

# **Improving handovers between a public service chatbot and chat employees: an affordances perspective**

A case study in Norwegian Labour and Welfare Administration

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# Acknowledgement

This master's thesis is part of the Frida@Work research project funded by the Norwegian Labour and Welfare Administration (NAV). We are grateful for the support provided by NAV and for all the information shared by NAV employees.

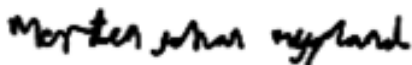
# Preface

This master's thesis has been written by two students from UiA – University of Agder, as the last part of a two-year Master of Science within the field of information systems under Faculty of Social Sciences.

Both students working has an interest in emerging IT-trends, which sparked the interest for this thesis on chatbots and how it affects the organisation it is being used in.

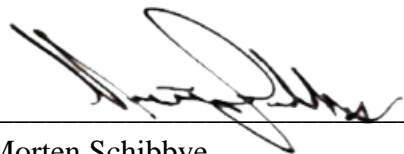
Work on this master's thesis has been a challenging experience, but in return has provided great new knowledge and experience for researching.

We would like to thank our supervisors Polyxeni Vasilakopoulou and Ilias Pappas for their valuable and helpful guidance and comments throughout this project. Their knowledge and expertise in their feedback has been invaluable to us. We would also thank Helena Hannås for providing feedback and proofreading on our thesis.



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# Abstract

Usage of chatbots in organisations has progressively increased over the last years. Chatbots are being used by companies in a variety of ways, such as automatic handling of customer inquiries, automation of mundane tasks internally, smart personal assistance, and as a medium between service providers and users. Despite the technological advances, there are still situations in which citizens and customers are unsatisfied with their interaction through a chatbot. Some of the challenges are linked to unsuitable responses to inquiries and the chatbot's lack of understanding, which can be responsible for the gap between the expectations of the systems and their performance. When these gaps occur, the inquiries are typically handed over to a chat employee which is tasked to handle the inquiry from that point on. Contact centres in public organisations usually deal with a large variety cases, sometimes with high level of complexity. Due to the technical limitations, chatbots often struggle with processing complex cases. A good handover process is therefore critical for an overall good user experience. This thesis focuses this handover, specifically between a public service chatbot and chat employees. Specifically, the interaction between the chatbot Frida used by the Norwegian Labour and Welfare Administration (NAV) and the chat employees at NAV contact centre (NKS).

To investigate this problem, we take use of the concept of affordances. By looking at the perceived affordances of NAV's chatbot Frida, we want to see how the process of handing over inquiries from chatbots in public service to chat employees can be improved. Additionally, we aim to find out how we can enhance the perception and actualisation of Frida affordances to facilitate handovers.

The literature review in this thesis identifies nine categories of affordances based on 91 affordances from literature. These categories are used for investigating chat employees' perspectives.

Using a qualitative case study as approach for this thesis, we have collected data through 14 semi-structured interviews and focus group interviews with chat employees, chatbot trainers, employees with roles as coordinator, and managing roles. The research is set in the organization NAV and specifically the NKS where the chatbot is operating.

Findings show that chat employees perceive many affordances, which is beneficial the handover. They also suggest chatbots with assisting role for chat employees could help improve it further. The affordances citizens perceive are not always actual affordances, leading to confusion and frustration. Findings points towards anthropomorphic traits as a reason for this, leading to a mismatch between expectations and actual capabilities of the chatbot. As a result of this study, we propose recommendations for improving the handover, categorised into technological, process-oriented, and training-oriented recommendations. Based on the findings and proposed recommendations we suggest further research into how an internal assistance chatbot could benefit chat employees dealing with case handling with high complexity, as well as further research into expectations compared to actual capabilities in chatbots.

# Table of contents

1. Introduction.....	1
1.1 Research problem.....	2
1.2 Research motivation and objectives.....	4
1.3 Research questions.....	5
1.4 Research approach.....	5
1.5 Thesis outline.....	6
2. Theoretical background and related work.....	7
2.1 Theory of affordances.....	7
2.2 Literature review method.....	9
2.3 Concept matrix.....	11
2.4 Themes from the literature review.....	15
2.6 Literature Findings and Needs for Further Empirical Research.....	23
3. Research Method.....	24
3.1 Qualitative case study.....	24
3.2 Research setting.....	25
3.3 Data Gathering.....	27
3.4 Data analysis.....	29
3.5 Fairness and authenticity.....	32
3.6 Ethical issues.....	32
3.7 Limitations of this study.....	33
4. Findings from the data collection.....	34
4.1 Findings related to Human-like Conversing affordance.....	34
4.2 Findings related to Assistance provision affordance.....	36
4.3 Findings related to Facilitation affordance.....	40
4.4 Findings related to distilling information affordance.....	41
4.5 Findings related to enriching information affordance.....	42
4.6 Findings related to context identification affordance.....	43
4.7 Findings related to personalisation affordance.....	49
4.8 Findings related to fostering familiarity affordance.....	49
4.9 Findings related to ensuring privacy affordance.....	55
5. Discussion.....	58
5.1 Human like Conversing.....	58

5.2 Assistance provision.....	59
5.3 Facilitation.....	60
5.4 Distilling Information.....	61
5.5 Enriching Information .....	62
5.6 Context Identification.....	63
5.7 Personalization .....	64
5.8 Fostering familiarity.....	64
5.9 Ensuring Privacy .....	65
5.10 Recommendations .....	65
6. Conclusion and further research .....	69
7. References.....	71
8. Appendix.....	76
8.1 Search terms .....	76
8.2 Information for the literature review .....	80
8.3 Consent form.....	81
8.4 NKS chat interface .....	83
8.5 NKS Chat log .....	83
8.6 Interview guide.....	86

## Figure list

Figure 1 - Handover model by Liu et al. (2020).	3
Figure 2 - Stages that can be optimized through managed handover experiences by Wintersberger et al. (2020).	4
Figure 3 - The thesis structure	6
Figure 4 - Theoretical framework of affordances, proposed by Pozzi et al. (2014)	8
Figure 5 - Kitchenham (2004) framework and Hustad et al. (2019).	9
Figure 6 - Picture of Frida as presented on nav.no.	26
Figure 7 - A visual representation of the data analysis process. The final stage of the process was iterated several times.	30
Figure 8 - First iteration of themes and sub-categories.	30
Figure 9 - Structure of the categorisation of findings from the thematic analysis.	31
Figure 10 - Example of summary in chat in the post-handover process by Poser et al. (2021).	62
Figure 11 - Chat interface from Chat employee perspective.	83
Figure 12 - Example of Frida chat with citizen.	84
Figure 13 - Example of chat, when initiating the handover.	85

## Table list

Table 1 - Final article corpus.	10
Table 2 - Concept Matrix.	11
Table 3 - Affordances related to Human-like Conversing (Mygland et al., 2021).	16
Table 4 - Affordances related to Assistance Provision (Mygland et al., 2021).	18
Table 5 - Affordances related to Facilitation (Mygland et al., 2021).	19
Table 6 - Affordances related to distilling information (Mygland et al., 2021).	20
Table 7 - Affordances related to enriching information (Mygland et al., 2021).	20
Table 8 - Affordances related to context identification (Mygland et al., 2021).	21
Table 9 - Affordances related to personalization (Mygland et al., 2021).	22
Table 10 - Affordances related to fostering familiarity (Mygland et al., 2021).	22
Table 11 - Affordances related to ensuring privacy (Mygland et al., 2021).	23
Table 12 - Overview of interviews, duration, form, and participants.	28
Table 13 - Summary of recommendations.	67
Table 14 - Selection process.	80
Table 15 - Overview of Phase two exclusion.	80

# 1. Introduction

Chatbots are being used by companies in a variety of ways. Many use them in order to automate large amounts of customer inquiries (Nuruzzaman & Hussain, 2020; Waizenegger, Seeber, Dawson, & Desouza, 2020). Some use them to automate mundane tasks internally in an organization (Stoeckli, Dremel, Uebernickel, & Brenner, 2020; Stoeckli, Uebernickel, & Brenner, 2018). Other areas of use involves using a chatbot as a smart personal assistant (SPAs) a medium between service providers and users (Knote, Janson, Söllner, & Leimeister, 2021) or a personal intelligent agent (PIA), like Siri from Apple or Alexa from Amazon (Moussawi, 2018). Different terms are used for it in the literature. For example Androutsopoulou, Karacapilidis, Loukis, and Charalabidis (2019) says that a chatbot is also known as a conversational agent, or a bot. In this thesis, the term “chatbot” will be used.

Chatbots can decrease both the waiting time customers experience with phone or email-inquiries, and decrease the workload on chat employees (Nuruzzaman & Hussain, 2020). There is an increase in implementing chatbots in online service encounters, as many companies communicate with their citizen through live chats, through their own website or social media (Feine, Morana, & Gnewuch, 2019). With the implementation of a chatbot, the business was expected to save 20 million dollars in customer service costs by 2017. By 2022, this was expected to rise to 8 billion dollar (Adam, Wessel, & Benlian, 2020). This enables the chat employee time to do more important tasks than answering repetitive inquiries (Adam et al., 2020). An important aspect of what makes a chatbot such a powerful tool is that it can improve itself over time due to its ability to learn. Advances in technology, such as artificial intelligence, have greatly increased the quality of chatbots (Adam et al., 2020).

Chatbot technologies has its root back in 1966 with the introduction of the chatbot “ELIZA” (Feine et al., 2019). Since then, the technology has been improved with the implementation of machine learning (ML), natural language processing (NLP) (Poser, Singh, & Bittner, 2021), natural language understanding (NLU), and natural language generation (NLG). Machine learning allows the chatbot to learn from the data and improve its accuracy over time, without the need for a programmer to program it (IBM, 2020). NLP allows the chatbot to understand, and interact with the user (Magnusson & Rånnerud, 2019). While NLU determines the intent of the user (Nuruzzaman & Hussain, 2020), and the NLG is as Gatt and Krahmer (2018) puts it; *“the subfield of artificial intelligence and com-putational linguistics that is concerned with the construction of computer systems than can produce understandable texts in English or other human languages from some underlying non-linguistic representation of information”*. Gatt and Krahmer (2018) also points out it's difficult to precisely define NLG. Nuruzzaman and Hussain (2020) come with the following description of what a chatbot is; *“Automated system that assist user by responding to their questions”*.



## 1.1 Research problem

Despite the technological advances, there are still situations in which citizens and customers are unsatisfied with their interaction through a chatbot. Some of the challenges are linked to unsuitable responses to inquiries and the chatbot's lack of understanding. These challenges can be responsible for the gap between the expectations of the systems, and their performance (Luger & Abigail, 2016). When these gaps occur, the inquiries are typically handed over to a chat employee which is tasked to handle the inquiry from that point on (Wintersberger, Klotz, & Riener, 2020).

The handover function is initiated when the chatbot can't help the citizen anymore, and a chat employee is needed to take over the conversation (Vassilakopoulou & Pappas, 2020). The handover process goes under many different definitions in the literature, such as handoff (Janssen, Rodríguez Cardona, & Breitner, 2021), hybrid model (Barnett et al., 2020), handover (Vassilakopoulou & Pappas, 2020), and service recovery (Feine et al., 2019; Poser et al., 2021) For this thesis "Handover" will be the term used throughout this thesis. When talking about the chat employee the literature uses different terms. These are typically as "Chat agent", "Human agent", or "live chat agents" (Vassilakopoulou & Pappas, 2020). This thesis will use the term "chat employee".

The handover occurs because chatbots are tasked to take on the simple issues, while more complex tasks are handed over to a chat employee (Waghmare, 2019), which could be the case if the automatic service fails (Wintersberger et al., 2020). Liu et al. (2020) say this could be algorithm failures, negative emotions from the citizen. As Kvale, Sell, Hodnebrog, and Følstad (2020) says, repeating a question or the chatbot notices that it can't answer this inquiry, gives the citizen the option to be transferred to a chat employee. Statistics show that around 20% of inquiries handled by chatbots leads to handovers to a chat employee (Vassilakopoulou & Pappas, 2020).

Primetshofer (2019) describes three different phases in the handover process. The pre-handover phase, Wait-handover phase, and post-handover phase. The pre-handover phase is when the chatbot understands that it has reached its limitation, or that the citizens ask for being transferred themselves. The chatbot then gives the citizen an option to be transferred to a chat employee. The wait-handover phase is when the system queues the support ticket and alerts a chat employee. The post-handover is when the chat employee joins the chat with the citizen. An example of a handover is shown in the figure 1 presented by Liu et al. (2020).

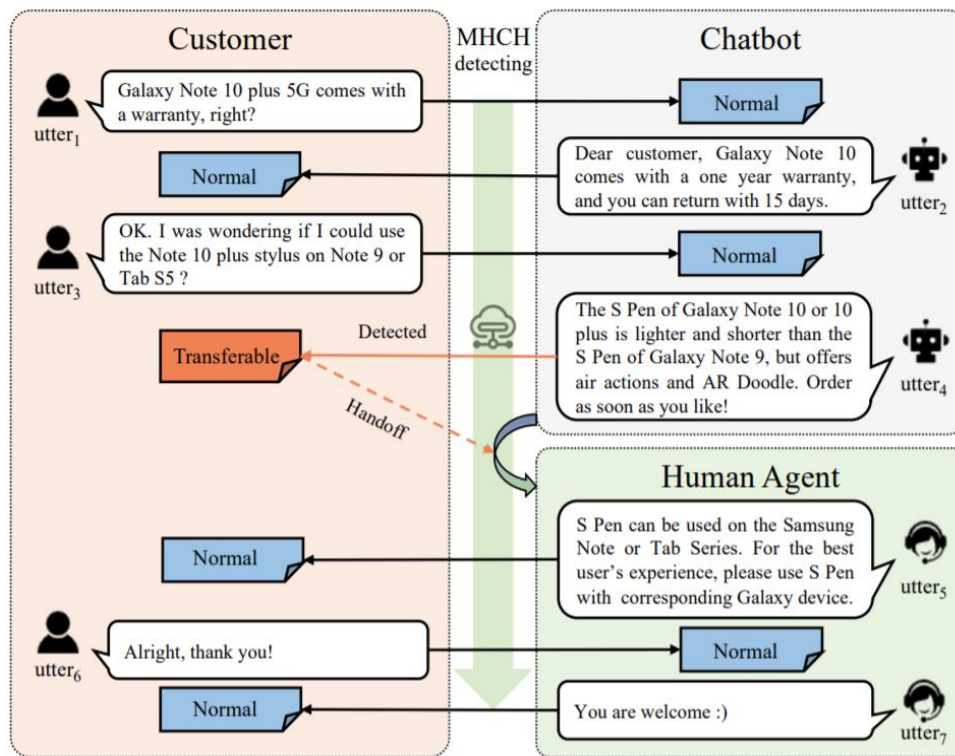


Figure 1 - Handover model by Liu et al. (2020).

The purpose of the handover process is to reduce the amount of routine requests previously handled by chat employees and leave more complex cases to them. In order to do this, the handover process purpose is also reducing frustration in inquiries a chatbot is incapable of handling by timing the handover more correctly, and to increase the interaction length for the inquiries the chatbot may be able to handle (Feine et al., 2019). It's also there to make sure the citizen doesn't abandon the service and gets an option of getting the help they need from a human (chat employee) if needed (Corea, Delfmann, & Nagel, 2020). Studies show that many people don't trust the chatbot and aim directly for the chat employee, others don't know how to talk to the chatbot, or are writing unnecessary text. Feine et al. (2019) puts it like this;

*“Ignoring customer frustrations can strongly impede the performance of customer service encounters and carries the risks that the service chatbot is perceived as cold, socially indebt, untrustworthy, and incompetent. Therefore, service providers should identify service encounters that were below customer’s expectations and trigger service recovery procedures (e.g., offering compensation). Such procedures can help to recover from almost any service failure and increase trust, perception of fairness, and service experience.”*

It also is difficult to identify dissatisfied citizens in a text-based environment, since they only have a post-interaction survey, and few users complete the survey (Feine et al., 2019).

Figure 2 presented from Wintersberger et al. (2020) shows the stages from a chatbot getting an inquiry from a citizen to a possible solution, when a handover to a chat employee is needed. It is demonstrating a different area the handover process could be improved on (Wintersberger et al., 2020).

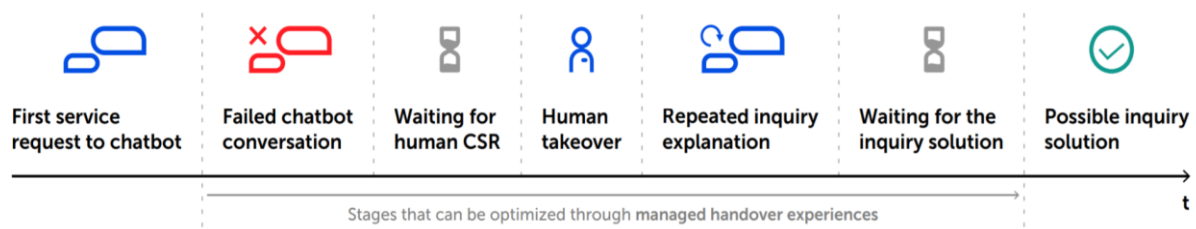


Figure 2 - Stages that can be optimized through managed handover experiences by Wintersberger et al. (2020).

## 1.2 Research motivation and objectives

This thesis focuses on the handover between a public service chatbot and chat employees. Specifically, we investigate the interaction between the chatbot Frida used by the Norwegian Labour and Welfare Administration (NAV) and the chat employees at NAV contact centre (NKS). This is an interesting topic for practice (public organisations aim to ensure services of good quality) but there is limited related research. We identified that there are few research publications on the topic by performing a literature review and this motivated us to work towards filling this gap. The findings in the literature review, show that handovers between chatbots and humans have only been in the focus for research in the past year, even though it has been common practice in companies that are using chatbots.

Literature shows the chatbot trend is on the rise (Adam et al., 2020; Berge, 2018; Chandel, Yuying, Yujie, Razaque, & Yang, 2019; Piccolo, Roberts, Iosif, & Alani, 2018). With the outbreak of the Covid-19 pandemic the use of chatbots has increased significantly, as physical, and social distancing in the public has been more important, to prevent spread of the virus. An organisation where the use of chatbot has been more relevant than before, is in public services NAV is providing, where their chatbot Frida has led to increased usage of their services with over 200% (Vassilakopoulou & Pappas, 2020). The chatbot has answered over 270.000 inquiries during March-May of 2020, where the citizens have been asking about a variety of questions regarding their situation during the Covid-19 pandemic (Ringes, 2020).

Chatbots tasks are currently primarily focused on simple tasks with relatively low complexity, where more complex tasks are handed over to chat employees (Waghmare, 2019). The problem occurs when the chatbot tries to solve a task that it is not designed to solve or if the chatbot has problems processing the text it receives. This often leads to a situation where the chatbot is stuck in a loop of repetitive questions until it realizes that it is unable to answer the question by itself (Vassilakopoulou & Pappas, 2020). While most of the inquiries are being handled completely by the chatbot, there are still some that are being handed over to a chat employee. For the chatbot Frida, 20% of inquiries have to be handed over to a chat employee (Vassilakopoulou & Pappas, 2020).

Based on the literature chatbots are here to stay, and they are helping companies tremendously. However, as long as chatbots struggle with the more complex inquiries, it is important to create good interaction, and to ensure that communication and collaboration

between chatbots and chat employees is good in order to maintain a good user experience (Corea et al., 2020).

There has been a great deal of focus on the relationship and interaction between the citizen and the chatbot in the literature (Androutsopoulou et al., 2019; Lee, Yamashita, & Huang, 2020; Nuruzzaman & Hussain, 2020). However, the relationship between chatbots and chat employees is rarely brought up in the literature. As stated by Vassilakopoulou and Pappas (2020): “*Prior research on chatbot interactions has focused mostly on the interaction between end users and chatbots and there is limited research on the interaction between live chat agents and chatbots.*”. Wintersberger et al. (2020), and Janssen et al. (2021) both agree that there is little research in this area, and that it's a highly important area in this field of research.

The concept of “affordances” is a theoretical concept, originating from the work of ecological physiologists. It is used to describe how objects in our environment can be perceived and used to trigger action possibilities. Within the field of information system research, this theoretical concept is particularly useful since it can help with exploring how innovative IT is used in combination with an organization's work practices. Specifically, in our study, the concept of affordances can help to investigate the relationship and interaction between chat employees, chatbots and citizens in the context of public service delivery.

The aim of this thesis is to improve our understanding of the handover between chatbots and chat employees by taking an affordances perspective. Specifically, we aim to understand the handover process in NAV, identify related affordances and provide improvement suggestions that can be useful for NAV and potentially other public service organizations that have introduced chatbots for service delivery.

### 1.3 Research questions

The research question is as follows:

How can the handover between public service chatbots and chat employees be improved?

Sub-questions:

- What are the perceived affordances of NAV’s chatbot Frida?
- How can we enhance the perception and actualization of Frida affordances that facilitate handovers?

### 1.4 Research approach

For this study, a qualitative case study was chosen as an approach to gain insights into the research questions proposed in section 1.3. Data has been collected through 14 semi-structured interviews and focus group interviews with the chat employees, chatbot trainers, employees with roles as coordinators, and management.

