

Three existing tools to uncover biases in design

The following are three tools that can be used do document the source of some of the biases that effect UX design. Links to the accompanying resources are provided.

Assumption mapping
Assumption mapping was created for identifying assumptions about a new product or service, exploring the assumptions held and rooting out as much of the unknown as possible. In the activity, assumptions are mapped on the axis of importance and knowledge. ideally all assumptions should be challenged and researched, a good place to start the discovery phase is with the assumptions that are both important and unknown.
For an introduction to assumption mapping see Mural's webinar recap with David Bland
https://www.mural.co/blog/intro-assumptions-mapping
And for more on the tracking of assumptions see the NN/g video on the topic.
(https://www.nngroup.com/videos/tracking-assumptions/)

SWOT analysis
A SWOT analysis is a tool to analyze the internal strengths and weaknesses, and external opportunities and threats of a given product service organization. This is a common practice in business development, and as UX becomes more aligned with business goals it is important to your share common language and understanding.
A resource on the topic from a business development perspective:
https://www.business.qld.gov.au/starting-business/planning/market-customer-research/swot-analysis A template to get started: https://www.mural.co/templates/swot-analysis

Context mapping
As presented in Gamestorming (Gray, Brown and Macanufo, 2010), the reasoning for making a context map is to see the landscape and environment around your organization or work. With a systemic view of the external context the team is better equipped to respond proactively to that landscape. The strategy and template are available in the published format or at https://gamestorming.com/context-map-2/

6 Discussion

6.1.1 A better understanding of UXR in practice

Through existing surveys and the primary data collection, a better understanding of how research for design is conducted in practice here in Norway has been gained. It remains that research for design purposes is so context-dependent that it has, so far, defied standardization. Research is not and should not be specified to a specific section of the design cycles or process. Instead, it happens throughout in differing forms.

The selection of research methods is and should be dependent on the research goals, the resources available and the constraints. There is occasionally some formalized structure to the research process, but this is most evident where one specific team or role is dedicated or responsible for the research. Research and information gathering is rather ad hoc and informal, much of which is based on the experience and intuition of the UX practitioner.

It is possible that constraints, such as the ones listed in the primary research (Table 5.3) are more akin to reasonings or excuses to avoid user research. This may stem from a lack of alignment, buy in or UX maturity in the teams' organization or in the client's organization.

6.1.2 Lack of academic data for UXR

In the initial stages of reviewing academic literature, it was apparent that the subject of research bias in UX design is not commonly discussed in academic work. This gap in available information meant that there is significantly more reliance on alternative sources - where commercial findings are more commonly shared. Down one tangent of research I continually came across what I categorized as "be wary of surveys" rhetoric. This is typically only passing mentions of caution towards biases, most of which comes from the work of psychology and is directed at response bias in surveys. The discussions center around the reliability and validity of the collected data but did not discuss or theorize about the

implications that unreliable or invalid data can have when user insights are applied in the design process.

6.1.3 Discussions of biases barely exist

Despite the variety in biases that exist, their effects and consequences, the existing materials for UXD report almost solely on cognitive biases as guidelines for IxD. Beyond cognitive bias as a tool for designers to use, response, sampling and participant biases are mentioned in connection with surveys however research and personal biases are rarely included. Some non-traditional education includes courses with bias in design as a module. Although within educational settings and course projects, the researcher is unlikely to encounter the consequences of bias. A few webinars and video presentations exist on the topics of bias in other industries, but the teachings are not yet pervasive as DEI initiatives.

It was interesting working with the mentions of biases in their effects because there was not a unified vocabulary. The distinctions in categorization of biases came to include the clarification of who was responsible for or the cause of the given bias.

6.2 Limitations

Acknowledging research bias

Stating that bias will always exist can sound defeatist even though it is believed to be true. Framing it differently to acknowledge that *Yes, biases do exist and this is how we work to overcome or compensate for them* is a shift in attitude. The work on this topic can become very meta, very quickly. As a researcher, I am investigating how UX practitioners consider bias in the work that they do. Added to this I am also a UX practitioner with newly gained knowledge of the topic of research bias.

I am aware of research bias and its implications, while also being aware that there are blind spots because of this. Documenting my own experiences and opinions separate to that of data collection encouraged reflection on the topics presented in both.

While this study presents that bias in research and design needs to be addressed and mitigated, it is the intention that the consequences of this research are to affect positive change on the awareness of bias in UXR.

Sampling

On the topic of sampling, Okse's work is an example of another organization beginning to try to understand the full scope and breadth of the (UX) design industry in Norway. The target population of UX practitioners in Norway is not defined or recorded anywhere. It is therefore difficult to judge the relevance of the sample to that of the greater population. In any case, the addition of more data from a greater number of sources would be likely to increase the external validity of the findings.

More information on the number of UX practitioners and the number of organizations that hire them, internally or via consultancy, would provide a better level of significance. Membership to public design network groups such as local IxDF groups, the Interaction

Design Association and Service Design Network could be used to roughly estimate the population size, but their numbers are difficult to define as local memberships are not mutually exclusive.