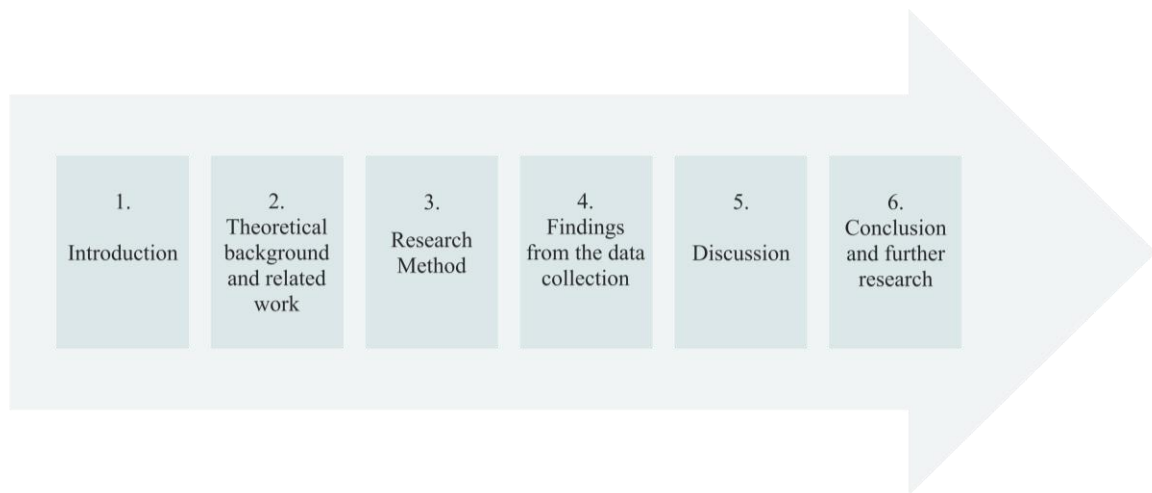
The research is set in the organization NAV and specifically the NKS where the chatbot is operating. In NKS, there are chat employees who are handling inquiries the chatbot is unable to answer. The locations of the NKS are spread out to different offices in Norway, so the

interviews were held with focus groups and with individuals, digitally through Microsoft Teams meetings.

Using semi-structured interviews, insight and clarification is gathered on how the handover function works and how it is perceived by the chat employees. Their insights help us build an understanding of what is perceived as affordances for the chat employees in NKS and give us insights into how actualisation and perception of affordances linked to the handover process can be enhanced, seen from the chat employee's perspective.

## 1.5 Thesis outline

The structure for the rest of the report is represented in figure 3. Each main section has their own sub-sections.



*Figure 3 - The thesis structure*

Section 2 (Theoretical background and related work) gives a background in the literature that fits our research problem. The section is to highlight the findings from the literature that we base this thesis on.

Section 3 (Research method) gives an overview of the research perspective and research design. It will show how the data collection was conducted, and how it was analysed. Ethical and limitations for the study are presented. The interview subject is introduced and given background information that is relevant for this thesis.

Section 4 (Findings from the data collection) presents the findings from the interview, which are categorized after the affordances found in section 2. The results give an insight of the affordances found at NKS, regarding Frida, handover process and chat employee.

Section 5 (Discussion) takes the findings from section 4 and uses the findings in the literature review to present recommendations NAV could take to improve the handover process, and make it more seamless, and improve the work experience for chat employees.

Section 6 (Conclusion and further research) shows the most interesting findings in the thesis and concludes what it means for NAV. Future research is presented which could prove useful for NAV to investigate.

## 2. Theoretical background and related work

The following section provides an overview of the theory used, as well as the literature review.

### 2.1 Theory of affordances

The concept of “affordance” originates from the work of Gibson (1977), which describes and argues how objects in our environment can be perceived, and how this information can be linked to action possibilities (Thapa & Sein, 2018). A chair can be used as an example to explain affordances, as it can be perceived as an action possibility for one person to sit down and can also be perceived as a place to hang clothes.

Although affordances originate from the works of ecological physiologists, it can be a useful theory for exploring how IT artefacts are being used in work practices in organizations. This is because affordances focuses on how actors interact with the environment (Wahid & Sæbø, 2015). As described by Gaver (1991): “*affordances are properties of the world that are compatible with and relevant for people’s interactions. When affordances are perceptible, they offer a direct link between perception and action*”. Gaver (1991) elaborates on this, pointing out that hidden and false affordances would lead to mistakes. With new innovative technology, he points out that they often feel functionally awkward, despite its technical aesthetic. On the other hand, new technologies designed with the current articulated needs may potentially limit the potential for new insights, since potential innovations may be overlooked (Gaver, 1991).

When exploring how IT can be implemented in innovative ways, affordance theory is frequently used in research on human-machine interaction (Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007). The theory of Affordances is a lens that has been helpful in order to better understand the relation between technology and human actors (Thapa & Sein, 2018). Gibson’s work was, as Thapa and Sein (2018) states, initially meant for objects and items in the natural environment and the action possibilities they provided, but as his ideas developed, the focus shifted from natural environments to artificial tools. The shift opens up the possibility of affordance theory being relevant and interesting for research within the field of information systems. Thapa and Sein (2018) cites Zammuto et al. (2007), and argue that; “*Several researchers maintain that affordances hold promise for a relational middle ground between technological determinism and social constructivism*” (Thapa & Sein, 2018). In this case affordance theory does not determine how technology will be used by people. Additionally, the limitations of the design and material means that there are not an unlimited set of potential uses for it.

The usage of affordance theory can be applied to many instances where the researchers aim to look at properties of technological artifacts and the effect within the context of an organisation. Stoeckli et al. (2020) applies this theory in order to include the material

properties of technological artifacts and their effect on social mechanisms in the organisation (Stoeckli et al., 2020).

The motivation for our usage of affordance theory is to address the research question proposed. This will be done by looking at how chatbot is being used in NAV, the affordances the chat employees perceive, and the effect on how usage of these affordances impact the handover process. The theoretical framework proposed by Pozzi, Pigni, and Vitari (2014) will be used as a basis for how the data will be analysed. This four-stage model presents the constructs of affordance existence, affordance perception, affordance actualization, and affordance effect, as a process. In this thesis, the main focus will be on the first three steps of this model (Cognition Process, recognition, and behaviour).

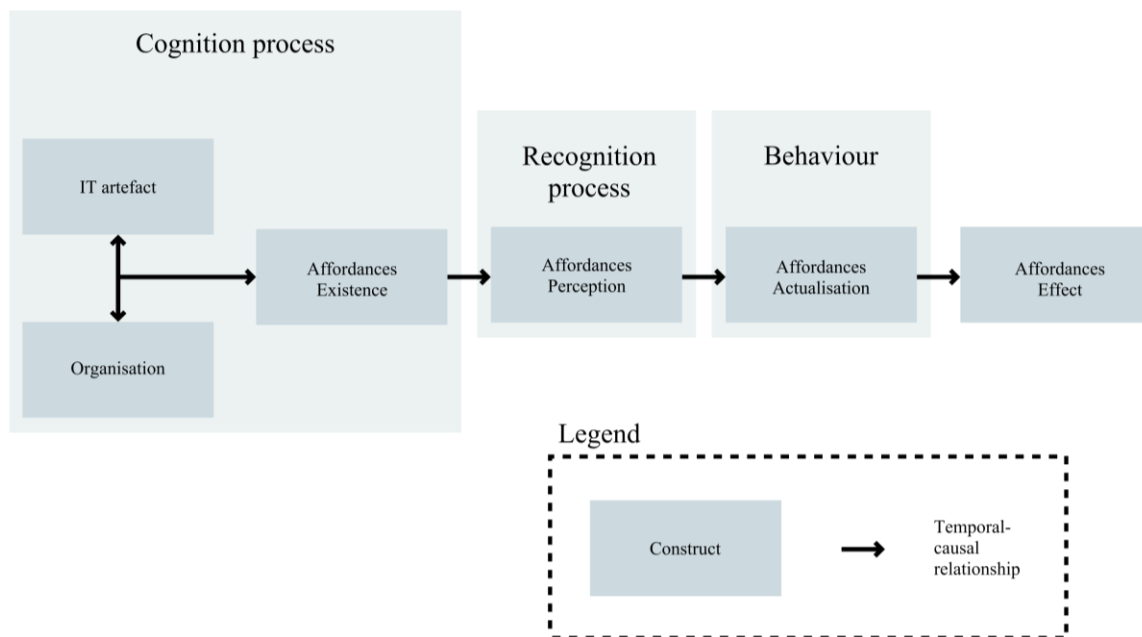


Figure 4 - Theoretical framework of affordances, proposed by Pozzi et al. (2014)



## 2.2 Literature review method

In this thesis we conducted a literature review based on the framework presented by Kitchenham (2004), and the model presented by Hustad, Sørheller, Jørgensen, and Vassilakopoulou (2019).

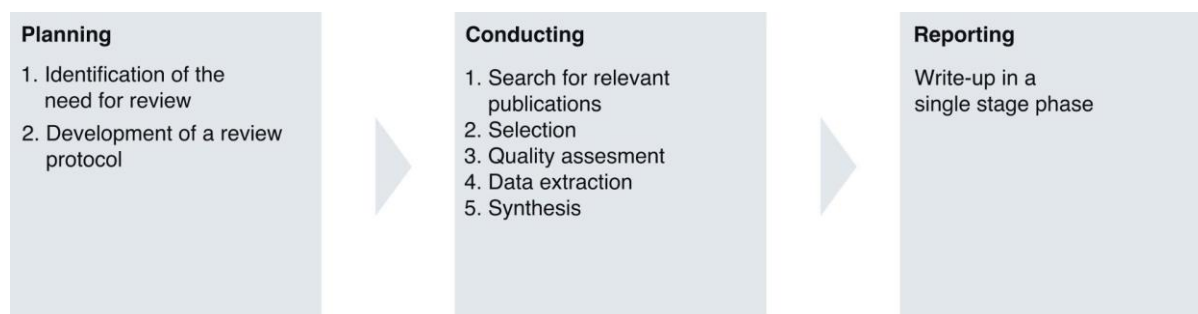


Figure 5 - Kitchenham (2004) framework and Hustad et al. (2019).

We implemented key principles offered by Webster and Watson (2002) for the article analysis. Following these principles, we identified key concepts and created a concept-centric matrix which provides an overview of the literature reviewed.

The search was conducted between 07.01.2021 - 05.03.2021. To identify and select research articles to be reviewed, we used the terms “The handover process”, “Chatbot AND handover”, “Human handover chatbot”, “Chatbot and handoff”, “Chatbot AND affordance”, “Conversational-agent AND affordance”, “Chat-agent AND affordance” to name some of them (All terms are found in appendix 8.1). We searched for these combinations in the abstract, title and keywords of published articles. Moreover, we performed backward and forward searches to review relevant citations. While the main search was performed in Scopus and Oria, we used Google Scholar to look for any papers that were not listed in the other two, and for the backward and forward searches. Inclusion and exclusion criteria were established to reduce selection bias, to guarantee the quality of the papers selected and to increase the validity of our review. Peer-reviewed, empirical papers, written in English, published in the last five years were included. Conceptual papers that lacked empirical evidence, reviews, papers that did not have an author, all duplicates, and papers not in English were excluded.

The initial search yielded 619 articles in total. The next step was to exclude the papers based on the exclusion criteria mentioned earlier, which resulted in 492 papers. The titles of the articles were checked for their relevance to the research question. After this step, 209 papers were shortlisted. The same for the abstracts, and after this step 145 were shortlisted. Finally, the full text of the shortlisted papers was assessed for relevance leading to 40 papers being included in the review. These 40 were used for the concept matrix. Appendix 8.2 provides an overview of the selection process and table 1 presents the list of articles included in the final review corpus.



Table 1 - Final article corpus.

#	References	#	References
1	(Androutsopoulou et al., 2019)	21	(Mahar & Bennett, 2019)
2	(Barnett et al., 2020)	22	(Wuenderlich & Paluch, 2017)
3	(Janssen et al., 2021)	23	(Magnusson & Rånnerud, 2019)
4	(Aoki, 2020)	24	(Petriv, Erlenheim, Tsap, Pappel, & Draheim, 2020)
5	(Følstad, Nordheim, & Bjørkli, 2018)	25	(Simonsen, Steinstø, Verne, & Bratteteig, 2020)
6	(Jin, 2019)	26	(Hu et al., 2018)
7	(Waghmare, 2019)	27	(Wintersberger et al., 2020)
8	(Valverde & Vasconcelos, 2019)	28	(Lee et al., 2020)
9	(Laban & Araujo, 2020)	29	(Corea et al., 2020)
10	(Feine et al., 2019)	30	(Følstad & Skjuve, 2019)
11	(Jiang, Wang, Chen, & Min, 2020)	31	(Hewitt & Beaver, 2020)
12	(Liu et al., 2020)	32	(Toader et al., 2020)
13	(Kvale et al., 2020)	33	(Stoekli et al., 2020)
14	(Ciechanowski, Przegalinska, Magnuski, & Gloor, 2019)	34	(Stoekli et al., 2018)
15	(Sangle-Ferriere & Voyer Benjamin, 2019)	35	(Waizenegger et al., 2020)
16	(Adam et al., 2020)	36	(Knote et al., 2021)
17	(Poser et al., 2021)	37	(Moussawi, 2018)
18	(Primetshofer, 2019)	38	(Lunberry & Liebenau, 2020)
19	(Zhou, Mark, Li, & Yang, 2019)	39	(Lippert, Gatewood, Cai, & Graesser, 2019)
20	(Nuruzzaman & Hussain, 2020)	40	(Meske, Amojó, & Thapa, 2020)

## 2.3 Concept matrix

The concepts matrix shown in table 2.

Table 2 - Concept Matrix.

	Terms used				Key concerns		Point of view		Communication means		Affordances								
	Handoff	Handover	Hybrid model	Service recovery	Trust	Frustration	Citizen/Customer	Employee	Text based chatbot	Voice based chatbot	Identifying context	Distilling information	Providing assistance	Supporting human-like conversation	Ensuring privacy	Providing facilitation	Enriching information	Providing personalisation	Fostering Familiarity
<b>Authors</b>																			
(Adam et al., 2020)					X		X		X										
(Androutsopoulou et al., 2019)					X		X		X	X									
(Aoki, 2020)					X		X		X										
(Barnett et al., 2020)			X		X	X		X	X	X			X						
(Ciechanowski et al., 2019)					X		X		X	X									
(Corea et al., 2020)	X						X	X	X										
(Feine et al., 2019)		X		X	X	X	X		X										

(Følstad et al., 2018)					X		X											
(Følstad & Skjuve, 2019)		X					X		X	X								
(Hewitt & Beaver, 2020)							X		X									
(Hu et al., 2018)						X	X		X									
(Janssen et al., 2021)	X																	
(Jiang et al., 2020)					X		X											
(Jin, 2019)							X		X									
(Knote et al., 2021)					X		X		X	X	X	X	X	X	X	X	X	
(Kvale et al., 2020)		X			X		X	X	X									
(Laban & Araujo, 2020)					X		X		X									
(Lee et al., 2020)					X		X		X									
(Lippert et al., 2019)							X		X				X					X
(Liu et al., 2020)	X						X		X									
(Lunberry & Liebenau, 2020)							X						X					
(Magnusson & Rånnerud, 2019)	X	X		X	X	X	X		X									
(Mahar & Bennett, 2019)	X					X		X	X									

(Meske et al., 2020)						X		X		X	X	X			X			
(Moussawi, 2018)					X	X			X			X	X				X	X
(Nuruzzaman & Hussain, 2020)						X		X										
(Petriv et al., 2020)					X		X											
(Poser et al., 2021)		X	X	X		X	X	X										
(Primetshofer, 2019)	X	X	X			X	X	X										
(Sangle-Ferriere & Voyer Benjamin, 2019)					X		X		X									
(Simonsen et al., 2020)					X		X		X									
(Stoeckli et al., 2018)							X	X		X	X	X		X				
(Stoeckli et al., 2020)					X			X	X	X	X	X	X	X	X	X		
(Toader et al., 2020)					X		X		X									
(Valverde & Vasconcelos, 2019)							X		X									
(Waghmare, 2019)	X						X		X									
(Waizenegger et al., 2020)						X		X	X	X		X	X	X			X	

(Wintersberger et al., 2020)		X				X	X											
(Wuenderlich & Paluch, 2017)					X	X	X		X	X								
(Zhou et al., 2019)					X		X		X									

## 2.4 Themes from the literature review

From the literature review, several interesting themes emerged; the different handover types, key concerns, point of view, communication means, and affordances. We will analyse each theme in the following sections.

### **The handover types**

From the 40 papers in the literature review, only 13 mention something about the different definition of the handover. Janssen et al. (2021), Waghmare (2019), Liu et al. (2020), Primetshofer (2019), Mahar and Bennett (2019), Magnusson and Rånnerud (2019), Corea et al. (2020), Feine et al. (2019), Kvale et al. (2020), Poser et al. (2021), Wintersberger et al. (2020), Følstad and Skjuve (2019), Barnett et al. (2020). These 13 articles explore the handoff, handover, hybrid model and service recovery. It's where the chatbot hands over the chat to a chat employee if the chatbot discovers it cannot help properly or the citizen has requested it. From these 13 papers, only Wintersberger et al. (2020), Poser et al. (2021), Liu et al. (2020) has the handover process as their main focus. All of them are looking on how to make the handover better and get a better understanding of it. Improving includes making it more seamless, and less frustrating for the citizen (Poser et al., 2021). This can be done by improving the waiting time (Wintersberger et al., 2020), and make the chatbot better understand/detect when it can't handle the question/inquiry in a satisfying way (Liu et al., 2020). Both Wintersberger et al. (2020), and Janssen et al. (2021) points out there is little research in this area, and it's a highly important area to research further.

### **Key concerns**

There is a significant volume of research on trust. This involves how chatbots affect users' trust in a company service. It explores how to improve trust and how to lessen it (Adam et al., 2020; Androutopoulou et al., 2019; Aoki, 2020; Barnett et al., 2020; Ciechanowski et al., 2019; Feine et al., 2019; Følstad et al., 2018; Jiang et al., 2020; Knotte et al., 2021; Kvale et al., 2020; Laban & Araujo, 2020; Lee et al., 2020; Magnusson & Rånnerud, 2019; Petriv et al., 2020; Sangle-Ferriere & Voyer Benjamin, 2019; Simonsen et al., 2020; Stoeckli et al., 2020; Toader et al., 2020; Wuenderlich & Paluch, 2017; Zhou et al., 2019), as well as lessen the frustration a citizen feel when interacting with a chatbot (Barnett et al., 2020; Feine et al., 2019; Hu et al., 2018; Magnusson & Rånnerud, 2019; Mahar & Bennett, 2019; Moussawi, 2018; Poser et al., 2021; Primetshofer, 2019; Waizenegger et al., 2020; Wintersberger et al., 2020; Wuenderlich & Paluch, 2017). This highlights the importance of trust, and decreases the frustration, but not only for the citizen. From the literature review, there is a lack of focus on the importance of making sure the employee's trust improves, and frustration is decreased.

### **Point of view and communication means**

These points of view are: 1) the customers' perspective, including a large variety of audiences, such as consumers, patients, and service seeking citizens (Adam et al., 2020; Androutopoulou et al., 2019; Aoki, 2020; Ciechanowski et al., 2019; Corea et al., 2020; Feine et al., 2019; Følstad et al., 2018; Følstad & Skjuve, 2019; Hewitt & Beaver, 2020; Hu

et al., 2018; Jin, 2019; Knotte et al., 2021; Kvale et al., 2020; Laban & Araujo, 2020; Lee et al., 2020; Lippert et al., 2019; Liu et al., 2020; Lunberry & Liebenau, 2020; Magnusson & R annerud, 2019; Meske et al., 2020; Moussawi, 2018; Nuruzzaman & Hussain, 2020; Petriv et al., 2020; Poser et al., 2021; Primetshofer, 2019; Sangle-Ferriere & Voyer Benjamin, 2019; Simonsen et al., 2020; Toader et al., 2020; Valverde & Vasconcelos, 2019; Waghmare, 2019; Wintersberger et al., 2020; Wuenderlich & Paluch, 2017; Zhou et al., 2019), and 2) the employee's perspective, including employees that seek interorganizational collaboration but also employees that simply aim to improve their efficiency in day-to-day tasks (Barnett et al., 2020; Corea et al., 2020; Kvale et al., 2020; Mahar & Bennett, 2019; Poser et al., 2021; Primetshofer, 2019; Stoeckli et al., 2020; Stoeckli et al., 2018; Waizenegger et al., 2020). These findings tell us that there is little focus on the effect a chatbot may have on an employee. Waizenegger et al. (2020) answers a call for more papers “to explore the effects of the actualisation of CA affordances on the customers and human employees.”. The call for paper came out in 2018 (Leidner, Gonzalez, & Koch, 2018), but our literature search shows there is still a lack of research in this area. Out of 619 papers found, 40 survived to phase 5, and only 9 of these talked from an employee perspective. Another thing is the small focus on the effect of a chatbot on a chat employee in customer service. We found that only Waizenegger et al. (2020), explored this from the perspective of a customer service/chat employee. This means little is known about what the effects really are. Furthermore, prior research covers both text and voice based chatbots. We would like to point out that text based chatbots is the most used type of chatbot, as voice based chatbots have too many faults at this point (Ciechanowski et al., 2019; Wuenderlich & Paluch, 2017).

## **Affordances**

Prior research has investigated the action possibilities provided by chatbots in different contexts. Across these different contexts, 91 different affordances have been identified and grouped in nine categories. The categorizations are based on the categories developed from the literature review by Mygland, Schibbye, Pappas, and Vassilakopoulou (2021).

### **Affordances related to Human-like Conversing**

Chatbots can provide action possibilities for the users with engaging in conversations, changing how they interact with software applications. Content with human-like messages can be created, allowing the users use natural language when they communicate with computers. Conversations with chatbots are progressively becoming smoother, as they can work out the intents of the users, follow the conversation context and come with follow-up questions in their answers. This is due to improvements in natural language processing and interpretation and the progress in conversational modelling are made. (Mygland et al., 2021). Table 3 provides an overview of the affordances related to humanlike conversing in the reviewed literature.

*Table 3 - Affordances related to Human-like Conversing (Mygland et al., 2021).*

<b>Related Affordances Identified in the Literature</b>	
Capture, Storage and Renderings of Voice Recordings	(Lunberry &

Mimicry of Human-like Conversation Methods	Liebenau, 2020)
Mimicry of Human-like Conversational Elements	
Presentation of Human-like Message Content	
Fostering team cohesion	(Stoeckli et al., 2020)
Enforcing discipline and compliance	
Socializing	(Waizenegger et al., 2020)
Mitigating boredom	
Simulating a human-like interaction	
Depending on the degree of anthropomorphism of virtual anthropomorphic advisors, they afford users to establish positive emotions (such as empathy) to increase users' satisfaction during and after value co-creation in a U-shaped manner	(Knote et al., 2021)
Through their anthropomorphic design, virtual anthropomorphic advisors help users overcome information disclosure barriers in value co-creation	
Hands-free and eyes-free use	(Moussawi, 2018)
Communication	(Lippert et al., 2019)

### **Affordances related to Assistance Provision**

Chatbots are often used in organisations to assist employees with their everyday work tasks, providing an interesting new set of action possibilities for users. Tasks such as setting and getting reminders and notifications, invoking software functionality, or accessing relevant information are examples such assistive tasks. These tasks are often regarded as mundane and repetitive by the users. Chatbots usually handle these tasks very well (Mygland et al., 2021). Table 4 provides an overview of the affordances related to assistance provision in the reviewed literature.



Table 4 - Affordances related to Assistance Provision (Mygland et al., 2021).

<b>Related Affordances Identified in the Literature</b>	
Receiving status notifications and updates	(Stoeckli et al., 2020)
Receiving real-time information	
Receiving metrics and key performance indicators	
Setting and getting reminders	
Setting and getting nudges/triggers to action	
Having messages processed and replaced	
Increasing visibility and ambient awareness	
Relieving employees from application switching	
Relieving employees from repetitive work	
Receiving status notifications and updates	
Receiving real-time information	
Receiving metrics and key performance indicators	
Getting reminded	
Getting nudges	
Getting a nudge to action and resolve it	
Invoking functionality	
Invoking functionality and making invocation visible	
Instantaneous solving of fact-based questions	(Waizenegger et al., 2020)
Executing tasks	
Help-seeking for personal issues	
Relief from mundane tasks	
Self-servicing	
Different affordances according to their unique combinations of mate-	(Knote et al., 2021)

rial properties that influence value co-creation in smart services.	
Afford users to spend more cognitive load on the actual value-creating task rather than on interacting with the system.	
Afford users to identify the technical object as an expert in a certain domain.	
Speedy assistance	(Moussawi, 2018)
Usefulness	
Access relevant information	(Meske et al., 2020)
Engage with application	
Minimising human error and maximising expertise	(Barnett et al., 2020)

### **Affordances related to Facilitation**

Chatbots can provide action possibilities to users for supplicating with functionality and querying information from multiple third-party systems within their own system, offering external integration. Through facilitation, chatbots can reduce the effort required for various tasks (Mygland et al., 2021). Table 5 provides an overview of the affordances related to facilitation in the reviewed literature.

*Table 5 - Affordances related to Facilitation (Mygland et al., 2021).*

<b>Related Affordances Identified in the Literature</b>	
Capturing data in third party systems	(Stoeckli et al., 2020)
Querying information from third-party systems	
Invoking functions from third-party systems and make this invocation visible	
Unifying access to third-party systems	
Building rapid prototypes	
General activity assistants afford smart service stakeholders to co-create value through external integration, and, thus, shape affordances accordingly in a reciprocal and dynamic manner.	(Knote et al., 2021)
Contact relevant institutions	(Meske et al., 2020)

### Affordances related to Distilling Information

Chatbots can provide action possibilities for users related to distilling information. This can be collection and aggregation of information, making large amounts of information understandable for users (Mygland et al., 2021). As also stated by Mygland et al. (2021); “They can even help users reflect on the information they provide for their own mood or mental state”. Table 6 provides an overview of the affordances related to distilling information in the literature reviewed.

Table 6 - Affordances related to distilling information (Mygland et al., 2021).

Related Affordances Identified in the Literature	
Receiving aggregated information	(Stoeckli et al., 2018)
Ensuring information flow through uncoupling	(Stoeckli et al., 2020)
Receiving aggregated information	
Afford users to effectively access and better understand large amounts of potentially consecutive information necessary for information-intensive value co-creation in a particular domain of interest.	(Knote et al., 2021)
Reflect own mood/mental state	(Meske et al., 2020)

### Affordances related to Enriching Information

Chatbots can enrich the information provided visual elements or with additional text, accelerating communication. Enriching information with the help of artificial intelligence make chatbots more useful as assistants in everyday tasks (Mygland et al., 2021). Table 7 provides an overview of the affordances related to assistance provision in the literature reviewed.

Table 7 - Affordances related to enriching information (Mygland et al., 2021).

Related Affordances Identified in the Literature	
Having messages processed and enriched with additional information	(Stoeckli et al., 2020)
Having messages processed and visually enriched with user interface elements	
Voice facilitators afford the facility to complement or replace interaction modes other than voice in value co-creation with respect to specific user needs.	(Knote et al., 2021)

Voice facilitators afford the facility to complement other smart services through external integration that enable/shape new value co-creation possibilities.	
General activity assistants rely on continuous adaptation in affordance actualization processes through crowd data integration to improve value co-creation.	

### **Affordances related to Context Identification**

Chatbot can identify problem-specific information, based on the information given by the user, and provide context to the related information, feedback, and orient ongoing conversation for users (Mygland et al., 2021). Related affordances are presented in table 8.

*Table 8 - Affordances related to context identification (Mygland et al., 2021).*

<b>Related Affordances Identified in the Literature</b>	
Consolidating information flow	(Stoeckli et al., 2020)
Facilitating feedback as reaction and discussions	
Separating organizational units	
Capturing data	(Stoeckli et al., 2018)
Querying information	
Having messages processed and replaced	
Afford users to explore a wide range of value co-creation possibilities for different purposes within their ecosystem.	(Knote et al., 2021)
Identify problem specific information	(Meske et al., 2020)
Access to other affordances	
Identify relevant institutions	
Identify others with similar problems	
Identify others with specific information	

### Affordances related to Personalization

Chatbots are able to adapt to the user’s interaction. Providing a more tailored response, adjusting their tone and style to the users, making the chatbot more appealing for the user. The personalisation is improving over time, as the chatbot learns from the interaction with the user constantly (Mygland et al., 2021). Related affordances found in the reviewed papers are presented in table 9.

Table 9 - Affordances related to personalization (Mygland et al., 2021).

Related Affordances Identified in the Literature	
Personal assistance	(Waizenegger et al., 2020)
SPAs provide different affordances for specified users or user groups, which in turn influences value co-creation in smart services.	(Knote et al., 2021)
Personalization and learning from interactions	(Moussawi, 2018)
Interactivity	(Lippert et al., 2019)
Adaptivity	
Feedback	
Choice	
Nonlinear access	
Linked representations	
Open-ended learner input	

### Affordances related to Fostering Familiarity

Little prior experience is needed to use a chatbot, as it is a technology most users are familiar with chat applications. Chatbots allow the users to express their needs directly through a familiar interaction mode, which the users are increasingly familiarized with. If the expectations are not fulfilled, the users may express disappointment and dissatisfaction with the service (Mygland et al., 2021). Related affordances found in the papers reviewed are presented in table 10.

Table 10 - Affordances related to fostering familiarity (Mygland et al., 2021).

Related Affordances Identified in the Literature	
Emerging Tensions: Satisfaction and Disappointment	(Moussawi, 2018)
Emotional connection	

Familiarity and Potential Improvement	
---------------------------------------	--

### Affordances related to Ensuring Privacy

Chatbots makes use of privacy preserving approaches, which they may also act as a gatekeeper for access to different functions. Sometimes it may be necessary in a chat to disclose key information about users. This makes it important to ensure privacy in the conversation (Mygland et al., 2021). Related affordances found in the reviewed papers are presented in table 11.

*Table 11 - Affordances related to ensuring privacy (Mygland et al., 2021).*

<b>Related Affordances Identified in the Literature</b>	
Adding gatekeepers that validate access to function of third-party systems	(Stoeckli et al., 2020)
Adding gatekeeper	(Stoeckli et al., 2018)
Leveraging anonymity	(Waizenegger et al., 2020)
If the user is aware that the data-driven active observer collects context and usage data, information disclosure barriers (such as privacy and trust concerns) will negatively influence value co-creation in smart services	(Knote et al., 2021)

## 2.6 Literature Findings and Needs for Further Empirical Research

To sum it up, we found that there is minimal research about the handover process between chatbot and chat employees, but there have been some in the past few years. There is a significant focus on raising trust and leveraging frustration among customers/citizens. There is great research interest on customer/citizen perspectives on chatbots, but little research is done when it comes to the chat employee's perspectives, especially in customer service. Further we found 91 different chatbot affordances from the literature related to different contexts and grouped them in 9 groups. The affordances identified can be used as a lens for investigating chat employees' perspectives. The affordances 'lens can help in moving beyond the mere technical features of chatbots towards better understanding the actual use of technology in context.

## 3. Research Method

This section describes the research method for this thesis and explains the reasoning behind the choices that have been made. Initially the research method for the study will be presented, and the research setting the study is put in. Further it will describe how data has been gathered and analysed, the fairness and authenticity of the findings, ethical considerations, and challenges and limitations.

### 3.1 Qualitative case study

For our thesis we followed a qualitative case study approach. A case study can be characterised the following way (Oates, 2006):

- Focus on depth.
- Examined in a natural setting.
- Focus on the complexity of relationships, processes and how they are related and connected.
- A wide range of data sources can be used, and can come from many informants, obtaining many perceptions about phenomena.

Case studies can also be divided into three types: exploratory studies, descriptive studies, and explanatory studies. The exploratory type of case study is used for defining questions and hypotheses for a potential new study. The descriptive case study will lead to a rich and detailed analysis of a phenomenon in a given context, while the explanatory study aims on trying to explain why certain events happen as they do or why certain outcomes occur (Oates, 2006). For this thesis, a descriptive type of approach is the most suitable, since it can provide the researcher with a rich and detailed analysis of a phenomenon in its context.

In terms of approach to time, case studies can also vary. In the case study for this thesis, the most suited variation is a short-term, contemporary study, since it examines and tries to explain what is occurring at the present moment.

The method for data gathering in this study is through semi-structured interviews and semi-structured focus group interviews. As Clifford, Cope, Gillespie, and French (2016, p. 143) says; *“semi- structured interviews unfold in a conversational manner offering participants the chance to explore issues they feel are important”*. Having this middle ground between structured and unstructured interviews is beneficial for our study since it provides us with an opportunity to discover new topics and findings we might have overseen. Based on the literature review on chatbots and the literature review on articles on chatbots with a theoretical lens of affordance, we can provide a good starting point for a discussion.

The paradigm that we find this study characterizes most with is the interpretivist paradigm. Walsham (2006, p. 9) share a quote in his article on the interpretive view which give a good summary of this view; *“What we call our data are really our own constructions of other people’s constructions of what they and their compatriots are up to.”*. With the research question, the aim is to find out more about factors that affect the handover process. It is important to note that even if we find factors that improve the experience of the process in NAV and with the chatbot Frida, this does not necessarily mean that this is the case for all

chatbots in all companies and organizations, nor does it necessarily mean it is an improvement for every chat employee in the process of handover. The people interviewed may have their own perception and interpretation of the handover process and affordances perceived and actualised may also differ. In that sense, the qualitative method described is mostly within the interpretivist paradigm.

### 3.2 Research setting

The study is performed in NAV, which is organized into three main lines of service: Work and service line, benefits line, and the economics line (NAV, 2013). The chatbot Frida belongs primarily in NKS, which falls under the line of work and service in NAV (NAV, 2013). People working in the NKS is the group where data is gathered for the research. The participants for the interviews are primarily from three groups within NKS. Chat employees working with handling inquiries on chat is one of the groups. Since all the inquiries on chat first must go through Frida at this point of time, their main task is to take over inquiries handed over by Frida. Since Frida was introduced into NKS in relatively recent time, many of the chat employees have also been supervisors on one or more of the other channels for communication, like phone, and e-mail. The second group of participants for the interviews are the chatbot trainers, who are tasked with training the chatbot. The chatbot trainers also have a background in supervising and have background in answering inquiries at NKS. The final group of participants for the interviews are people from the management of NKS.

This study is part of a cooperation project between UiA, UiO, and NTNU, called Frida@work. The aim of this project is to gain insights on how Frida can become a more reliable and efficient part of NAV's service delivery. The focus for this study is the NAV, which is responsible for managing the services and benefits on behalf of the welfare state (Simonsen et al., 2020). There are around 60 benefits and services, like retirement pensions, unemployment allowance, healthcare service, child benefits, etc. The citizen meets NAV through their 456 local offices, contact centers, or their digital services (Simonsen et al., 2020). NKS is responsible for inquiries on telephone, chat, and social media. Around 4.500.000 of the inquiries are from telephones, and around 140.000 from chat and Facebook inquiries in 2019 (Simonsen et al., 2020).

The chatbot we are looking into at NAV, is the chatbot Frida. Frida was launched in the fall 2018. As Simonsen et al. (2020) notes in their study:

*“Anna [Frida] went public in the fall of 2018 and answered chats from approximately 400 users each day in the beginning of 2019. 40% of the users got an answer in this first encounter, 40% were transferred to chat with a human advisor, and 20% went to another channel (e.g., telephone) to communicate with LWA. Anna is not expected to respond to very complicated questions, as neither the technology nor the users are considered “good enough” yet.”*



In 2019, the success rate of Frida's handling of inquiries was 40%. The remaining 60% of inquiries were either handed over to a chat employee or supervisor on one of the other channels in NKS. During the outburst of Covid-19 cases in 2020, Frida answered 270.000 inquiries, equivalent to the capacity of 220 chat employees (Ringes, 2020). Only 20% were asking to be transferred to a chat employee, and as the article points out, the NKS only got one service complaint. This was related to one citizen which did not realise they were talking to a chatbot, which they meant was little empathic (Ringes, 2020). The chatbot trainers at the NKS are daily working on training the chatbot Frida on how it should answer a question regarding the different benefits and services. In total there are six trainers, two in Bergen, two in Trondheim, and two Leikanger, where each of them has their own designated field of area they train the chatbot in (Ringes, 2020).

The chatbot has its own database the trainer puts their answers in, where it is trained (Ringes, 2020). Since Frida is equipped with ML, she learns the more citizens ask her questions. The ML analyses the question from the citizen to see if she recognizes what they are actually asking after (Simonsen et al., 2020).

NKS is in control over their own front-end, but the back-end related to Frida is using the software from Salesforce, and Boost.AI. Where Salesforce is the CRM system (Salesforce, 2021), and Boost.AI gives the tools to train Frida, and automate her services: "*Virtual agents powered by AI and trained by humans*" (Boost.Ai, 2021).

The chatbot is given the human name of Frida, and a human-like face, hair, clothes, and a "name tag" bearing resemblance of an employee working in NAV.



Figure 6 - Picture of Frida as presented on nav.no.

### 3.3 Data Gathering

Data was gathered through semi-structured interviews with chat employees from NAV. The goal for this was to gather as much information about the handover process from the view of chat employees in NKS. Data for this study has been gathered through semi-structured interviews with focus groups and individuals over Microsoft Teams-meetings with employees from various departments and positions in NAV. Some focus groups consist of employees with different positions, while some of the focus group interviews have participants with employees with the same position. Each interview has been recorded, and then transcribed in a word document stored in a private Microsoft Teams-group with our UiA-accounts.

The first interviews took place in November 2020 and mid-January 2021. The interview in November 2020 was initially part of a feasibility study and was included as the aim for the study was the same as in this thesis. The first interview was a good way to find what questions needed adjustments for further data gathering. In January 2021 there were three main activities in regard to data gathering. Two workshops were set up for us where we conducted two focus group interviews, but with a duration of approximately one hour with chat employees, chatbot trainers, and coordinating and management roles in NKS. These interviews were specifically aimed towards the chat employees and chatbot trainers and their perception and thoughts on the handover process. The following month was focused on working on the theoretical background and literature study. In March and April 2021, the remaining data was gathered. The chatbot trainers and chat employees were interviewed in focus groups and the coordinators and employees with management roles were interviewed in semi-structured interviews. The interviews in March and April 2021 varied in length from approximately 20 minutes to one hour. This was mostly since some of the employees had tight schedules. For these interviews, the order of questions in the interview guide was prioritised, so the most important questions were asked first. The order in the interview guide seen in appendix section 8.6, is therefore not necessarily the order used for all the interviews. After each interview, the audio files were transcribed and translated into a word-document on a closed Teams-group on Microsoft Teams for the Frida project, ensuring that the data was stored securely and only available to the people working on the project.

To organize the large amounts of data gathered, an additional document was created to sort findings and quotes from different transcriptions into categories identified and findings from each question asked in the interviews.

Table 12 shows an overview of the date, duration, participants, type of interview and role in NKS. IS1-IS20 (interview subject), IV1-IV3 (supervisors from UiA), IV2-IV4 (interviewers from UiA), VN (supervisors for NTNU), IVN1-IVN2 (interviewer from NTNU), VO (supervisor from UiO), IVO1-IVO2 (Interviewer from UiO).

Table 12 - Overview of interviews, duration, form, and participants.

Date of interview	Duration	Participants	Type of interview	Role in NKS
12.11.2020	1 hour	IS1, IS2, IV2, IV4	Focus group interview	Chat employees
08.01.2021	1 hour, 2 minutes	IS2/IS5, IS3, IS4, IV1, IV2, VN	Workshop (focus group interview)	Chat employees, Chatbot trainers, Management/coordinator
08.01.2021	1 hour, 3 minutes	IS1/IS6, IS7, IS8, IV3, IV4	Workshop (focus group interview)	Chat employees, Chatbot trainers, Management/coordinator
14.01.2021	55 minutes	IS9, IS10, IV1, IV2, IV4, VN, IVN1, IVN2	Focus group interview	Management/coordinator
17.02.2021	38 minutes	IS7, IS4, IS10, IV2, IVN2, IVO1, VN, VO	Focus group interview	Chatbot trainers, Management/coordinator
09.03.2021	47 minutes	IS11, IS12, IS13, IS14, IV2, IV4	Focus group interview	Chat employees, Chatbot trainers
14.04.2021	59 minutes	IS15, IV2, IVN2, IVO1	Semi-structured interview	Management/coordinator
15.04.2021	58 minutes	IS4, IS12, IV2, IVN2, IOV2	Focus group interview	Chatbot trainers
16.04.2021	53 minutes	IS14, IS16, IV2, IVN1, IOV1	Focus group interview	Chatbot trainers
16.04.2021	34 minutes	IS7, IS17, IV2, IVN1, IOV1	Focus group interview	Chatbot trainers
20.04.2021	23 minutes	IS18, IV2, IVN2, IOV1	Semi-structured interview	Management/coordinator
21.04.2021	18 minutes	IS19, IV2, IVN1, IOV2	Semi-structured interview	Management/coordinator
28.04.2021	20 minutes	IS9, IV2, IVN2, IOV1	Semi-structured interview	Management/coordinator
29.04.2021	17 minutes	IS20, IV4, IVN1, IOV2	Semi-structured interview	Management/coordinator

Total participants were: 28 persons.

### 3.4 Data analysis

For a qualitative study, the data analysis should have an open-minded approach. When researching and analysing data it is important to have a clear idea about the concepts that are relevant, and will help categorize the data (Oates, 2006, p. 275).

When analysing the data from the interviews, we followed an inductive approach, giving the chance to discover themes that could have been overlooked in the search in previous literature. The literature study was helpful to categorise the findings based on previous work, but as stated previously, there has been little research on the topic of the handover process between chatbots and chat employees, especially with the use of affordances theory. That means that it could still be possible to find additional categories outside of those identified in previous literature. Many of the findings are still categorised in one of the categories identified from the literature study. In some of the findings, we may see that the description of the affordance category somewhat differs from what the findings indicate. For these findings that do not directly fall into one category, we've made sure to explicitly state how they differ from the category description and if necessary, put them in a separate category.

The data was analysed following the data analysis process as described by (Oates, 2006, p. 268). The process of transcribing the interview can be particularly helpful in order to start the data analysis process of getting an overall impression and general understanding of the findings (Oates, 2006, p. 269). After the transcription of the interview, the next phase is to identify and categorize the data into themes. Even though this study is following an inductive approach where it could have been useful to use "Grounded theory" as an approach, we cannot claim that we do this, mainly because the categories used for the findings do not strictly come from the empirical data but is also inspired and based on affordances found in articles from literature. The thematic analysis will not commit completely these categories, and it will be as open minded as possible.

Figure 7 below presents the process from recording to categorisation of analysed findings. Mentioned in section 3.3, interviews were first transcribed from the recordings from the Microsoft Teams meeting arranged after they were finished. Since most of the interviews were in Norwegian, the next step was to translate and read through the translated transcription, ensuring that no critical information was lost in the process. Non-textual data such as tone of voice in responses has been considered to some degree, however this is not always easy and can also be hard to identify since data was gathered through virtual Microsoft Teams-meetings. To organise the large amount of data and to start the analysis process, the findings were further organised into categories based on what was asked, making the next process of categorising easier.

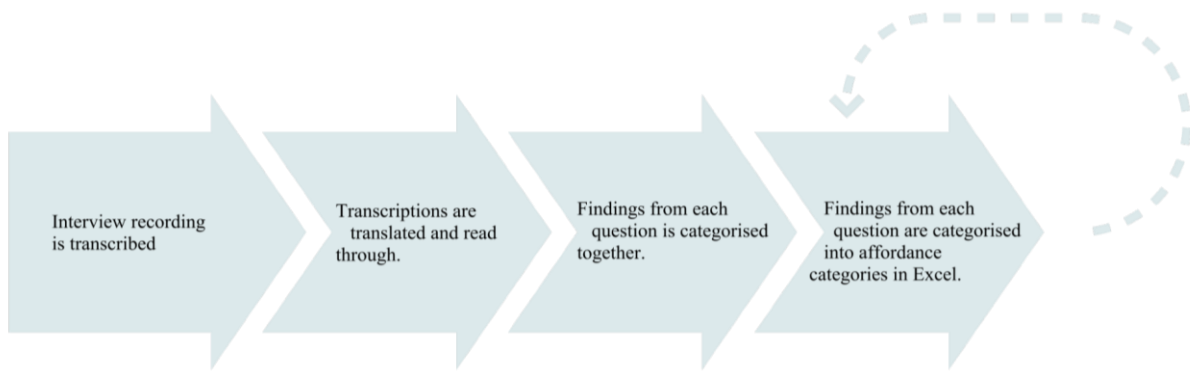


Figure 7 - A visual representation of the data analysis process. The final stage of the process was iterated several times.