It is known there are recognized design network groups in at least 5 Norwegian cities and it should be noted that teams interviewed were only located in either Oslo or Stavanger, thus the sample for this research is potentially not indicative of UX teams across the entire country. As stated earlier, convenience sampling has a tendency to result in participants that exhibit similar characteristics therefore the work was presented in self-contained cases and only compared within this study. More cases could have been investigated, though the work conducted here was enough to note trends and gaps in knowledge.

7 Conclusion

7.1 Answering the research questions

The complexity of the context of both UXD and bias in UXR meant that there was no unified answer to the primary research question of how UX practitioners consider biases in their research (Q1). Scientific research standards were generally acknowledged as important and relevant to UXR. Though the sparse knowledge and limited ability to articulate a deeper understanding of research bias are enough to support continued learning on the topic (Q5). It is therefore concluded that the topic of research bias does not currently receive adequate consideration from the interviewed teams.

The UX practitioners interviewed describe and classify the research that they do with the identified attributes common to other research settings (Q2). The four most common research methods reported include interviews, user testing, surveys, and workshops (Q3). This was fairly consistent between the interview participants and multiple survey reports.

The ideal research setups described by participants were rooted in what had worked for them previously (Q4). The largest discrepancy between ideal and reality was access to users. More specifically their wishes were for direct and repetitive access to a representative group of users that would be engaged and available.

The majority of the suggestions and advice for techniques to mitigate bias were collected from industry texts and alternative materials (Q6). It is somewhat encouraging that other sources have identified some portion of this issue and chosen to produce material on the topic to further spread awareness.

7.2 Takeaways

The following are a list of activities and considerations for UX designers and researchers to begin to address biases.

- Educate yourself and others on cognitive and personal biases
    - Work to understand bias as they apply to design and research
- Document assumptions and applicable biases in the context of your work
- Actively work with others that have different lived experience from you
- Actively seek opinions of others that you do not agree with you
- Balance openness to new ideas and critical thinking about decisions and actions

7.3 Future work

A key difference between academic and commercial research is the continuation from research to design and into development, as such it is appropriate that future work on this topic could continue on to designing and developing an interventions for mitigating biases in UXR. Additionally, the knowledge gained here can be used to teams of designers to better define and communicate their process both internally and externally.

Dissemination as included in Figure 2.5 is an important part of research. This sharing of knowledge can go beyond publishing to present findings in a digestible and actionable manner. Making the work and results available to others allows others to be inspired by other's work.

A proposed area of further research is the quantitative measurement of bias in research, similar to that of the blind spot bias by Scopelliti *et al.* (2015). Alternatively, to continue the tradition of qualitative case studies, a longitudinal (study over a period of time) case study could potentially have multiple designers track and document the types of research they do over the course of the project or and iteration of the product cycle. Here I would recommend a mix of diary studies, interviews, observations and artifact collection in order to triangulate what designers and researchers think, say and do in regard to biases in their research.

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Appendix A

Codebook of 88 codes.
Bolded codes are the 31 parent or top level codes.

_Survey related
Consult vs in-house
Express interest of the
researcher(!)
Limitations acknowledged
Responses + Demographics

**2020 COVID related (not
remote work)**

About people involved
about clients
about designers
about management
about product or developers
about researchers
about users

Academic vs commercial

Assumptions

Background
Education
Job title

Biases
Acknowledge own
perspective
Biases in Sci vs Des R
Do they discusses biases
Explicitly discusses biases
Knowledge (or lack) of
biases
Mitigating biases

Constraints
Access to users
Buy-in or convince
Engagement
Money – budget
Other priorities
Politics
Technology
Time - avail. - sched.

Cycle, trend, pattern

Design processes
Res-Des-Dev ratio
Research steps or processes
-response to question-

Facilitation tips etc

Highly relevant

I identify with this

Ideal
Reality

**Names for types of
research**

Pay or salary

**Project or Product
example**

Questions to ask

Remote work
Benefits of remote
Challenges w remote

RESEARCH
R and D tools
    list of tools etc.
R attributes
R frameworks - approach –
mindset
R methods or activities
R outputs
R process w planning
    collaborating for
    research planning
R standards