The literature study conducted for this thesis, several affordances were identified, which helped form how the findings should be categorised. With the affordance's theory, the findings and themes were sorted into a table, categorized into the affordances identified, and presented with quotes from the transcribed interview. For all findings in each affordance category, a thematic analysis was conducted and was placed in segments based on its relevance to the research questions.

The thematic analysis followed the process Oates (2006) describes for inductive approaches for thematic analysis (Oates, 2006, p. 269). This process starts by categorising based on categories observed in the data by the respondents, which in our case were quotes from the transcribed interviews. We first started with categorising data based on categories observed in the data. Three main categories emerged in the first iteration: Back-end technology in Frida, Front-end technology in Frida, and Processes in NAV. Many of the respondents talked about positive and negative experiences, which is why we also used this as a way of categorising. Next stage in the process is to refine the categories. The three categories we found were too large and broad to use and were therefore broken down into smaller sub-categories based on more specific themes used by the respondents. For the thematic analysis, we found sub-categories for each main category. The figure below shows each category from this process with its own sub-categories.

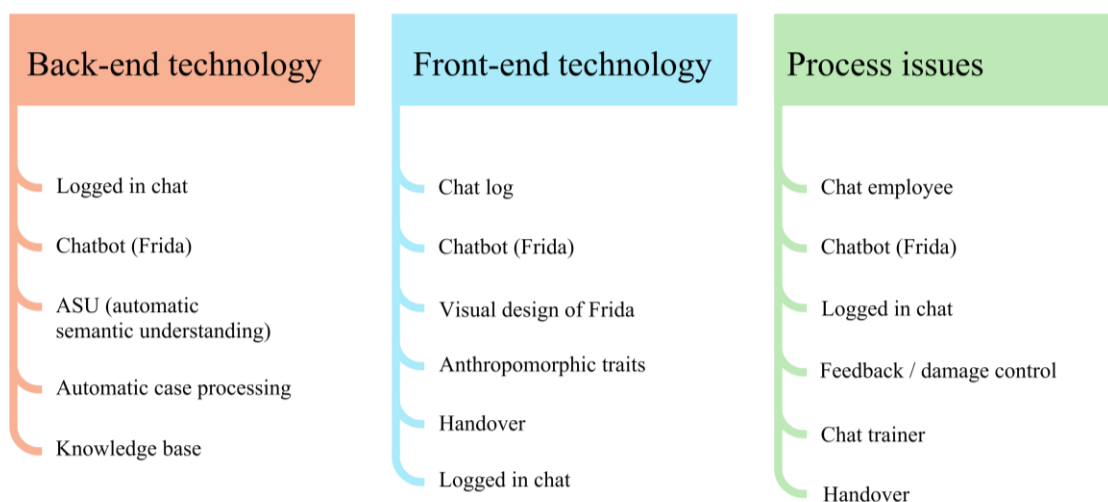


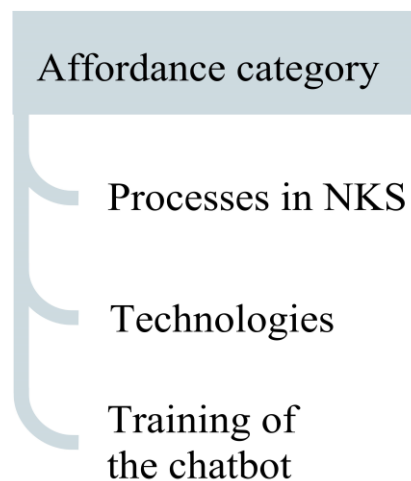
Figure 8 - First iteration of themes and sub-categories

For organising the categorisation, an excel document was used with quotes (with a small summary of what the quote said) was placed in each main category, then each quote was set in a specific colour, based on which sub-category it was placed in.

After this iteration, we further developed the analysis by identifying themes related to specific affordances, moving us forward into the next stage Oates (2006) mention, were we look for themes and inter-connections between categories.

When analysing the findings from the affordance categories, the thematical analysis took inspiration by categories from the theoretical framework by Pozzi et al. (2014), as mentioned in section 2.1, focusing on perceived affordances, and actualisation of affordances by citizens and chat employees/chatbot trainers under each sub-category seen in figure 9. This made it possible to better see connections between the categories. Important to mention is that this way of analysing did not mean that we compared perceived affordances between chat employees and citizens, but rather to see connections between the categories of affordances and sub-categories.

After refining the themes from the data, the findings were finally categorised into three categories: Processes in NKS, technologies, and training of the chatbot.



*Figure 9 - Structure of the categorisation of findings from the thematic analysis.*

### 3.5 Fairness and authenticity

The fairness and authenticity for the study were assessed using the insights by Oates. Specifically, Oates (2006) refers to Guba (1989) and presents a set of criteria for judging the quality of critical research for interpretivism. The set of criteria are based on ideas of ‘fairness’ and ‘authenticity’ (Oates, 2006, p. 298). The criteria’s are the following (Oates, 2006, p. 298):

**Fairness:** Did all the stakeholders in the research have equal access to the inquiry process, the choice of questions, the responses and their interpretation? In the project Frida@work, a shared Microsoft Teams-group was formed to create a platform for communication and sharing of gathered data among the stakeholders in the project.

**Ontological authenticity:** To what extent did the research enable the informants to enlarge their personal views of their worlds? Focus groups have been the chosen method, which may enable informants to provide us more insights by sparring with other informants. However, this can be a double-edged sword in the sense of bringing ontological authenticity, as this may also limit some informants who do not necessarily take the word in all situations. As a response we have tried our best in the interviews with the focus groups to ask for inputs from all informants we want information from.

**Educational authenticity:** To what extent did the research enable the informants to improve their understanding and appreciation of the constructions of others? To meet this criteria, the choice of method for qualitative data gathering fell naturally on focus groups, since this is a good way to bring in different informants to come with their understanding of constructs to each other.

**Catalytic authenticity:** To what extent did the research stimulate the informants into action or decision-making? Guba (1989) mention three techniques to ensuring that this criteria is being met: Testimony of participants from all stakeholder groups should be available, their interest in acting on the evaluation, and their willingness to become involved.

**Tactical authenticity:** To what extent did the research empower the informants to take action? There are three ways we can ensure tactical authenticity: Testimony of each participant is solicited, follow-up to determine who participates and to find out in which way they participate. The final way is to evaluate and see whether or not the process was participatory, and if all the participants feel they’ve had a significant role in the process (Guba, 1989).

### 3.6 Ethical issues

Two ethical issues that come to mind are “Behave with integrity”, and “Follow appropriate professional code of conduct”.

- Behave with integrity: which means how the data is secured, handled, and how it will be used (Oates, 2006, pp. 60-61).
- Follow appropriate professional code of conduct: As Oates (2006, pp. 60-61) writes in his book “*These codes capture the professions commitments and responsibility, to help members make ethical decisions*”.

A breach of these ethics may happen during the project. We will secure, handle, and use the data as it should, but mistakes may happen. As for handling the data, it is important we do the necessary research on the codes to make sure we don't breach any ethical codes during this project. To ensure that data from the interviews are kept safe, we store this information on Microsoft Teams group in our respective university, UiA, which means that GDPR-restrictions from our university are the ones used.

Other ethical issues may be that the chat employee may want to retract their statements/answers which may damage the outcome of the report, but something we must comply with, because it is their right to withdraw from the research at any time.

The project and thesis are approved by NSD, and the team needs to follow the relevant regulations. During the interviews the interviewees got a consent form (see appendix 8.3). This form provided information regarding the aim of the project, who is responsible, why they are asked to participate, what it means for them to participate, its voluntary (can withdraw their answer from the study at any time, all personal information will be deleted etc.), privacy, what happens to your data after the project, and your rights.

### 3.7 Limitations of this study

The information gathered for this thesis is from chat employees, chatbot trainers and management from the NKS, which means that the view on the handover process from the citizens point of view is presented through the eyes of these people. This is to focus on how the process may be more seamless for the chat employees, but in some situations, the view of the citizens themselves may be important to investigate possible solutions, or in terms of issues regarding expectations to a chatbot.

Frida is also a chatbot in a public organisation in Norway, designed to handle a vast variety of inquiries on the various services they provide, and may therefore not be comparable with chatbots used in for instance a private company that have different goals, and different customer segments. We have seen chatbots being used for a variety of different tasks, such as purely for use internally in a company, some for counselling, business to business, personal assistance for personal use, and as a tutor. This thesis will therefore be limited to chatbots in similar organisations such as the public sector, dealing with similar tasks and complexity.



## 4. Findings from the data collection

In this section the findings from the data collection are presented (see table 12 for overview of the interview subjects). In total, there are 13 interviews; five semi-structured interviews and eight focus group interviews conducted digitally over Microsoft Teams. The names of the interview subjects are anonymous and will therefore be referred to as IS1 - IS20.

To recap; the research question is:

How can the handover between public service chatbots and chat employees be improved?

Sub-questions:

- What are the perceived affordances of NAV's chatbot Frida?
- How can we enhance the perception and actualization of Frida affordances that facilitate handovers?

The following subsections are divided between the different affordances found in the literature review. In each of the following subsections, the affordances mentioned earlier will be described in more detail. It will then be explained why this affordance is important for the work of the chat employee and the handover process. Lastly, a short analysis of our findings, and what implications they have for NAV. The same topic/improvements may be seen in different affordances, as they can be categorized in multiple ways.

### 4.1 Findings related to Human-like Conversing affordance

The human-like Conversing is defined as stated in section 2.4: Chatbots can provide action possibilities for the users with engaging in conversations, changing how they interact with software applications. Content with human-like messages can be created, allowing the users use natural language when they communicate with computers. Conversations with chatbots are progressively becoming smoother, as they can work out the intents of the users, follow the conversation context and come with follow-up questions in their answers. This is due to improvements in natural language processing and interpretation and the progress in conversational modelling are made (Mygland et al., 2021).

The human-like conversing affordance is important because Frida provides the citizens with action possibilities for engaging in conversations. This affects the handover process because the citizen is given the possibility to interact with Frida and can freely choose if they want to initiate a handover or complete their inquiry with the help from Frida. With the help of Frida, less of the general, easily resolved questions will reach the chat employee, freeing time, and resources to focus on more complex tasks. Frida has gotten different improvements to handle these general inquiries. One of the functions/systems she has is called a "Action trigger".

*"If Frida wants to print out the exact same answer over again, say that you ask for "When will I get my parental benefit?". And she gives you that answer, and then maybe you try to rephrase yourself. ("But when will I get my parental benefit?") To get a more specific answer, she will try to give the same answer. But then because she has already give that answer, we have another answer that will say something like ("*

*I think i have given you the only answer i have to this, it might be better to rephrase, or talk to a human?”) (IS7).*

This helps Frida not repeat the same answer repeatedly but gives the citizen alternative answers. If Frida still doesn't understand it, she offers the citizen to be handed over to a chat employee. Unless it's after closing time. A similar function is when a citizen tries to ask the same question twice, called a “twice replay action”.

*“If you ask the same question two times in a row then you have the same action twice- Reply that kicks in like IS5 says and that reply contains the offer to talk to human. We had also had the same option if you ask Frida something that she doesn't understand. What we call the unknown question...” (IS3).*

The “twice replay action” is there to help the citizens so they are not stuck, and just loop around in the chat without getting anywhere. This affords the citizens to have multiple “action possibilities” to get the help they need. The result is that citizens get to chat with a chat employee, rather than just giving up on the service. Frida has an “IF” statement, and Frida gives the citizen three choices they need to go through to talk to a chat employee, which also affords citizens with “action possibilities”. To initiate the “IF” statement, the citizens need to start the handover process. The handover process can be initiated in several different ways depending on where the citizens start, what time of day it is, and where they need to be transferred to in order to get the answer they need. Frida is a service that is live 24/7, however this is not the case for chat employees who work at NAV.

*“In the past it was the case that if you asked to talk to a person you had to choose that answer, and you got "Sorry it is closed". Now we have a kind of variable, an IF statement that reads the opening hours of the chat. To provide an answer based on whether it is open or closed. So it will be a smoother experience for the users. If you have first clicked through four steps, first selected private person, and selected family, then you get “No, it is closed. We open tomorrow at 9”. So we have probably given people a much better experience of the dialogue with Frida.” (IS4).*

When a citizen comes with an inquiry and is being transferred in the working hours for chat employees, NAV has also provided functionality that makes the process as smooth as possible. Before being put into a queue to a chat employee, citizens go through three questions about their inquiry they must answer, this also to further improve the smoothness and pace of transferring citizens to chat employees.

*“They must first choose whether they are a private person or an employer or something else. Then they have to choose within which topic they want to chat. Whether it is work related, or family etc. So when they have made the choices. Then they are automatically pushed into the queue, if there is no queue, they arrive at a chat employee if there is a vacant chat employee.” (IS4).*

With the “IF” statements and the three choices to be transferred to a chat employee, the citizens are afforded a human-like conversing with the chatbot, since they are given “action possibilities” with Frida.

A process NAV has deployed is when a citizen is calling on the phone channel, they get a SMS while on the phone telling the citizen that they can get help faster through chat compared to the phone. This affords the citizens with different “action possibilities”. Where they can choose to comply with this SMS and get help from Frida instead and chat with a

chat employee or continue calling. The purpose is to cut the queue time by moving more citizens to the chat.

*“We have also worked with different strategies, precisely to move users and those who do not have to stand in line on the phone for ten, fifteen, twenty minutes. We send out SMS with a link to Frida and we test different ways to do it, for example sneak in the queue, or do you have questions of a general nature, or do you know that you can chat with us, click here. Then they get a link and then the call can be terminated, and then you go into a chat queue instead.” (IS9).*

From the findings it's clear that Frida is offering the citizens different “action possibilities”, which in return reduces frustration for the citizen. If the citizens don't want to talk to Frida, they can just write “human”. They get these types of options throughout the interaction to initiate the handover process if necessary. If Frida understands that this is something she doesn't know, or the citizen has asked about the same thing multiple times, Frida gives them the offer to be handed over to a chat employee. If the citizen chooses to comply with that, the citizen needs to go through three steps to get to a chat employee. NAV is working on reducing the number of steps when the handover process is initiated. As they see that some do not finish the three steps it takes to get handed over. It's clear from this that NAV does not want the citizen to get “stuck” with the chatbot but does not also want to make it too easy to get handed over. This could be a good move on the NAV part, as it “forces” the citizen to try and learn about Frida, and not just go to the chat employee right away. They implemented this from experience with having "chat with Frida" and "chat with an employee" as two different options on their website. This would make the handover more seamless, as the more information the citizen gives Frida, the less (hopefully) the chat employee needs to find the answer for the citizen. Most of the information is stored in the chat log which follows when a citizen is handed over from Frida to the chat employee.

## 4.2 Findings related to Assistance provision affordance

Assistance provision is defined as stated in section 2.4: Chatbots are often used in organisations to assist employees with their everyday work tasks, providing an interesting new set of action possibilities for users. Tasks such as setting and getting reminders and notifications, invoking software functionality, or accessing relevant information are examples such assistive tasks. These tasks are often regarded as mundane and repetitive by the users. Chatbots usually handle these tasks very well (Mygland et al., 2021).

Assistance provision as an affordance is particularly important because it helps the chat employees with reducing the number of mundane tasks and improves the handover process. One example of this is the process of introducing the chat employee automatically in the beginning of a handover process, which is there to help give the employee some breathing room. This also provides the citizen with information about the expected waiting time, which may be seen as an improvement to making the handover process more seamless. In situations where the handover process is initiated, extra measures are made in order to make the citizen stay focused on the chat.

*“There is also talk of adding one such invitation then that when you are put over, watch the chat, and keep the chat page open. Then we will answer you as soon as possible. That way people are not tempted to start reading VG, Facebook and do other things. Also forget that they have a chat.” (IS4).*

A useful feature that chat employees have to stay alert and focused in chat inquiries is the notification sound when a new message has been received. As far as the chat employees were aware, this feature has not been implemented on the citizens side of the interaction. *“On the chat employee view page you can get sound, but it does not help users anything. Users are often those who sit and multitask.” (IS4).* *“The user sits on Facebook and forgets that they are there. Then the chat employee writes “Hello? Can I help you?”.” (IS4).*

Improvements to notifying chat employees when they receive new messages, in addition to the sound, have also been made.

*“Earlier we were not notified that someone came into the chat. Maybe a little color change at the bottom of the corner. But now it will actually pop up on the page that a new chat is coming in. I think it's much easier to understand exactly that bit then, because it was a bit easier in the beginning that there was a lot of chat that passed us by. Because we did not notice them when it came in” (IS13).*

Other visual aids for assisting provision are also present in the design of the chatbot, giving the chat employees visual reminders on chats that need to be answered quickly.

*“If you sit in another chat, you can see that they have answered there, the box turns red if it is over a certain time. Think it's 2 minutes.” (IS11).*

A part of the chat solution that comes with Frida, is a chat log (see appendix 8.5) for each inquiry that is being handed over to a chat employee. When asked about how the process is after the handover is initiated, the informants said that a transcript of the chat with Frida is provided to them. This functionality helps afford the chat employee to prepare after the handover process is initiated.

*“The other ones have already talked to Frida first, then we have a transcript. What we do is that we get first an automatic answer that you have been transferred to human. My name is so and so and give me a minute. Let me read the transcript of what you talked to earlier. And then we read through quite fast and check what has she asked. What information has been. Then I usually pick up on what has been given along the way and what seems to be the misunderstanding. What seems to be the reason for the transfer.” (IS5).*

The chat log is a prominent feature which affords chat employees with good assistance provision. This enables the chat employee to answer faster than starting from scratch. There are however still some features with Frida which cannot provide the same assistance as a human-being after a handover process is initiated.

*“I could probably get most of the information I needed from the conversation by just reading the conversation they had. Of course, if Frida was a human, then she could ask the follow up questions.” (IS6).*

Even though the chat employees are aware that they can use the chat log to gain knowledge about the inquiry, the citizens will not be aware that chat employees possess this information. As a result, the flow of the handover may be somewhat halted.

*“... probably think that we cannot see what they have written before. And in other cases, they asked me directly, can you see what I have written before in the chat? And then I say yes. And then we start directly with the following up.” (IS6).*

NAV has been working on other aspects of the work surface chat employees have. One of the features they're working on is easier access to knowledge and features that enable chat employees to share information easier with citizens.

*“Recently we have changed our chat solution underway. We have preserved the Frontend, we have preserved “BoostAI” as a supplier of chatbot, and preserved Frida. But Frida talks now with another chat solution than earlier, and it is also about us working to get a better work surface for our chat employees. Where we also are working with implementing something called “kunnskaps base”, or “Knowledge base”. So that we can efficiently get the answer, quick text, or what it has to be. What is relevant today, for example in relation to the topics you are sitting and chatting on. You get updated news, you can do effective searches etc. Take some few clicks, then you get that information from the knowledge base into the chat window, and can press “send” so that it's visible for the user.” (IS9).*

NAV looked into whether Frida or another chatbot could help the chat employee gather this kind of information quickly for the chat employee. From the findings, NAV has an internal chatbot in the HR department which is there to gather information regarding changes in regulation etc. “NAV already has an internal HR chatbot, but it is not in use in the NAV contact center.” (IS15). There has been talk about an internal chatbot, “Einstein” for the NKS, but is currently put on ice. One function “Einstein” could do is make a summary of the chat log, which would give the chat employee more structured information than the transcript. Since Frida would have to write to a chat employee differently compared to a citizen this task would have been too complex for her.

*“Frida will not be the one used. The chat employees must get a little different type of answer and I think that if we start to put it here in Frida as well, it will be a very big and complicated and difficult to maintain, so, but maybe they can talk together, but they should be separate.” (IS19),*

Having Frida perform this task can become reality if NAV gets the necessary technology to do it: “we do not have the technology for it yet, but it would have been an advantage if Frida could give a quick summary of what the questions were instead of us having to read through the entire chat log.” (IS19).

NAV is working on implementing “Automatic case processing” within the field of service for family related inquiries regarding kindergarten. Here Frida could do some light case processing, which would assist the chat employee as they would not have to do as many mundane tasks and it could relieve stress.

*“when approaching the time when kindergarten open and start, we have an enormous pressure on the family area, to simply receive those who call and send a message to say that they have been given a place in a kindergarten, and the cash support must be stopped from this and that date, that it may typically be an example where Frida instead of saying “you can send us a written message by logging in and sending here” which then a person should receive, that one then looks at more that it is possible to develop Frida to say that «thank you for letting me know that you have been given a*

*place in a kindergarten. Can you answer this and this point »and that it never goes via the contact center, but that it is then if they are logged in directly into a case processing solution on cash support and then it stops and catches up if there is something missing, then it triggers a new action.(...) It will be a great way to relieve stress, without taking away any particular service or risking so much.“ (IS7).*

This would relieve stress, and pressure from the chat employee as they don't have to act unless there is something wrong, and Frida would solve more inquiries with the citizens herself.

An assistant function NAV had before but lost because of changing suppliers but are not implementing again is the “Thumbs up and down” function. This would be more to help the chatbot trainers at NAV, but this would provide them information on what is happening, and if Frida gives good/correct answers to the question. This information could be used further to make sure the citizens get the information they should get, and in a correct “format”. This could lead to more citizens finishing their inquiries with Frida, and do not need to initiate the handover process, which in return would let the chat employee focus more on the complex cases.

*“The advantages are that we see where the shoe hits. Very easy for us to filter as we get up... First and foremost where things have gone wrong. Where the user chooses to press the thumb down. Why they do it, and what has gone wrong. This is how we get the opportunity to get measures, but also have the opportunity to look thumbs up, and then we see where it has gone well. Which we can then use other places in the model.” (IS14).*

Lastly we found out both employees at NKS, as well as the employees in other departments at NAV, used Frida to get quick information. This shows Frida is a great place to gather information rather than trying to find it themselves. This may sometimes be difficult since NAV is both big and complex. Just NAV.no alone has over 100.000 different sites.

*“Frida is actually used for quite a lot internally in NAV. Maybe not as much of employees in NKS[NAV contact center], but as of other employees in NAV. Something that the chat employees at the NAV offices, for example, sit in meetings with the user and have something they are unsure of, so instead of starting to look on NAV.no, as they sometimes have to do, we see that they can use Frida and get, so it is used internally, but we have not systematized it so much in relation to our employees.“ (IS20).*

*“I find it very useful. I know the chat employees uses Frida when they are in conversation with a user. Also, what is good instead of trying to look for a special question, you can just write a message to Frida and she will find it right away. And it is very good to know that what is written there is checked by a subject coordinator, so you know the information that is there is correct.” (IS16).*

When a citizen is logged in (through the login function in chat), the chat employee can afford the citizen to connect to other departments at NAV or their local NAV office.

*“...in some cases, we have to give information to other departments in NAV. And that will be possible to do if the chat was logged in, for example, if the user has to speak with his local NAV office, so we could send a message to the NAV office for them.“ (IS6).*

This gives the chat employee the option to direct the citizen to the right place or give them the right information through the chat.

In the chat between a citizen and chat employee, the chat employee has the option to use a third-party system in the interface to get help, or report threats. This function in the chat affords the chat employee to get help, or report if something is unpleasant between the citizen and chat employee.

*“There is also a function, how to invite a third party, that you can get a leader to look at the answer before you send it. “Is this correct?” for example. Or are a subject manager or whatever it has to be. A security mechanism for chat employee if they are uncertain about something, or they can raise their hand to get help from the solution. So that the one watching over gets a notice, and an indication on that “Ok, can you help me with this” before he answers or a threat has been issued. So we work quite a bit with the workspace for the chat employee, to both get a better workday, and a better flow, but also working more effectively.” (IS9).*

The findings show both functions that are implemented in Frida and functions NAV hope they may have in the future for Frida. Some are meant to help the chat employee or make the handover process seamless, and some are used as an assist even if that was not the intention of NAV. Overall NAV has put a lot of effort into helping the chat employee with their tasks, these includes the notification that a new chat has started and showing that a chat has not been active in some time. This improves the post-handover process, making sure that the citizen gets an answer from the chat employee, and makes it easier for the chat employee to spot when something is written by the citizens. As mentioned, the chat employee gets this “chat log” when a citizen is handed over from Frida, it's good they get it, but they need time to read through it all to know what has been written. This is using up valuable time, since citizens are writing their question again. This would indicate they don't read the information or the information they are giving is too complex for some of them to understand. This is a type of situation where a summary may help. If Frida or another internal chatbot (which communicates with Frida), makes a summary of the chat log Frida provides, it may result in less time used to read the summary and more time used to answer questions. Lastly, it's interesting to see that Frida is not only used as a quick way of getting information in the NKS, but also other departments in NAV. This points to unrealised potential for Frida, or for an internal chatbot, as the HR chatbot, or the chatbot “Einstein”, both mentioned previously. In Salesforce there is a function, currently not implemented by NAV yet, which allows the chat employee to invite a third party to the chat with a citizen. The idea behind this is to either get help, clarification, report, etc. This is something that would be of great help for new chat employees to get help fast or get help with complicated cases to get a second opinion before sending it.

### 4.3 Findings related to Facilitation affordance

The facilitation is defined as stated in section 2.4: Chatbots can provide action possibilities to users for supplicating with functionality and querying information from multiple third-party

systems within their own system, offering external integration. Through facilitation, chatbots can reduce the effort required for various tasks (Mygland et al., 2021).

The affordances related to facilitation are important because they can help both citizens and chat employees to access third party systems through chat. This is especially relevant for the chat employee, as they could use the chatbot to access different systems at the NKS that can make their job more efficient.

The findings here are scarce. As for most of the functionality that NAV needs in their chat solution, Frida and the internal chatbots can provide this, and therefore don't have the need for any third-party systems. NAV has many plans for what Frida may be used for in the future, however, the technology at its current state is not good enough.

NAV hopes that when the technology eventually gets better, Frida will be able to do the job without the need for any third-party applications involved. For instance, in a case where Frida would be able to investigate a citizen's case, and see that their maximum sick leave is soon, Frida could contact the citizen through one of the many channels of communication (Email, phone, Messenger at Facebook, etc).

*“if we go even further in time, I would have liked Frida to be able to be a little more proactive, that it might see that the unemployment benefit case is about to go out or that you are approaching the maximum amount of sickness benefits, it may be a better example, then the chatbot can contact you via, well, whatever it is we use. Facebook, messenger, WhatsApp, Yes, there are many channels, and ask "What are your plans next" "should you have a meeting with a caseworker". That Frida can seek you out, on certain conditions, and help you get started so you do not miss out on your rights.”* (IS19).

This would make the chatbot (Frida) facilitate communication between NAV and the citizens. The automatic case processing for inquiries related to kindergarten (see section 4.2), could make Frida able to afford the citizen to use a third-party system to complete the application which the chatbots retrieve.

There was little from the findings indicating facilitation. One explanation for the lack of facilitation is that NAV is a public organisation and doesn't have the opportunity to make use of third-party systems freely. This is related to the concern of privacy and laws in Norway. Still they hope to achieve facilitation in the future, which could be through Frida giving updates regarding benefits end date, afford facilitation through the chat with a chat employee or connect a citizen and their local NAV office.

#### 4.4 Findings related to distilling information affordance

The distilling information is defined as stated in section 2.4: C Chatbots can provide action possibilities for users related to distilling information. This can be collection and aggregation of information, making large amounts of information understandable for users (Mygland et al., 2021). As also stated by Mygland et al. (2021); *“They can even help users reflect on the information they provide for their own mood or mental state”*.



Distilling information is important for the chat employee and the handover process, as the chatbot may distil information, making it faster for the chat employee to get an overview of the situation, or to understand information faster. This will afford the citizens with aggregated information. At first Frida will only be allowed to do simple case handling with the login chat or be allowed to update a citizen's case.

*“if you provide information related to one or another case, or something that is important to the case, that it can be automatically recorded in that case, or something like that, but it also requires that Frida can log in the user and identification and the whole bit there, so that way it is a bit up and forward in the future before we are there.” (IS15).*

This would give the citizen the option to use Frida to update their information, rather than calling or contacting NAV on other channels to do the same. This would save time for the supervisors on all channels. Another improvement is having Frida as a “right hand” for the chat employee. Some citizens just write “human” in the chat, and start the handover process, before giving Frida a chance to answer their inquiry. Having Frida as a “right hand” for the chat employee, she can monitor the live chat, and come with suggestions of answers.

*“Those who write "human" once in the conversation, and they ask a simple question that Frida could actually have answered. Then it is easy for the chat employee to copy it and paste the answer. To reformulate it and make it very user-friendly that way.” (IS14).*

The chat employee already has this option, with the use of the “knowledge base” (the information the chat employee uses, and other relevant information is stored there), where they can find the information and copy it. If Frida was the one to retrieve it, it would have improved the efficiency of the chat employee. *“...It will be in a way the same as that function, only it will be easier if Frida constantly comes with the information, and it is easily accessible. Just to "Copy, paste" the answers.” (IS14).* This is one of NAVs future plans for Frida. Since some case handling is quite “light” it's possible for Frida to handle them, but this is still a few years ahead.

The “Automatic case process” could lower work pressure the chat employees have regarding that service area, so they can focus on other more important questions/case handling with the login chat. Also having Frida as a “right hand” would mean they could gather information faster, then finding it themselves in the “knowledge base”, which will result in a faster post-handover process, as the citizen gets help and answers faster.

## 4.5 Findings related to enriching information affordance

The enriching information is defined as stated in section 2.4: Chatbots can enrich the information provided visual elements or with additional text, accelerating communication. Enriching information with the help of artificial intelligence make chatbots more useful as assistants in everyday tasks (Mygland et al., 2021).

The affordances related to enriching information can be particularly important regarding quality of service, but also improving efficiency on finding all relevant information about a

given service or inquiry a citizen may have. There is currently little in our findings suggesting that chat employees currently have the affordance of enriching information in Frida.

The findings indicate that the chat employees have an affordance of enriching the information they give to the citizens through the logged in chat.

*“the greatest advantage over long term solution is that I am able to check what is actually going on in the persons case so that I may actually give a correct answer. That's not only generally based, but is based on the facts of this specific case, so that's the greatest benefit” (IS3).*

With the login chat the chat employee has the option to look at older cases for that citizen and come up with better or newer information based on previous inquiries. The findings indicate a constraint where Frida should have afforded the citizen with enriching information but is unsuccessful.

*“...If they need help with something they can't figure it out, problems like filling out an application or understanding something, where you might have a lot of questions back and forth, and answers quite specific on where they are, that is something the chatbot will quickly fail at.” (IS7).*

Frida will fail when there are a lot of questions going back and forth and will then struggle to enrich the information. The outcome will be that they either give up on the chat service or try to get transferred to a chat employee instead.

Frida is failing in some of the areas where she provides information, like enriching certain information. Either because she does not understand it herself, the citizens are not communicating correctly with Frida, or that Frida lacks the necessary information needed. All these factors contribute to Frida failing at enriching information for the citizens. On the other hand, the “login chat” function gives the chat employee the opportunity to enrich the information in a post-handover, making sure the citizen gets up to date, receives the correct information based on their case data, and corrects previous statements from a chat employee if it is wrong or out of date.

## 4.6 Findings related to context identification affordance

The context identification is defined as stated in section 2.4: Chatbot can identify problem-specific information, based on the information given by the user, and provide context to the related information, feedback, and orient ongoing conversation for users (Mygland et al., 2021).

The context identification affordance is important because the chatbots provide the context to what the citizens are talking about or looking for. The chatbot can use this to find the relevant information, give feedback, or orient ongoing information. If the chatbot should fail at this, then the handover is initiated. The context that Frida has identified and kept the citizens in can then be transferred to the chat employee through the handover process. The chat employee can use the information collected by the chatbot to act and help the citizen as quickly and timely as possible. From the findings we discovered that NAV has done a lot in relation to keeping the citizen in context and making sure the chatbot transfers the

information to the chat employee. One of them is the ASU (automatic semantic understanding), a function that helps Frida to have a smoother conversation and less false-positive answers with the citizens.

*“That gives Frida the option to, instead of “I dont give an answer, or saying “I don't understand”, or if she is uncertain. We have three different reactions there, she thinks of one option, but she is not sure if it has to do with percent, she thinks you are asking about the payment date, but she is not sure. Instead of printing that answer “I don't know”, She would say, “I can help you with this, but i'm not sure if its related to”, and if you said payment date, instead of salary, she would say (“ I'm not sure if it's related to salary but i think i can help you with payment day”) She can give multiple option, if she tied between “I'm not sure of it sickness benefits, or parental benefits, you are asking about since you mention both”, she might say “I'm not what you are asking, but maybe some of these option may help?”. ” (IS7).*

This gives Frida a better chance of actually helping the citizen and less likely to give them an answer they are not satisfied with. This would afford the citizen with context identification, and if this helps the citizen, they won't have the need to be transferred to a chat employee. Similar functions are as the “Action trigger” and “Twice replay action” which were mentioned in section 4.1. NAV is currently training Frida to better understand when a citizen is talking about different benefits in the same sentence.

*“It is a challenge for Frida like that in the first place, because if you then have a user who writes that "has sent a report card, when will I receive payment of unemployment benefits?" then we have answers both on the submission of report cards and on the payment of unemployment benefits, so for Frida's part, there will actually be two different answers, and then you would probably be able to get a choice between the two answers. So to try to correct it, we have had to add chat with training data about, for example, payment of unemployment benefits then, so that Frida will understand that even if you write that you have sent in a report card, it is still a question of payment of unemployment benefits.” (IS12).*

This is still difficult for Frida, since citizens write the same question in different ways. If they split the sentences up in different sentences, it makes it much harder for Frida to know what the citizen is after. To try to fix this, Frida has something called “Context topic”.

*“This is how we can add to each subject area, so that if you first have a question where you ask about AAP, then we can add context to that intent, Or the answer we give Frida, so if you ask a follow-up question where you do not include the name of the benefit, Frida will still understand then that here it is asked about work clearance allowance (AAP) in the next question as well. It is the case that we can keep them within the right subject area then.” (IS12).*

This makes sure the citizens will get information within the right topic area from Frida. Frida also has a “General clarification”.

*“...in addition, we collaborate across the locations in the chatbot team so that we have a lot like that, what should you call it, general clarifications in Frida, so that if you write only "I am a student", or "I am unemployed ”or something that is just single words that are not directly related to a benefit, they get choices based on that, with what may be relevant, based on their user group” (IS12).*

If a citizen is unsure what to ask about, they can just write “I am a student” and will get relevant information related to that user group.

All this affords the citizen context identification. Helping the citizens resolve their issues with Frida, less work pressure will be applied for the chat employees. Making Frida able to guide citizens to the correct public service is a different function NAV is currently working on. The aim is to make Frida able to communicate and collaborate with other chatbots from different public institutions (Tax Authority, the municipality etc.) to create a seamless experience, since not all citizens know which institution they need to contact in order to get the help they need.

*“Not everyone in Norway knows what NAV contains, what “Skatteetaten” contains”, what the “Arbeidstilsynet” contains. So we are trying to build a guide competence for Frida that can send you to the right public agency. That will save money and time for the user and public agency if the flow is right. This is also important for example “This you need to talk with “Skatteetaten about”. We also have a project where we are working to see how we can get the public chatbots to talk in teams. An example is that you start with “Kommune Kari”. You ask a question to “Kommune Kari”, then you get an answer on that. Then a NAV question pops up, so instead of “Kommune Kari” answering something she is not trained on. Then she will offer you to talk with Frida, then Frida will arrive at that window without the need to change the chat solution. So will Frida continue answering that question. Then it can come back to “Kommune Kari” if there comes a question back again. So that the Norwegian population is experiencing a more seamless encounter with the public.” (IS9).*

If chatbots are able to do this in the future, it would mean they would be able to understand the context the citizen is in, as the same question at NAV or the tax authorities would give different answers. There are also different filter functions in the work, some have been implemented already. With the filter function, Frida gives the citizen the option of choosing whether they are a private person, employer, or something else. A future plan is for Frida to understand which page the citizen is on NAV.no when the citizen initiates the chat.

*“we get to know that you are an employer, for example, or you are on the family page, and then we assume you have questions about family that it is about, and Frida understands it in the context you are in a better way” (IS9).*

In this case Frida is better off giving the right information faster, then asking about what the citizen is wondering about, which the chat employee can use when the citizen is transferred to a human. From the beginning NAV wanted it to be easy for citizens to be transferred to a chat employee. *“We have changed it overtime because in the beginning we would like it to be very easy to get transferred because it was a very new service and we wasn't sure about how good it was” (IS3).* So, it was quite easy to be transferred, but as time moved on and Frida got better and better at answering. They wanted it to not make it as easy to be transferred to a chat employee. They wanted to be on the “right level”.

*“how to ensure that Frida is at the right level. That is, when will the limit go for you to be passed on to a human being. If it is the case that it should be in a way a very low threshold, then of course the effect of Frida will be much lower, it may be that people just pass Frida and go straight to the chat employee without trying. And then it may be the case that it is in different contexts, therefore there are some types of inquiries*

*and questions that should go directly on to people. And some types of topics that we can in a way... Be a little more difficult to ask some follow-up questions before you possibly get to talk to the chat employee. So at what level should you go to, should you have such a starting point for all conversations, or should you in a way differentiate based on context and what type of conversation is in question. So there are also things that we drive and look at.” (IS9).*

So, it depends on the topic, service area, and question how “difficult” it should be before being transferred to a chat employee. An example would be asking for the payment date is quite easy for Frida, while the mentioning of “Death” is a trigger for Frida to transfer the citizen to a chat employee. This affords the citizen staying in context. One of the biggest changes to Frida from when she was introduced till today, is that the simple inquiries are filtered out to her.

*“The biggest change is actually similar to the changes one sees on the phone and more self-service solution. You filter out the simple questions. You do not sit down to answer the same question 10 times in a row, because Frida manages to say where you find the form, or where you see the case processing time or where you log in. So what you are left with are longer and more complex conversations to a greater extent. But this also applies to other channels. What are the general trends is that human beings are left with more complex also the routine answers are filtered out very quickly.” (IS7).*

This is so the chat employees can use their expertise on the more complex task, and not get overflowed with general/easy questions that Frida could easily have answered.

*“It is in a way Frida's task to take over the simple... Simple conversations, to put... Chat employee who can to a greater extent can use their professional competence to a greater extent, than to answer the payment date for sickness benefits, where can I find an application for child benefit.” (IS4).*

They also point out that it's good they get some easy questions as well, so they(chat employees) do not have to deal with complex tasks all day, but that's different between each person.

There were a lot of findings related to context identification in the NKS. Some of the findings in this part have flaws, but it is something NAV is currently working on. Frida is only able to answer inquiries written in Norwegian Bokmål. NAV is currently working on a way for Frida to be able to answer in both English and Norwegian Nynorsk, since they have experienced that several citizens have requested this.

*“There are very many who get in touch on chat who write in English and there is nothing that Frida can answer per. today, there are only Norwegian answers, so everyone who writes an English offer will immediately be transferred to a chat employee.(...)It is also the case to get an answer in Nynorsk then, because we always see that someone calls for them not to be completely satisfied that it is only Bokmål. That we should also have answers in Nynorsk. So there is such a Nynorsk integration in Boost AI, but something must also be done from our developers then for it to go into Frida, that we get an automatic translation there.” (IS12).*

So by giving Frida the ability to understand English or “Nynorsk”, will mean that less of the general questions in those languages would be handed over directly to the chat employee when initiating the chat with Frida.

Frida is struggling with keeping the citizen in the right context when they have a series of rapid questions. She also has an issue with synonyms, the complexity in all the different service areas, or when the citizen’s writing is not understandable for the chatbot. The findings show that NAV is working to lessen some of these issues.

One example is an information film on how to interact with a Chatbot, which will be presented to the citizen through NAV.no. Additionally, Frida will suggest watching the film if she sees the citizen is struggling or she does not understand.

*“we will make an information film we can offer in the chat window, linked to where we see that they... Now you talk to us in a very strange way, we understand that you do not understand that you have to press a button or a link. Then we can offer that "Look here to get some tips".” (IS18).*

A lot of the context identification problems arise from citizens talking to Frida as if she was a human. Their expectations of a chatbot are too high, or they write a lot and confuse it. By educating the Norwegian population in the use of chatbot, the citizen will be able to get more use of the chatbot, and the chat employee can focus on the more critical and complex cases which need a more human understanding.

A future improvement that is similar to the “Automatic case processing”, mentioned in earlier sections is that the citizen may inform Frida (when login in chat), for example that they have gotten a kindergarten place, and do not need the cash support any longer. It’s then important that Frida is able to afford the citizen context identification, which all the previous functions mentioned will help her to do. If the citizens better knew how to communicate with Frida properly the chat employees would not need to provide the same general information for the citizens on this. *“...it may be unnecessary that we sit a hundred persons and forward the same answer, "thank you for letting us know, we will pass it on" (IS7).* With this future implementation Frida would take over some of the mundane tasks at the family service area and have less chat employees forwarding the same message all day.

Since Frida is getting new functions, more service areas, new ways of asking, and answering a question, those who train Frida will have to work harder. The chat trainers’ job has gotten more complex as the areas Frida has been operating in has expanded over the years.

*“We started with parental benefit. It is a very narrow area and it was easy to build and get Frida to predict correctly, but as we expanded we included the rest of the family related benefits. Then unemployment benefits, sickness benefit, pensions, disability and so on. We see that it is another level of complexity because many other words and many of the keywords are used in many different benefits. So we have competing answers because what Frida does when she predicts based on what we call keywords that is essential words like “what is unemployment benefit?”” (IS3).*

It was easy from them in the beginning, but the complexity is growing, and Frida is struggling.

*““what is unemployment benefit” is important words for Frida and she will use those to predict, so if you have a longer question with those two, she will most likely go to unemployment benefits. But then you can have the people asking “after a parent*

*benefit, can I have unemployment benefits? Then you suddenly have more important words and then you have the intents competing so strictly technical, we had to do some, call it, trick of the book to get Frida not to predict correctly. It uses what we call synonyms to guide Frida in the proper direction” (IS3).*

It's also a difference between a private citizen or an employer since it's difficult for Frida to learn the difference when the keywords are all the same within the same hierarchy.

*“Because you have- an example is. I'm an employer and one of my employees is sick, and I'm employed and I'm sick. What can I tell? Tell my employer? Then you have the keywords are all the same. This employer, employed, and sickness benefits, so it's very hard to learn Frida to choose correctly because we are within the same hierarchy. We could split the hierarchy in two and we have one hierarchy for citizens and one for employers” (IS3).*

The building of the employer hierarchy is still in its early phase, it will improve over time, but as IS3 points out “...that's, uh, more expensive and big process”.

The complexity and field of areas Frida gets trained to do, make it more complex. This makes it more difficult for those who train Frida to keep the citizens in the right context.

As mentioned in section 4.2, NAV is working on implementing the “Thumbs up and down”, in the answers given by Frida. As one of the interviewees said about this functionality, it helps them to “...get a little more clue on "Did you understand this here or did you not understand it?"” (IS17). This could help give the chat employee or chat trainers an indication of the mood of the citizen, as they can analyse what answer they like, and what they don't like that Frida gives/answers. She gave the right answer, but the citizen gave it a thumbs down because he/she did not like it, or understand it?, etc. Which could afford the chat trainers a distilling information.

To get the most out of NAV today, the population should be educated in how to talk to a chatbot in order to make the most use of their functions and lessen the pressure on the chat employee. Since Frida is going to work with other chatbots in the public sector, the sector could follow a unified standard. If a citizen learns how to talk with “Kommune Kari”, they would be able to talk to Frida, as it would be the same process, just a different chatbot, and service area. This could improve the pre-handover process. This could lead to the chat log being more useful for the chat employee in the post-handover phase. The chat employee would use less time reading and analysing the text. This could help lessen the complexity in Frida, as the population would use more or less the same answer to communicate with Frida (in an ideal world). With the “Thumbs up and down” function, it would help the chat trainers to distil the information better to the citizens. As they would get feedback from the answers Frida gives in the chat. It would also depend on if the citizen gave the answer a thumbs down, even if it was correct. This could reflect the mood of the citizens. The “Thumbs up and down” could also cause problems. As one needs to look closely what answers gets a thumbs up and what gets a thumb down. As a wrong/bad answer may get a thumbs up, indicating this may be a correct answer when it isn't.