**Resources (books to
read)**

Sampling
Recruitment
    via proxy

Teams or teamwork
Larger organizations

User research and testing

UX advice

UX community traits

UX growth
UX maturity

UX sayings or quotes
Alignment
Anchoring
Big picture
Context
Intuition – experience
It depends
Iterate or re-evaluate
Sense of ownership
Shared understanding
You are not the user
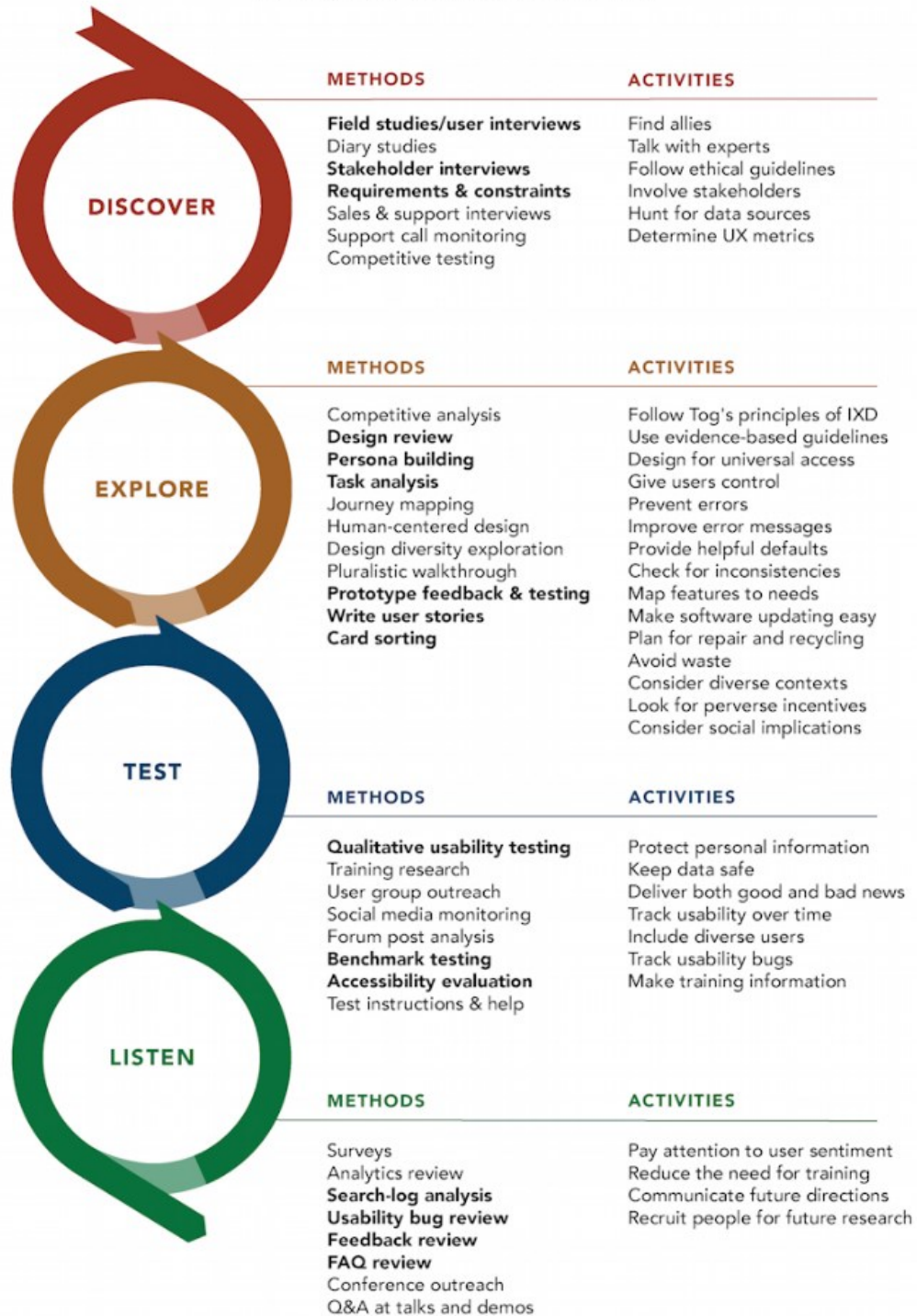
Value of UX

What is 'design'
about UX design

What is 'research'
about research/UXR

Appendix B

UX ACTIVITIES IN THE PRODUCT & SERVICE DESIGN CYCLE

DISCOVER

METHODS	ACTIVITIES
Field studies/user interviews	Find allies
Diary studies	Talk with experts
Stakeholder interviews	Follow ethical guidelines
Requirements & constraints	Involve stakeholders
Sales & support interviews	Hunt for data sources
Support call monitoring	Determine UX metrics
Competitive testing	

EXPLORE

METHODS	ACTIVITIES
Competitive analysis	Follow Tog's principles of IXD
Design review	Use evidence-based guidelines
Persona building	Design for universal access
Task analysis	Give users control
Journey mapping	Prevent errors
Human-centered design	Improve error messages
Design diversity exploration	Provide helpful defaults
Pluralistic walkthrough	Check for inconsistencies
Prototype feedback & testing	Map features to needs
Write user stories	Make software updating easy
Card sorting	Plan for repair and recycling
	Avoid waste
	Consider diverse contexts
	Look for perverse incentives
	Consider social implications

TEST

METHODS	ACTIVITIES
Qualitative usability testing	Protect personal information
Training research	Keep data safe
User group outreach	Deliver both good and bad news
Social media monitoring	Track usability over time
Forum post analysis	Include diverse users
Benchmark testing	Track usability bugs
Accessibility evaluation	Make training information
Test instructions & help	

LISTEN

METHODS	ACTIVITIES
Surveys	Pay attention to user sentiment
Analytics review	Reduce the need for training
Search-log analysis	Communicate future directions
Usability bug review	Recruit people for future research
Feedback review	
FAQ review	
Conference outreach	
Q&A at talks and demos	

Bold methods are some of the most commonly used.

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