## 4.7 Findings related to personalisation affordance

Chatbots are able to adapt to the user's interaction. Providing a more tailored response, adjusting their tone and style to the users, making the chatbot more appealing for the user. The personalisation is improving over time, as the chatbot learns from the interaction with the user constantly (Mygland et al., 2021).

The personalisation affordance is important since the more the chat employee uses Frida, the more she can learn about how each chat employee operates, and act upon this information. This would give the chat employee more tailored responses, adjusting the tone, and style of response. This can be transferred to the citizen and the handover. Making Frida able to differentiate between each citizen (through the login chat), she can provide tailored responses, adjusting her tone and style, so that Frida and NAV are not seen as this "cold" place. They describe it as: *"also to create a warmer NAV and not have such a large distance between the public agency and the user."* (IS9). A constraint for both chat trainers and citizens is that multiple people are working on trainer Frida. *"I think they have the same basic approach, but then they choose maybe some different solution."* (IS7). This could indicate that a citizen can meet a "different" Frida depending on the service area they are in, but only one of the 20 interview subjects mentioned this as a potential problem.

Today, there are no affordances related to personalisation in Frida for either the chat employee or citizen. As Frida learns more with the training, and machine learning functionality, this can be a possibility in the future. An issue is that there are six chatbot trainers training Frida today. The chat trainers have the same approach but different solutions. Mentioned in section 4.6, The complexity in Frida's field of tasks grows, the complexity of the answers she has to provide increases too. Having the same approach to a problem is therefore not enough if they have different solutions. This could lead to the process of changing or updating answers to get more complex over time. From the findings the chat trainers do follow a standard, but to what extent is unknown.

## 4.8 Findings related to fostering familiarity affordance

The fostering familiarity is defined as stated in section 2.4: Little prior experience is needed to use a chatbot, as it is a technology most users are familiar with chat applications. Chatbots allow the users to express their needs directly through a familiar interaction mode, which the users are increasingly familiarized with. If the expectations are not fulfilled, the users may express disappointment and dissatisfaction with the service (Mygland et al., 2021).

Affordances under this category are important for having an effective flow in a handover process. A chatbot is a relatively new technology, and even though there is an increasing user base that is familiar with the messaging format, the line between human-to-human interactions with human-to-machine interactions becomes somewhat blurred, especially after a handover process is initiated.



The affordances related to fostering familiarity in the findings were found in the chatbot itself and the interface the chat employee uses to handle inquiries. Throughout the development of Frida, from the introduction to the present day, there have been numerous changes and improvements to the interface and visual design elements. The chat itself has seen several changes, from being a chat window covering the entire page to a small chat in the bottom right corner that follows the user around the page.

*“It was quite a lot of work to get permission to publish and start using chat on NAV.no at all. In the beginning we got approval to establish a chat button, a chat with Frida button, or a chat with human button.” (IS9).*

Overall, the focus for the design has been that it should be as seamless as possible.

*“You got a link that you click on, that may send you to a new chat solution, but maybe not the same chat solution. We were clear from day 1, that it was not like that we meant the user journey should be. It should be seamless.” (IS9).*

Since the chatbot is placed in a familiar place, allowing the citizens to easily find it and get help from either the chatbot or chat employee. Several other minor design changes have also been added to improve smoothness of transition between chatbot and chat employees. A common ground for all these changes is usage of different colour codes for chat windows, and icons that help the citizens identify whether they’re talking to a human or a chatbot.

*“We now got a chat window that lies on top of NAV.no, so that you can continue your work, or read, or whatever it may be while you chat and that the design looks inviting for the user and that we got taken care of a more modern design, and we got all these changes with switch, and icons, and it had a different color when chatting with the chatbot, that kind of stuff.” (IS9).*

*“We have also worked with this on how this is transferred from Frida to humans. That we get the seamless transfer. So we don't need to ask the questions again. You need to include the chat dialog. And that it should be a selection. Clear marking, that now you are talking to a human being, now you are talking to the chatbot, now you are talking to a human being. And then it can probably never be good enough, but we have at least taken some measures around it.” (IS9).*

When a citizen is transferred, the icon and color of the chat changes to indicate a change from chatbot to a human. This is providing a way for citizens to recognise that the interaction has changed from being from human-to-machine to human-to-human. Similarly to the chat window for the citizens, the front-end interface for the chat employees have also been improved since the launch of the chatbot. *“it was a very old fashion solution before we got to design our own solution.” (IS9).*

The chat employees are afforded familiarity on their working interface, with having different tabs for different chats, making it look like a web browser (See appendix 8.4).

An important design trait Frida has, as well as many other chatbots, is anthropomorphism; The ability to mimic humans in its way of communicating. This can be features like avatars that look like a human, and a human name. However, one anthropomorphic trait that can be difficult to mimic, even for chat employees, is the right tone of voice in replies.

*“We have discussed it a bit, so we can say that the goal is for Frida to appear helpful and professional, or in other words quite neutral, and would perhaps say that Frida is more polite than friendly? (..) But it is the case that for example Frida asks a user if*

*they want some more information after receiving an answer, Frida answers like "do you want more information about this" or "it is nice if you can write a little more like that and like that », so that it should be a polite tone but should be quite neutral then I think."* (IS12).

Empathy is a trait found in humans that can be hard to mimic for machines. For situations where empathy is important for the inquiry, NAV have solved the issue by initiating a handover process instead of trying to mimic a human. This could for instance be inquiries where the word "death" is brought up. These are inquiries that NAV know can be difficult to handle for a chatbot and requires a level of empathy the chatbot is not capable of providing.

*"...death, I think, or a funeral or whatever it is. I think... There are some such words that recur, which means that you can immediately talk to a person and not have to deal with a chatbot. Where we absolutely need to be sure that we answer correctly and have a(...)Ensure empathy in the conversation...."* (IS9).

When we asked the chat employees and chatbot trainers about how citizens perceive Frida, many of them replied that the anthropomorphic traits could confuse the citizens of whether or not they were talking to a human or a chatbot.

*"We have managed to give Frida a human name and we have given her a human face, and for many people that's enough. Although, at the start Frida says "I'm Frida the chatbot", this message is on the top and it's disappearing in the dialogue. People don't understand, even though she replies very fast. So they don't know and people can have a long conversation before they understand that "Hey, I'm talking to a robot" as they call it. A robot. And then they say "hey, I wanna talk to a person" "* (IS3).

Some say that this may be a positive thing: *"I think that many other chats that you have to get in touch with are called "Kari" or Frida "or. They have a name, better than just saying that you talk to a robot."* (IS11).

However, there are also reasons that argue for fewer anthropomorphic traits to make it easier to differentiate between chatbot and chat employees.

*"For those of us who are chatbot trainers, we may see that there might have been a need for Frida not to be so human then. Because there is a lot of misunderstanding about whether "is this a robot or a human being you are chatting with" "* (IS12).

*"Especially when we have called it a chatbot in addition. It is not a word that is so common, and perhaps familiar with what it really means. When you read quickly through the welcome message Frida has, you might think that you are talking to a human being then. Even if it's a chatbot, and then you do not get very much help, when there is a human avatar there as well. Because it does not really any robot like. That way, there can be very few indications that they are actually talking to a machine and not a human."* (IS12).

The chat employees from this focus group also shared the view that Frida could be misinterpreted as an arrogant person. *"After it had been transferred from Frida, something had come in that the person thought it was an arrogant person who answered. Oh yes. Yes, it can easily contribute to misunderstanding."* (IS11).

IS12 and IS13 confirmed this shortly after IS11.

*“yes there has been some of that. It also happens that when chat employees get the chat put over to them, there are some users who have a check “Are you actually a human being?”. Since you are talking to Frida, or talking IS11, both have a human name. Then they check that they have actually been transferred to a human or not.”* (IS12).

*“Yes, it does happen. That there is the question “Am I talking to a human being now?””* (IS13).

There are however traits with Frida that help clarify the difference between chatbot and human.

*“If she tries to give the exact same answer two times in a row, she would exchange the second time she would try to get an answer with an answer that says, “I think I have already answered this question. Could you ask it another way?” “Or it might be better to talk to a human” and we will have a chat with a human option. So then, I think most people if they haven't realized that there's a bot that will help because a human normally not say that you should probably talk to a human.”* (IS7).

With the human-like traits, the citizens are afforded familiarity, in both positive and negative ways. Citizens can get frustrated at Frida because they think she is a human, then get transferred and the frustration follows to the chat employee because Frida did not do her job. *“In the beginning, there were some who became a little frustrated and impatient. There were people who did not know it was a chatbot they were talking to. You could see it when they called Frida different things.”* (IS1).

Some of the people interviewed have expressed that this may be an issue, since the expectations for a human chat employee are more likely to be much greater than what a chatbot may have.

*“I think, in my opinion we are, NAV have broken a very, very specific rule for chat bots by giving her a human face in a human name. This is one of the biggest mistakes you can do. Because the expectations are so much higher to a person.”* (IS3).

According to the interviewees, the citizens are also unhappy when they find out they've been talking to a chatbot and not a human.

IS7 points out that most of the population doesn't understand how to communicate or interact with a chatbot. It's not something that we learn in school, and that may be the reason why many treat Frida as a human or have too high expectations of her.

*“Nope, because they don't understand how to talk to a chatbot. Or many people do, but many people doesn't know how to relate to a chatbot. They expect the chat bot to be at the same level as a human where I can start talking about “I was sitting on the bus and thinking about my next payment from now”(…) But that's a part of the digital education we're in the middle of or in use of chat bots were in the very start and my guess is when years go by, more people would understand more on how to communicate with chat bots but one could easily desire that the public has some sort of- Like in the 80s-90s, we had something called Datakortet, what was The very basics of computing, like “What is email? What is a text document? What is a printer?” And we could use something like that to educate people. Or just show a short movie. This is how you can communicate to a chatbot, because more and more*

*services using chatbots. Not only NAV but Skatteetaten, Folkeregisteret, and private enterprises.” (IS4).*

NAV hopes that in the future that the population will be more educated in communicating and interacting with a chatbot. It is a constraint for the chat employee since many would not get the right help from Frida, since they do not understand how to communicate with her as mentioned earlier. If the citizen could communicate with Frida more efficiently, less would have been transferred to a chat employee.

When it comes to Frida's ability to give a good answer to citizens, some of the interviewees suggest that chatting to a chatbot sometimes requires a certain way of communicating in order to get the best result. As some interviewees also have said, some citizens write long messages with trivial information, while chatbots in most cases work best when they are only fed with information that is vital for the inquiry.

*“There are some users who struggle to understand that Frida is a robot and when you then have the starting point that you think you are talking to a person, they may formulate themselves in such a way that they do not get as good help from Frida as they could have received if they had understood that it is a chatbot they have talked to. So to try to remedy here, we see that they are changing the welcome message to Frida, among other things, both to remove the sentence to say "I am Frida, a chatbot who can help you" which has very little expectation control, and also to change to Frida being referred to as a chat robot instead of a chatbot to make it clearer that here you are actually chatting with a robot. We are also looking at whether you can make Frida's avatar a little more robot-like in appearance so that you also get an indicator that this is a robot you are talking to.” (IS12).*

From the findings, NAV is unsure on how to address Frida, more like a robot or more like a human. With giving Frida a more robot-like appearance, the citizen may not give Frida a chance since she is a chatbot and are unaware that her being able to help them the same way a chat employee could. This may result in more easy/general questions being transferred to the chat employee instead of being solved by Frida.

Another problem is that citizens don't know how to communicate with Frida, and they communicate with her as if she was a human. *“They[ the citizens] think they're talking to a human, or they talk to the chatbot as they would to a human.” (IS5).* The citizens write unnecessarily complicated sentences as well, *“They have some essays before they come to the question.” (IS3).* Frida struggles with understanding long messages, or when very general inquiries such as: *“And other is oversimplifying by saying “I haven't got any money” or “where's my payment?”” (IS3).*

A function mentioned in section 4.6 is the “Thumbs up and down”, would afford the citizen familiarity as they know that a thumbs up indicates a positive/good response while a thumbs down would indicate something negative/bad response. Which they could use to show NAV what Frida answered in a good way, or bad (or as mentioned earlier that citizens put a thumbs down because they did not like the answer even if it was right).

A future plan at NAV is to educate the citizens more, and get them to accept Frida as a solution, because they want to increase knowledge about her as a reliable channel.

*“...at some point it is important that we go out to sell Frida [Sell her to the public], and sell chat [To the public]. We do nothing now. We have received it on NAV.no,*

*that we have worked a lot on the channel strategy and first we started with a page you could initiate chat on, but now Frida is, so to speak, on the whole of NAV.no” (IS9).*

This could help with educating people that Frida exists, and push them to try her out, instead of calling with their questions.

*“Not least on behalf of Norway that people gain confidence in this type of technology, and then we have to deliver. We are still on a very small scale of what is possible to achieve, so we have to slowly but surely score better on the expectations of the user and create more value. Offering Frida on the logged-in page, that she can retrieve payment information about you as a person, then Frida can take the step further” (IS9).*

For NAV to start marketing Frida on a bigger scale, the reliability of the technology needs to get better. Since NAV is working on implementing universal design, making it more familiar, more citizens may adopt Frida as a channel.

*“I believe that the technology will develop so that more and more of those we have today considered non-digital will be able to make greater use of this technology and will be able to get help from Frida's, if not Frida even, Frida's children and grandchildren [Metaphor for the next generations of chatbot] will be able to start helping in a slightly different way. In any case, it is my hope that those who, that is, that they help users to become digital simply. Getting more intuitive solutions.” (IS20).*

This would make more of the population recognise its potential to solve their problems as Frida becomes more familiar for the different groups of citizens. This could make it possible for people who are not that digitally competent or have a lack the ability to initiate a handover process and complete it.

NAV is trying to foster familiarity for both the citizen and chat employees to enhance the handover process and having an effective work surface for the chat employee. From the chat employee perspective, they get a work surface they should be accustomed to. It looks like a web browser, and the colour scheme tells the situation they need to know (new message, waiting, inactive etc). This is providing valuable information for the chat employee and helps them prioritize. There has also been some new design on the citizen's side. The chat window is now placed where you normally would find a chat window, in the bottom right corner, and the chat icon and colour change depending if you talk with Frida or a human. In this pre-handover, and pro-handover some citizens are not aware if they are now talking to a human or not. This could indicate that the information in the pre-handover is not sufficient for the citizen, or it's difficult for them to understand. Another interesting finding is that there is a split in NAV about if Frida should have a human name, face etc, or have a more robotic name and appearance. Both have its positive and negative sides. It depends on how NAV wants to be pictured. How NAV should proceed will be discussed in section 5.8. Lastly, some of the problems regarding citizens lacking knowledge in communicating with a chatbot. As discussed in chapter 4.6, citizens need to be educated in some way to get the most out of Frida. To do this, NAV plans for an education film, and further marketing of Frida as a reliable channel. This may help the citizens to understand Frida better, but there are still those

who are not digitally competent, or have a disability, making it hard for them to make use of Frida.

## 4.9 Findings related to ensuring privacy affordance

The ensuring privacy is defined as stated in section 2.4: Chatbots makes use of privacy preserving approaches, which they may also act as a gatekeeper for access to different functions. Sometimes it may be necessary in a chat to disclose key information about users. This makes it important to ensure privacy in the conversation (Mygland et al., 2021).

Ensuring privacy affordance is important because it can stop unwanted information in the chat, hinder the chat employee from getting access to unnecessary information, or information they should not have. Regarding this, NAV has done different improvements to limit the personal information given to Frida, and what personal information the chat employee can get access to. NAV has implemented a popup in Frida when the citizens are starting the chat for the first time with Frida.

*“When you start Frida, then you get a popup that says something about privacy. We are clear that you should not enter personal information. We are clear on how this information may be processed and so on. And that you in a way give an acceptance that you have read and understood, before you then continue with Frida. And that is in a way... There are many sides to such a case. One is that we must in a way be orderly and handle things in a proper way, and the users must also be confident that we handle their data, in a good way. And that we are concerned with privacy and are clear that .. that this is what we offer them here and that's how you should use this channel.” (IS9).*

Here NAV states what information is stored, how it is handled, and what the citizen should not write to the chatbot. Frida has no need to get sensitive information from the citizens as Frida can't use it, but in the future NAV aims for this to change. Today the chat employees have the option to get access to a citizen case and personal information, but as we found out, there are plans to give Frida some more tasks regarding the automatic case handling, as explained in section 4.2. Ensuring the privacy of the chat employee in the chat is something NAV is still in discussion.

*“Should we go out with the full name of the chat employee? Should we just have first names? There are also such discussions that we have. What level should we go to? What do users expect? How should NAV act in a way?” (IS9).*

Currently, the employee's first name is shown in the chat, but NAV hasn't decided what is the best course of action regarding this. When the citizen is logged in through the login chat, they show their full name, so there is a discussion that the chat employee should do the same. Since the citizens should know who they are talking to when discussing personal information. The citizen login using bank ID, so NAV knows they are talking to the right person and does not give out private information to someone else. If the citizen is in the service area that has the login chat service available, they can login in the chat, if the chat employee sees this as necessary. Even if the citizen is already logged in at NAV.no (MyNAV), the citizen then needs to accept the link the chat employee sends to login in the chat once more.

*“If the user is already logged in to the ID port, inside it "Your NAV". Then it is not the case that it automatically triggers access to user cases. Then the user must accept such an acceptance message from the chat employee, which says: To turn on the case. In any case, it must be approved manually by that chat employee. It is the chat employee who takes the initiative for this login dialogue.” (IS4).*

This affords the citizen privacy as the chat employee will not get access without both parties approving it. A logged in chat will demand a higher level of attention from the chat employee, as they are now handling sensitive information.

*“the one that's logged in will definitely demand a higher level of attention than an anonymous chat. So my guess is that the efficiency for the two others will be not so good because you will pay much more attention to the peop- the one that is logged in and you have access to the person's case.” (IS3).*

When a chat employee has a logged in chat as one of the three active chats, there is a greater focus on that chat compared to the other two. This is something that is worrying the chat employees, as IS5 described:

*“I worry a great deal about being able to answer good enough on the logged in chat at the same time as I'm processing two non identified chats, because with the login chat there is a large responsibility resting on me. That I actually get the information correctly that I am able to collect fast enough on the information available and it may be quite large amounts of information, but I have to collect and process fast and doing that at the same time as I'm talking to two other people I can't. I can't see how I'm going to, how I'm going to care enough for those two non identified.”.*

There will be a bigger focus and pressure on the chat employee to answer correctly, and on time. NAV does not want the citizens to be the one initiating the login in chat as of now, as there is functionality missing.

*“The risk now to allow the user to initiate login, we can suddenly sit with three login chats, and then we may have to switch between different systems to be able to respond to the different users. Then it's fast it can go wrong. So it is really a security mechanism that allows us for the time being that we who have control, and we who initiate.” (IS9).*

When the function and technology is in place, the citizen may be the one to initiate a login-chat. With the logged in chat, the chat employees now have the option to see what has been said in previous chats with that citizen. The chat employees have the opportunity to clarify, or correct previous statements given to that citizen. Regarding keeping the citizen in context and making sure no security is breached.

*“It is also the case that this Salesforce-solution is built up so it can handle multiple login in chat simutainlsy, and at the same time keep the user in context. It is extremely important with regards to privacy, and security. So that it's not a security threat when you are chatting with one, and he has a question about something, and then you answer based on the information from another user.” (IS9).*

A chat employee should not be able to give another citizen the wrong information based on another citizen's case, and NAV hopes this will promote more trust and confidence in the citizen to use that chat more.

*“...we also think that it will promote trust and confidence to a user that... Okay, it's okay for me to start with Frida, I can test Frida first, and then see how far we come. And in many cases she will be able to answer you fully and completely, and in some cases you have to move on, but you at least have the reassurance that there is someone at the other end who will help you, at least during our opening hours.”*  
(IS9).

This affords both citizens and chat employee privacy as there is a functionality in place preventing a chat employee sending information to the wrong person when handling multiple chats at the same time.

The privacy is ensured by the popup NAV provides at the start of the chat with Frida. This is a good thing as it informs the citizens to not write sensitive information and explains how the data is handled, affording the citizen privacy. After initiating the handover process and arriving at the post-handover, the chat employee may see the need to get access to the citizen case to answer the question. When this is initiated the citizen shows their full name in the chat, and so should the chat employee. In doing so, they would promote trust, and it's important for the citizen to know that they are talking with someone who has empathy, to not damage the trust they have with NAV. When the chat employee has access to the case, it seems they can look at everything regarding the particular citizen, and not just about what was asked for. This could be a constraint for the citizen, as it does not afford privacy if the employee reads something unrelated to the case/question. On the other hand, the chat employee could come with new information if they see that something stated previously is wrong. There is also a concern among some of the chat employees, that how much they should care for the non-logged in chats, when they get a chat that is logged in. Since the login needs much more care, and it needs to be correct. This could indicate that there is a bigger pressure when it comes to the login chat. The logged in chats could affect the other chats' negativity as the chat employee may use longer time to answer them. Previously mentioned, NAV hopes Frida could do more, like “Automatic case processing”, by contacting the citizens to inform them of the deadline of their benefits etc. This would afford the citizen, and somewhat the chat employee privacy. Having the personal information from a citizen handled by Frida, means that the chat employee does not need to concern themselves with it.



## 5. Discussion

In this section the findings from section 4 will be discussed in relation to the research questions, following the same fashion of categorisation into affordance types as found in section 4. In each sub-section, the importance and relevance of the affordances discovered in the findings improving the handover process is discussed. Further, the improvements that seem critical to improve process' linked to a handover are discussed. Finally, the discussion presents our recommendations based on relevant theory from the literature.

### 5.1 Human like Conversing

For affordances identified under the category of human-like conversing, the findings suggest that a lot of the benefits of citizens' affordances is closely related to many of the affordances that foster familiarity in the handover process. A human-like way of conversing can make the experience of the handover more familiar for a citizen, since it resembles how a conversation could have been with a chat employee. However, since a handover may be initiated faster with a less human-like conversation style with Frida, it is not so clear what is the best approach. If efficiency is at the core of making the handover more seamless, making the chatbot more human-like in conversation may lead to a delayed handover process. If the aim is to afford citizens with the ability to use a more natural language to improve the experience and ease to express themselves in contact with NAV, affordances related to human-like conversing is important for the handover process to be more seamless. In many situations, it is a combination of both these aims, which means that finding a good balance between human-like conversing and unambiguity for handover triggers are both important factors for improving the handover.

The different functions NAV has today, improve the handover process and makes the flow more seamless. This is supported in the literature by Feine et al. (2019);

*“The chatbot could seamlessly handover the conversation to a trained human service agent, automatically trigger service recovery procedures, or express certain verbal utterances such as excuses. Research has shown that these immediate reactions can reduce the level of frustration and can lead to an increased interaction length.”*

The different functions afford the citizens different ways and approaches to initiate the handover process, which in return reduces frustration and increases interaction length for the citizens and the chatbot. The chat employee is affected by the chatbot answering more of the general questions, giving them more time to use on complex cases/chats. Since there are different and easy ways to initiate the handover process. If Frida is not able to help the citizen, it does not represent a significant reduction in the customer experience. When the “human help” is offered immediately after a failure, or if the citizen asks for it (Følstad & Skjuve, 2019; Kvale et al., 2020), it will help the citizens get out of any “loops”. This is like the problem identified in the “Action trigger” function. When a citizen asks a question twice in a row, they will get an answer from Frida saying she already has answered that, and an option to talk to a chat employee. This function can easily be worked around by asking question one, asking question two, and then asking question one again. In doing so, the

citizens will be kept in the loop. By writing “human”, they also get the option to start the handover process. Actions which will lead to a quick handover process are however not very human-like. Writing out “human” in the chat, is not a typical way of communicating that you want to speak to someone else, e.g. a manager or another supervisor. When using a chatbot it is however a useful feature for citizens who perceive this as an action possibility to be handed over to a chat employee.

From a perspective of a chat employee, it seems less critical to focus on mimicry of human-like conversing, as they are very much aware of the fact that Frida is a chatbot, when chat employees use Frida to find information to assist them with a handover, short messages, or key words, are much more effective for getting the right answer. Here it is important to point out that Frida is initially a chatbot meant to be used by citizens and not a chatbot assisting chat employees in their handling of inquiries.

An interesting result of this study is that chat employees and chatbot trainers sometimes use Frida as a way of gathering information quickly rather than using their knowledge base. Chat employees perceive that they ask questions as if Frida was a human being to find information, but also as a search engine to find information needed for solving inquiries. The search in the literature does not mention chat employees, supervisors on other channels, or chatbot trainers using chatbots for this purpose. There are however specific chatbots that are being used for similar purposes, like internal chatbots retrieving information from knowledge bases for the chat employee and automating routine work (Corea et al., 2020; Mahar & Bennett, 2019; Primetshofer, 2019; Stoeckli et al., 2020; Stoeckli et al., 2018; Waizenegger et al., 2020).

If an internal chatbot should be implemented, and chat employees know it is a chatbot, the findings suggest that less human-like conversation improves the process of handover. The same goes for another feature often seen in chatbots, where they mimic human's typical response time. Chatbots could potentially respond close to instantly when receiving a text, but to mimic a more human-like response time, messages are sometimes delayed on purpose to appear more human-like (Mahar & Bennett, 2019).

## 5.2 Assistance provision

Affordances in Frida providing assistance, which were exclusively related to the chatbot, were not as many as initially anticipated. This is most likely due to Frida being a chatbot primarily meant for customer service. Still, there are some affordances for the chat employee which helps make the handover process more seamless.

Some of the affordances related to reminders on responding to inquiries that have been waiting for a certain time seems to be important for a seamless process for handovers. This includes visual design features like colour changing on chat windows that have not received a reply after a set amount of time. Chat logs are also important for chat employees, affording them with ease of preparing for an incoming inquiry.

As mentioned in section 5.1 and 4.2, some of the interviewees with background from handling chat inquiries from Frida stated that they sometimes used the chatbot to quickly get

to the information they sought for. With the vast amount of information about various services, it becomes apparent that an easy way to access the right information would help resolve inquiries faster. Følstad and Skjuve (2019) points at a chatbot's lack of ability to provide a good enough answer is not necessarily bad for the user experience, given that they were able to offer a simple path for following up an inquiry with a chat employee. This highlights how the handover may benefit having a “tiered” approach for chatbots in customer service (meaning that implementation of a chatbot for customer service allow for escalation to a chat employee if needed). In this sense, chatbots function more as the first line of support, where an important task is relaying unresolved inquiries to a chat employee (Følstad & Skjuve, 2019).

If we assume that chat employees in NKS main purpose is to answer the more complex inquiries, a well-handled handover process could potentially improve the handling of all inquiries in total. In a handover situation, chat employees may even be one step ahead, since the chatbot already gathered some information beforehand. The chat log provides all the information from the interaction, which the interviewees say is useful for solving an inquiry faster. Even though the chat employee received the transcript of the chat with Frida, there are still citizens who do not realise the transcript is forwarded, which is halting this part of the handover process. To improve affordances linked to preparing chat employees before inquiry takeover, it seems to be critical for the citizens to also recognise that they do not have to repeat anything that they’ve already said to the chatbot.

Affording the chat employees with easy ways of gathering information about a given service or type of information is mentioned as an important aspect of improving the handover process. As of today, the way chat employees are intended to gather this information is through a knowledge base. However, many of the chat employees and chatbot trainers say they use Frida instead because it is an easier way to get to this information. This affordance in Frida gives an indication to how affordances we’ve categorised as information distilling and enrichment of information could improve handover processes for chat employees. As the findings also suggest, NAV also see this as an important focus for improving the handover, since activities such as ease of finding knowledge and to share this information with citizens are some of their main focuses for the future of Frida. More actualization of this affordance can perhaps lead to further improvements to the improvement to the handover process, if it is designed more around the needs of a chat employee. Frida is however a chatbot tasked with customer service, which is why an internal chatbot meant for chat employees is better (referring to the discussion in section 5.1 on human-like traits in chatbots).

### 5.3 Facilitation

NAV could implement a new technical aspect in Frida, giving her more tasks/functions, to have the opportunity to afford facilitation from a third-party system to the chat employee. This would make the post-handover more seamless for the chat employees. In the organization Meske et al. (2020) studied, they saw that the chatbot could afford facilitation with capturing data, get updated information through the chat, get status reports etc. (Meske

et al., 2020). This means that if Frida got more tasks/functionality, she could keep the chat employee up to date on changes in the information in the “Knowledge base”, new regulations (changes the government makes for example) or capturing the data the citizen gives to the chat employee. This would provide the chat employee with all the information they need, to complete the handover process. Stoeckli et al. (2020) explore how chatbots work internally in an organization.

Navigating through all the information and forms in NAV is complicated. Interviewees also state that many who contact NKS come with inquiries which are not related to any service they provide but which are for another public institution. In other European public institutions where they’ve implemented chatbots, the same problem emerges, as each chatbot is only able to answer inquiries related to their own specific field of service (Lee et al., 2020). If public institutions and organisations can share data and be able to facilitate communication and information between institutions, many inquiries that are general in their nature, but out of scope for Frida, could be handled. This in turn means that the handover can be improved, or in this case be eliminated, because simpler inquiries can be handled automatically, even though they’re not necessarily within Frida's field of work.

## 5.4 Distilling Information

Looking back to section 5.2, a factor seemingly critical for improving the handover is making sure that the chat employees taking over a chat from Frida can get updated on the inquiry quickly and with ease. The chat logs provide the information that they need to do this, but this information is not organised in any way other than by time stamps. Although used in a different setting, chatbots have previously been used for gathering relevant information, and organising this in a way, making it easier to get up to speed on what the inquiry is about (Mahar & Bennett, 2019), see figure 10. As Mahar and Bennett (2019) describes:

*“...Agents were chatting quickly and handling multiple cases at one time, such that they didn’t reliably have time to read over an entire chat before needing to respond and help the customer. Successful summaries, on the other hand, could help keep responses within the designated SLA time period, and keep customers happy.”*

This helped the chat employee feel more confident and prepared when they got the inquiry from the chatbot. If NAV can make use of an effective summary function, they are on the right track. This is supported by Knotte et al. (2021) as it lets the chat employee; *“...spend more cognitive load on the actual value-creating task rather than on interacting with the system.”*. The chat employee would use more of their time “creating value” for the citizen, rather than using that time retrieving the information from the system or by reading a chat log that has not been summarized. Stoeckli et al. (2018) and Stoeckli et al. (2020) both found similar uses in the organization they researched. The chatbot in this organization did more of the administrative work and collected useful information for the employee. In NAV an example of this is the “Automatic case processing” which would help the chat employee focusing on other tasks or allowing the citizen to inform Frida with case related information (in login chat), which it would then update their case. This could reduce the numbers of handover as Frida would take more of the mundane tasks. According to Poser et al. (2021),

this is a benefit for the chat employee, as they would not be strained as much. Similar solutions would be to have Frida as an assistant for the chat employee. Some citizens do not give Frida a chance to help them, even if she could have answered it perfectly. By having Frida, or another internal chatbot, in the post-handover as well, it could be a part of the chat window for the chat employee and show potential examples of answers the chat employee can use when answering the citizen. Janssen et al. (2021) have seen similar uses, in a B2B environment. When the chatbot collected the information and presented it to the salesperson during the conversation with the customer. This was based on what the customer had written to the chatbot earlier. This would alleviate some pressure from the chat employees as the information needed can just be copied and passed into the chat from Frida's suggestion.

## 5.5 Enriching Information

Similar to what has been discussed in section 5.4 and 5.2, affordances connected to enriching information for the chat employees are scarce but seems critical for a seamless handover process. In terms of affordances connected to a chatbot enriching information, some chatbots, mainly chatbots meant for usage internally in an organisation, provide summaries and additional information for the people using them (Poser et al., 2021). An example can be seen in Poser et al. (2021), which is presented in figure 10.

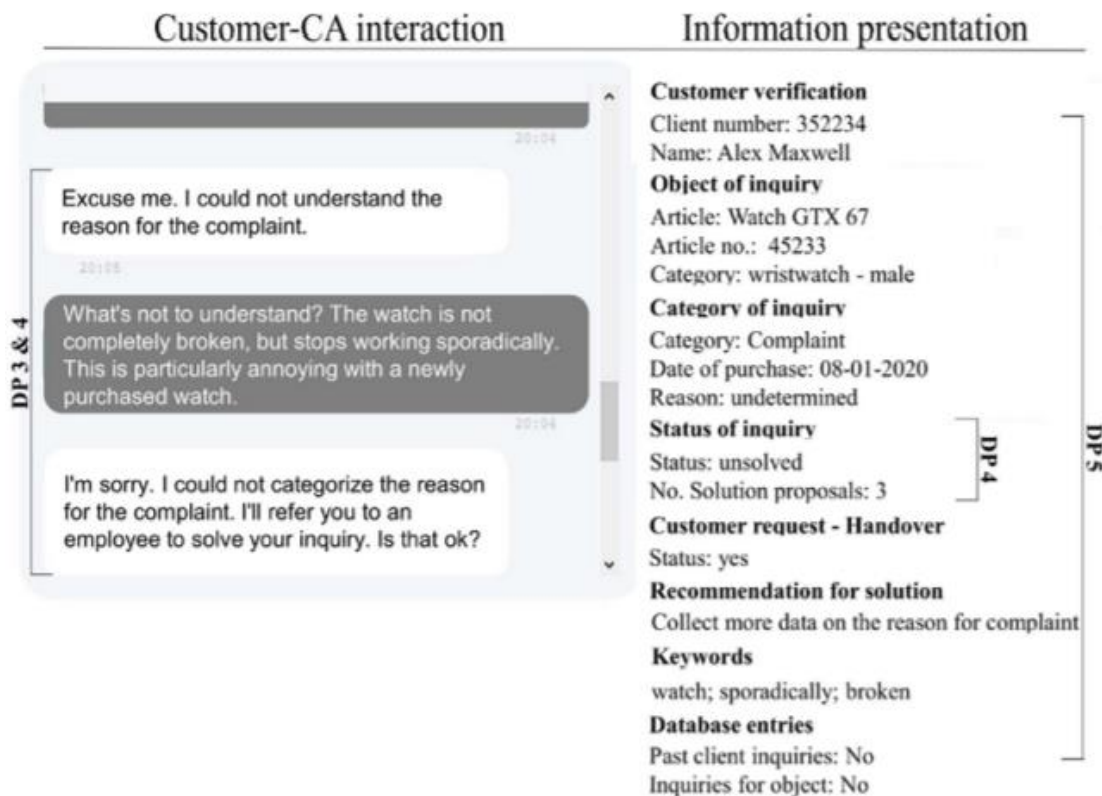


Figure 10 - Example of summary in chat in the post-handover process by Poser et al. (2021).

The upcoming function, which is currently being implemented in NKS, will provide an option for chat employees to log in the citizens. In near future, it will help chat employees get

enriched information about inquiries by getting additional information about previous inquiries and other relevant information.

Enriching information can in the case of NAV be of different nature, and both will help the chat employee in their work, which in turn will improve the handover. The first way information can get enriched is based around the chat inquiry being more personalised in a sense, and not as general in nature. This type of enrichment is closely linked to the logged in functionality. The other is the one seen more often in the literature, where information about a certain service or type of information is provided with other relevant information.

## 5.6 Context Identification

A chatbot's ability to identify context is one of the core elements many of the affordances a chatbot may have. In essence, what a chatbot does is to identify the text it is being provided, and then provide a suitable answer (Poser et al., 2021). Since the back-end of Frida is being developed by someone other than NAV, they will in that sense be very dependent on the progress within context identification the developer makes.

The critical part to affordances related to context identification is improving the current affordances like identifying more themes and context in messages. Since this is something which is partially out of NAV's control, the focus should therefore be on improving the perception of the affordances that do exist at the present time, and minimising likelihood of perceiving false affordances, which are likely to lead to frustration for citizens.

One of the prominent false affordances identified from the findings is that citizens think that the chatbot can understand and identify many themes in large amounts of text, where much of the text might be trivial information around the context of the problem which is confusing for the chatbot. Hewitt and Beaver (2020) points out in their study where they compare human-to-human and human-to-machine interactions, that adding longer inputs in the training data could introduce unnecessary noise, and he therefore recommended using training language which is more focused on relying on direct language, and on the task (Hewitt & Beaver, 2020). This study mainly focused on the chatbot's ability to identify context in the inquiries from citizens.

On the other hand, there are frequently implemented improvements to the problems around context identification which help the actual affordances linked with identifying context to come closer to the expectations that the citizens have. Mentioned in section 4.6, context topics is a relatively new concept in Frida, that is new from what we've seen in the literature up to this point. This is the kind of functionality that helps bridge the gap between expected capabilities and actual capabilities.

The Thumbs up and down which is mentioned in other sections (section: 4.2, 4.6, and 4.8), could provide the chat trainers at NAV with distilling information, which could be used to improve Frida's ability identify context in messages. As chatbot trainers have said in the interviews, this information can be used to get better indications as to what answer Frida gives are good, and which ones that are bad. It would also show the answer Frida gave was

correct, but the citizen gave it a thumbs down, which could be used to indicate the mood and mental state of the citizen.

## 5.7 Personalization

The findings did not highlight any personalisation affordances, but we found room for improvements. NAV has talked about an internal chatbot called “Einstein”, that was put on ice some time ago. “Einstein” could be a personal assistant that the chat employee could personalise for their own needs. Waizenegger et al. (2020), points out that people have less time, despite technology support that facilitates many work practices and processes. “Einstein” could be the one doing or taking over some of the administrative tasks a chat employee does to alleviate pressure and save time.

*“By interacting with the CA they co-create value and improve their communication, achieve better task management, enhanced information retrieval, enhanced learning and better data-driven decisions” (Waizenegger et al., 2020).*

Another improvement could be that Frida could be adaptivity (“The technology presents information that is contingent on the behaviour, knowledge, or characteristics of the learner” (Lippert et al., 2019), give feedback (“The technology gives the learner information about the quality of their performance and how it could improve (Lippert et al., 2019). To help the chat employee see where they could potential improve.

## 5.8 Fostering familiarity

A great deal of the findings indicate that affordances linked to fostering familiarity is especially important for a seamless handover process. Like many other chatbots in different organisations, Frida possesses certain anthropomorphic traits to mimic a human-like appearance. Stated in section 5.1, this is good for giving the citizens the ability to interact in a more natural way.

A problem that seems to be at the core of most of the problems identified from the findings is the similarity in design to Frida and an actual human being. The work tasks for Frida are not necessarily the same as a chat employee, and the expectations are not the same either. The issue of expectations is therefore at the core of the problem in this sense. Improvements that help the citizens ability to recognise when they talk to a chatbot and when they’re in dialogue with a chat employee are therefore important. This is closely related to the anthropomorphic traits in Frida especially, since the window in which the chatbot operates is the same, or close to identical to the one where a chat employee takes over a chat. As suggested by Simonsen et al. (2020), helping users gain domain knowledge about the chatbot in the communication should be encouraged amongst chatbot designers (and trainers), since their analysis indicate a mismatch between expectations and capabilities when chatbots greatly resemble humans (Simonsen et al., 2020).

Doing this in practice may be easier said than done. In essence, what should be encouraged, based on empirical data from this study, is to create clear boundaries between the field of a

chatbot and the chat employees, to investigate what specific expectations the initial stages of the interaction with the chatbot give the citizens, and likewise for the interaction after the handover. This can be factors such as certain anthropomorphic traits, the name of the chatbot, or the tone of voice being too similar to humans. As the findings suggest, these human-like traits are very close to what we see in human beings but not entirely, and therefore leads to misunderstandings. Magnusson and Rånnerud (2019) discuss the issues surrounding anthropomorphism in chatbots and points to previous literature being torn in regards to what is the correct way to go.

Critical factors for making the handover process more seamless can therefore be summarised to two points regarding fostering familiarity. Visual traits in the design that help recognition of the difference between chatting with a chatbot and a human, backed up by the views the interviewees had regarding what they mentioned as problems in the handover process. Correct balance of anthropomorphic traits in a chatbot, as some interviewees also stated that some of the human-like traits were also contributing to mismatch in expectations to the chatbot, and confusion when their inquiry was handed over to a chat employee. The key to this is to establish what the correct balance of human-like traits creates the least ambiguity.

## 5.9 Ensuring Privacy

The findings related to ensuring privacy affordance, shows both positive and negative results regarding privacy in the chat between citizens, chat employees and Frida. Waizenegger et al. (2020) points out it's a good thing NAV has anonymous names when Frida is talking to the citizens. This is related to sensitive topics, which are in most cases handed over to a chat employee and it might help the citizen ask "stupid" questions as they don't feel judged by it. *"Clients feel more comfortable discussing sensitive topics with CAs[Chatbot] for the perception that they will not be judged and the interaction is anonymous."* (Waizenegger et al., 2020). Knote et al. (2021) points out by not providing information about data collection and storage, there is a risk the citizen will lose the trust in Frida or the organization in general. NAV implemented the popup this January 2021, informing the citizens about these issues. NAV could also use Frida or the internal chatbot "Einstein" as a gatekeeper for sensitive information in the chat. Stoeckli et al. (2020), and Stoeckli et al. (2018) both saw the chatbot as a gatekeeper in the organization they researched. This could be applied to when a chat employee accesses a citizen case through the login function so that the chat employee only sees what is relevant within that area (that the citizen is talking about), and other information about the citizen. Having the chatbot as a gatekeeper could help the chat employee keeping the login chat in context. A gatekeeper would also monitor that the right information goes to the login chat, and not the unlogged ones.

## 5.10 Recommendations

Drawing from the findings discussed in the paragraphs presented earlier in this section, we developed a set of recommendations. The recommendations are for NAV and NKS and points to actions and changes that can be made to improve the handover. A common ground



for all the points and findings discussed, is that they can be linked to one of the three first stages in the theoretical framework of affordances presented in section 2.1, proposed by Pozzi et al. (2014), namely affordance existence, affordance perception, and affordance actualisation, and so the summary of the discussion will have a focus on these stages in the theoretical framework. The list will be categorized into three categories: technological recommendations, recommendations on changes to processes, and recommendations linked to training and education of staff and users [citizens].

In terms of affordances for chat employees, the findings indicate that they are, in general, perceived well by the chat employees, and many of the chat employees interviewed also perceive affordances in Frida which are outside the intended field of usage. This is because chat employees are working with Frida daily, in a sense forcing them to learn how Frida can afford them and how she can't. They constantly learn new ways of optimising their interaction with Frida and therefore can actualise many of the affordances with ease. They are also being involved meetings to improve the chatbot and can give feedback directly to the developers and management.

Frida is a chatbot primarily focused on customer service and not assistance for employees. Therefore, we do not recommend adjusting Frida on the premisses of the chat employees, but instead focus on providing the chat employees with an internal chatbot that can enrich and distil information from the inquiry Frida handed over. This is primarily because of the discussion from section 5.1 and 5.6, which discusses the mismatch between expectations to competence in Frida and the actual competence (and existence of affordances) for the citizens.

If an internal chatbot, focused on assisting a chat employee would be implemented, we highly recommend differentiating the human-like traits from the ones in Frida, because expectations from the chat employees are very different from the citizens.

The most critical factors that seem to affect the handover process at the present moment are related to the citizens ability to recognise affordances, and more importantly avoid factors and design that lead to false affordances for the citizens. This is closest related to what is being discussed in section 5.1 and 5.6, as the expectations for what Frida can do for them are too high, and when presented with the information that they've been talking to a chatbot, expectations may change, and confusion arise. Based on the findings, this indicates that some citizens perceive a false familiarity, and act on this, which in turn leads to confusion and a less seamless handover process.

A short-term recommendation for this problem is to avoid human-like traits with Frida that may deceive citizens into believing that they are talking to a human. There are naturally grey zones to this, and it is hard to find the correct balance for what may be deceiving and what is not. In the long-term, our recommendation is to continue closing the gap between actual capabilities Frida has in identifying context in natural language, and the capabilities citizens expect (or perceive) from Frida. Improvements are frequently being made by the developers

in this field, to close this gap. Another factor that helps close the gap is how Frida is being trained by the chatbot-trainers.

The feature of giving an interaction a thumbs up or down was one of the potential functionalities that would help with training Frida to be able to identify context better. Still, it is important to point out that interviewees with background as chatbot trainers pointed out the possible issue of uncertainty as to what exactly a thumbs up or thumbs down should be interpreted.

In terms of actualisation of affordances, the general impression is that there are not too many issues associated between this and the handover process. One minor issue may be in the final stage of an inquiry, namely the possible solution and closure of inquiries.

*Table 13 - Summary of recommendations.*

<b>Recommendation Area</b>	<b>Description of Recommendation</b>	<b>Related Affordances</b>
Technology	<ol style="list-style-type: none"> <li>1. An internal chatbot that can help with administrative work.</li> <li>2. A summary of the chat provided to the chat employee.</li> <li>3. Give Frida the ability to offer updates, status reports or other relevant information to the chat employee.</li> <li>4. Make Frida and other public sector chatbots able to talk together to provide a common service.</li> <li>5. In the logged in chat, Frida could update the citizen case.</li> <li>6. Frida as an assistant, helping chat employees when they talk to the citizens (suggested answers based on what the citizens write).</li> <li>7. The internal chatbot "Einstein" could take over the administrative task a chat employee has.</li> <li>8. Frida can provide feedback on the chat employee performance.</li> <li>9. If Frida is to be more human-like, it should be clearly stated what Frida's capabilities are, so the citizens don't expect too much.</li> <li>10. If Frida is to be more robotic, name, icon need to be changed.</li> <li>11. Provide a gatekeeper so the chat employee only gets to read what is relevant to the case in a login chat.</li> </ol>	<p>Assistance provision.</p> <p>Facilitation</p> <p>Distilling.</p> <p>Information</p> <p>Personalization.</p> <p>Familiarity.</p> <p>Ensuring Privacy.</p>

	<ol style="list-style-type: none"> <li>12. Provide a gatekeeper when the chat employee has three chats, so the chatbot would watch over that the chat employee do not send the information to the wrong person.</li> </ol>	
Process	<ol style="list-style-type: none"> <li>1. Inform the employees of the possibility to get fast information from Frida, rather than finding it yourself.</li> <li>2. Adjust Frida so she either answer right away, or set a timer so it is perceived as more human-like (3-4 seconds)</li> <li>3. Clarify how Frida's appearance should be to create less confusion on whether it's a chatbot or a human.</li> </ol>	<p>Human-like Conversing. Assistance provision. Familiarity.</p>
Training	<ol style="list-style-type: none"> <li>1. Train employee to get information from Frida more effectively and efficient</li> <li>2. Educate the citizen on chatbot usage.</li> <li>3. Reduce the gap between expected capabilities of understanding natural language and actual capabilities, by clarifying actual capabilities better for citizens</li> </ol>	<p>Human-like Conversing. Distilling Information. Context Identification.</p>

## 6. Conclusion and further research

For this thesis, the following research questions have been proposed:

How can the handover between public service chatbots and chat employees be improved?

Sub-questions:

- What are the perceived affordances of NAV's chatbot Frida?
- How can we enhance the perception and actualization of Frida affordances that facilitate handovers?

There are several ways this research question can be addressed. Our approach focuses on the affordances that are perceived from the chatbot Frida in NAV, and enhancement of perception and actualization of the affordances correlating with the handover process between chatbot and chat employees.

In this thesis, we have explored how a chatbot is being used in a public sector organisation in Norway, how employees work with this chatbot and how it affects their work. To get insight into how the emerging new technology we see in chatbots, we have looked at what affordances the chat employees perceive in this technology, and how it also may limit them in their work by using a theoretical framework based on the theory of affordances. Throughout this analysis we propose recommendations within three categories that can improve the handover: Technological, process-oriented, and training-oriented.

One of the most important findings on issues related to improvement of the handover process is the level of expectations some citizens' have based on what they perceive, when they contact Frida. The confusion is related to Human-like traits and mismatch between expectations and the actual abilities the chatbot have. Several other cases from the literature point out that a critical factor for misleading expectations is oriented around the human-like traits of a chatbot. Recommendations to solve this issue are twofold: the short-term solution is to improve recognisability, that Frida is a chatbot. This can be done with visual design elements, primarily focused on avoiding things that may lead citizens into perceiving Frida as an actual human-being, and vice-versa when chatting with a chat employee. The long-term solution is to continue the focus on improving the chatbots ability to correctly identify information as humans do. Further development of context topics, and the ability to identify more than one question or theme in messages are both good examples of steps in the right direction.

The findings also show that chat employees in NKS have extensive knowledge about how a chatbot can help them execute their work tasks, as well as perceiving affordances outside the chatbots intended usage. This finding implies that chatbots designed as an assistant for chat employees is needed and could benefit them in their work. In terms of the handover process, additional affordances provided by an internal chatbot could help make the process of getting updated and informed after being handed over a case from a chatbot would be improved. Our recommendations are to investigate possibilities for implementing an internal chatbot with the aim of assisting the chat employees when receiving inquiries. Findings from literature

suggest that affordances related to enriching and distilling of information for the chat employee are critical for a successful internal chatbot, along with features that eliminate mundane tasks for them as well. For handling of complex inquiries, this may be especially important, first because of the vast amount of information needed to be processed, and secondly, because it is always changing along with changes in rules and regulations.

The findings from the literature study can contribute to research on chatbots in the context of citizens and chat employee's behaviour making digital transformation successful (Pappas, Jaccheri, Mikalef, & Giannakos, 2017; Pappas, Mikalef, Giannakos, Krogstie, & Lekakos, 2018). Many different chatbot characteristics, with related action possibilities, are explored in the papers reviewed. There are however less focus on aspects that are important for the actualisation of affordances such as digital literacy and the elimination of digital inequalities (Vassilakopoulou & Hustad, 2021). This calls for further research on how to improve perceivability of affordances related to context identification, familiarity, and privacy in different contexts (Mygland et al., 2021).

Our findings and recommendations from the interviews with NAV can contribute to better procedures for inquiry handling, and improvements our understanding of how appearances of chatbots in organisations in public sector affect the expectations citizens and customers have to chatbots during a handover process. Additionally, findings on affordances linked to internal usage of chatbot show the potential this has for a good and effective handover process, as well as the importance of the chat employees gathering of knowledge in this process. The empirical data suggest that an organisation such as NAV could have benefitted from implementing an internal chatbot in NKS, making it interesting to look at potential benefits of internal assistant chatbot for chat employees, especially in organisations dealing with complex case handling and large service fields.

It could also be interesting to look at how the citizens come to the conclusion that they're talking to a chatbot or a chat employee, what their expectations are for them.

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## 8. Appendix

### 8.1 Search terms

Searchword/string	Search engine	Comment
TITLE-ABS-KEY ( chatbots AND chat AND agents ) AND ( LIMIT-TO ( SUBJAREA , "COMP" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Chatbot" ) OR LIMIT-TO ( EXACTKEYWORD , "Chatbots" ) OR LIMIT-TO ( EXACTKEYWORD , "Conversational Agents" ) )	Scopus	Result: 31
TITLE-ABS-KEY ( chatbot AND live-chatagent )	Scopus	No result
TITLE-ABS-KEY ( chatbot AND live-chat AND agent )	Scopus	Results: 2 articles.
live chat agent	Google scholar	Results: 19.800 Only the 9 papers on the first page were used. Many of the article were the same as previously found.
TITLE-ABS-KEY ( chatbot AND human-agents ) AND ( LIMIT-TO ( SUBJAREA , "COMP" ) OR LIMIT-TO ( SUBJAREA , "ENGI" ) OR LIMIT-TO ( SUBJAREA , "SOCI" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Chatbot" ) OR LIMIT-TO ( EXACTKEYWORD , "Human Agent" ) OR LIMIT-TO ( EXACTKEYWORD , "Human-agent Interaction" ) )	Scopus	Results: 23
TITLE-ABS-KEY ( chatbot AND citizen )	Scopus	Results: 32
TITLE-ABS-KEY ( user AND interaction AND public AND organization ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) ) AND ( LIMIT-TO ( SUBJAREA , "COMP" ) OR LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "BUSI" ) )	Scopus	Results: 108

TITLE-ABS-KEY ( "Citizen view" AND "public organization" ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) )	Scopus	Results: 1
TITLE-ABS-KEY ( "Citizen view" AND "private organization" )	Scopus	Results: 1
TITLE-ABS-KEY ( chatbot AND public-sector )	Scopus	Results: 8
TITLE-ABS-KEY ( chatbot AND private-sector )	Scopus	Results: 2
Citizen interacting with public sector chatbot Materialtype: Article Language: English Release date. Last 5 year	Oria	Results: 19
Citizen interacting with private sector chatbot Materialtype: Article Language: English Release date. Last 5 year	Oria	Results: 9
TITLE-ABS-KEY ( " <b>The handover process</b> " ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2015 ) ) AND ( LIMIT-TO ( DOCTYPE , "cp" ) OR LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SUBJAREA , "COMP" ) OR LIMIT-TO ( SUBJAREA , "ENGI" ) OR LIMIT-TO ( SUBJAREA , "MEDI" ) OR LIMIT-TO ( SUBJAREA , "MATH" ) OR LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "NURS" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Handover" ) OR LIMIT-TO ( EXACTKEYWORD , "Handover Process" ) )	Scopus	Result: 102
TITLE-ABS-KEY ( chatbot AND "Handover" )	Scopus	Resultat: 1
TITLE-ABS-KEY ( <b>coordination-between-human-and-machine</b> ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2016 ) )	Scopus	Resultat: 2
TITLE-ABS-KEY ( <b>handover-process</b> AND <b>it</b> ) AND ( LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO	Scopus	Result: 77

( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2015 ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Handover" ) OR LIMIT-TO ( EXACTKEYWORD , "Handover Process" ) )		
"customer service" handover	Scopus	Result: 52
"handover process" AND challenges AND ( LIMIT-TO ( SUBJAREA,"SOCI" ) OR LIMIT-TO ( SUBJAREA,"NURS" ) ) AND ( LIMIT-TO ( PUBYEAR,2021) OR LIMIT-TO ( PUBYEAR,2020) OR LIMIT-TO ( PUBYEAR,2019) OR LIMIT-TO ( PUBYEAR,2018) OR LIMIT-TO ( PUBYEAR,2017) OR LIMIT-TO ( PUBYEAR,2016) OR LIMIT-TO ( PUBYEAR,2015) )	Scopus	Result: 80
Human handover chatbot	Google scholar	Result: 280 Only 10 were chosen. Many of the article were the same as previously found.
"Human Handoff"	Oria	Result: 21 Only 1 were chosen. Many of the article were the same as previously found.
Chatbot AND handoff	Google scholar	Result: 399 Only 12 were chosen. Many of the article

		were the same as previously found.
Service recovery in chatbot	Google scholar	Result 2140 Only 1 were chosen. Many of the article were the same as previously found.
TITLE-ABS-KEY ( chatbot AND affordance )	Scopus	Result: 7
TITLE-ABS-KEY ( conversational-agent AND affordance ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2017 ) )	Scopus	Result: 6
Chatbot AND affordance Year: Between 2015-2021 Exluded: patents, and qoutes	Google scholar	Result: 1550 Only the first 15 were chosen. Many of the article were the same as previously found.
conversational agent AND affordance Year: Between 2015-2021 Exluded: patents, and qoutes	Google scholar	Result 7800 Only the first 15 were chosen. Many of the article were the same as

		previously found.
Chat-agent AND affordance	Scopus	Result: 0
Live-chat-agent AND affordance	Scopus	Result: 0
Chat-agent AND affordance Year: Between 2015-2021 Excluded: patents, and quotes	Google scholar	Result 21
Live-chat-agent AND affordance Year: Between 2015-2021 Excluded: patents, and quotes	Google scholar	Result: 3

## 8.2 Information for the literature review

Table 14 - Selection process.

	Scopus	Oria	Google Scholar	Backwards search	Total	Removed
Collected	500	25	90	4	619	579
Phase 1, Must have author, no duplicates, English, 2015 or newer, have access, no reviews	394	21	73	4	492	127
Phase 2, <b>Title</b> is relevant	147	5	53	4	209	283
Phase 3, <b>Abstract</b> is relevant	98	5	38	4	145	64
Phase 4, <b>Full text</b> is relevant, empirical data gathered	13	2	22	3	40	105
Phase 5, Deep analyses	13	2	22	3	40	0

Table 15 - Overview of Phase two exclusion.

No Author	15
Duplicates	58
English	5
2015 or newer	24
Have access	7
No reviews	18

## 8.3 Consent form

### **Vil du delta i forskningsprosjektet ”Frida@Work”?**

**Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke den kritiske rollen tillit spiller i bruken av NAVs chatbot Frida. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.**

#### ***Formål***

Prosjektet Frida@work skal undersøke den kritiske rollen tillit spiller i bruken av NAVs chatbot Frida ved å undersøke problemet av ufullført samtaler dvs. samtaler som ikke blir ferdigstilt i Frida. Målet er å sikre at et større antall samtaler med Frida fullføres, eller sømløst overføres til en veileder (saksbehandler) der det er behov. Prosjektet adresserer følgende overordnede forskningsspørsmål: Hvordan kan Frida bli en mer pålitelig og effektiv del av NAVs tjenesteleveranse?

Frida@Work er en forskning prosjekt med deltakerne (forskerne og master studenter) fra UiO, UiA og NTNU.

#### **Hvem er ansvarlig for forskningsprosjektet?**

Institutt for Informatikk ved UiO er ansvarlig for prosjektet og samarbeider med UiA og NTNU.

#### **Hvorfor får du spørsmål om å delta?**

Vi spørre deg om å delta i studien fordi du har erfaring med utviklingen av Frida eller med å jobbe med samtaleresultater fra Frida. Vi fikk kontaktopplysning din fra NAV.

#### **Hva innebærer det for deg å delta?**

Hvis du velger å delta i prosjektet, betyr det at vi har noen intervjuer/workshops med deg om Frida. Intervjuene/workshops blir tatt opp og transkribert for analyse. Temaet handler om din erfaring med Frida som ellers utvikler seg som ansatt.

#### **Det er frivillig å delta**

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

#### **Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger**

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Prosjektgruppe vil ha tilgang ved behandlingsansvarlig institusjon: forsker og master studenter.

Navnet og kontaktopplysningene dine vil jeg erstatte med en kode som lagres på egen navneliste adskilt fra øvrige data. Datamaterialet blir lagret på forskningsserver.



Deltakerne vil kunne ikke gjenkjennes i publikasjon.

### **Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?**

Opplysningene anonymiseres når prosjektet avsluttes, noe som etter planen er 31.10.2021. Etter 6 måneder fra prosjektslutt skal data slettes.

### **Dine rettigheter**

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg, og
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

### **Hva gir oss rett til å behandle personopplysninger om deg?**

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Institutt for Informatikk har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

### **Hvor kan jeg finne ut mer?**

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- UiO: Miria Grisot, [miriag@ifi.uio.no](mailto:miriag@ifi.uio.no)
- UiA: Polyxeni Vassilakopoulou, [polyxenv@uia.no](mailto:polyxenv@uia.no)
- NTNU: Elena Parmiggiani, [parmiggi@ntnu.no](mailto:parmiggi@ntnu.no)
- Vårt personvernombud ved UiO: Roger Markgraf-Bye [personvernombud@uio.no](mailto:personvernombud@uio.no).

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:

- NSD – Norsk senter for forskningsdata AS på epost ([personverntjenester@nsd.no](mailto:personverntjenester@nsd.no)) eller på telefon: 55 58 21 17.

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## **Samtykkeerklæring**

Jeg har mottatt og forstått informasjon om prosjektet Frida@Work, og har fått anledning til å stille spørsmål. Jeg samtykker til:

- å delta i intervju-workshop

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

---

(Signert av prosjektdeltaker, dato)

## 8.4 NKS chat interface

The picture is sent to us from NAV, and the quality could not be improved.

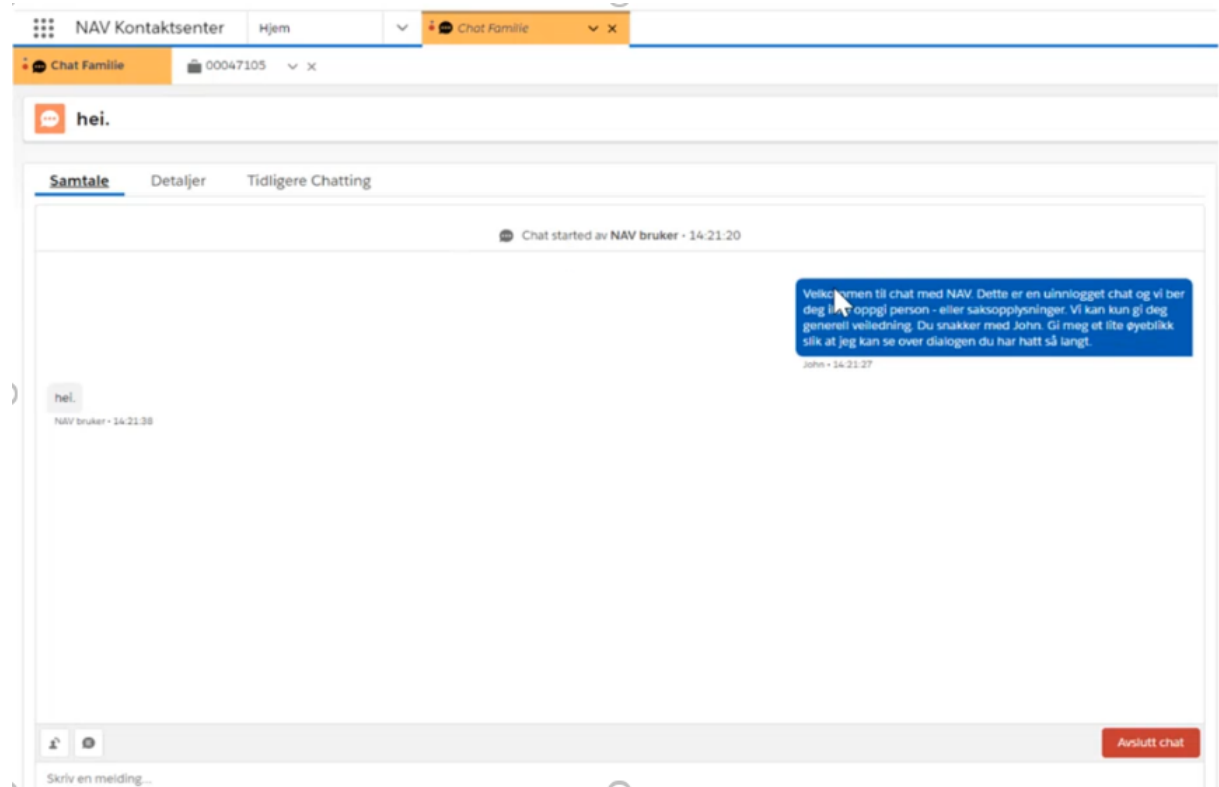


Figure 11 - Chat interface from Chat employee perspective.

## 8.5 NKS Chat log

The picture is sent to us from NAV, and the quality could not be improved.



Figure 12 - Example of Frida chat with citizen.

NAV Kontaktsenter Hjem Chat Familie

Chat Familie

Sak  
**New**

Saksnummer

**Samtalelogg** Detaljer

14:21:19 - bot:  
Det er mange som vil snakke med oss nå. Hold chatten åpen og følg med, så svarer vi deg så snart vi kan.

14:21:19 - bot:  
Jeg setter deg over, et øyeblikk.

14:21:19 - client:  
<<< Foreldre, barn og familie >>>

14:21:07 - bot:  
>>> Økonomi og gjeld <<<

14:21:07 - bot:  
>>> Uføretrygd <<<

14:21:07 - bot:  
>>> Sykepenger, grunn- og hjelpestønad <<<

14:21:07 - bot:  
>>> Sosiale tjenester <<<

14:21:07 - bot:  
>>> Pensjon <<<

14:21:07 - bot:  
>>> Foreldre, barn og familie <<<

14:21:07 - bot:  
>>> AAP, jobbsøker, permittert <<<

14:21:07 - bot:  
Velg et alternativ, så setter jeg deg over:

14:21:07 - client:  
<<< Privatperson >>>

Figure 13 - Example of chat, when initiating the handover.

## 8.6 Interview guide

# Intervjuguide 18.03.2021

Vi er en gruppe på to som skriver en masteroppgave i om Frida og denne handover prosessen i forhold til chat agent/veileder. Vi er en del av prosjektet Frida@work som blir finansiert av NAV.

### **Vi starter med design relaterte spørsmål:**

1. Brukervennlig design (HCI), har dere gjort noe der i forhold til de ansatte sin side av chatten?
  - a. Har dere hørt/fått noen klager fra chat agent/veileder ang designet?
2. Med tanke på denne chatloggen, får chat agent/veileder den informasjonen de trenger?
  - b. Er det ytterligere informasjon fra chatbot som kunne være nyttig? For eksempel nøkkelord, sammendrag, eller chatbots forslag til løsning?
3. Når en bruker er overført fra Frida til chat agent/veileder, får de en lyd i chatten om at nå er chat agent/veileder på plass, eller ?

### **Ventetid:**

4. Er timingen for handover-prosessen ofte god, eller er kommer den for sent / for tidlig?
5. Er det faktorer som kan føre til at timingen på handover'en kan bli forbedret?
6. Hva gjør dere i dag for å forhindre frustrasjon i forhold til ventetid i chat?

### **Tekniske spørsmål:**

7. Har dere gjort noen endringer i forhold til maskinlæring (machine learning) eller NLP (Natural language processing) osv, på Frida?
8. Har dere gjort noe med tanke på "toneleiet" til Frida? Eksempel på dette er da om hun skal være mer/mindre vennlig/snill, eller være helt nøytral i "tone bruken" sin.

### **Login chat funksjon:**

9. Hvorfor er det slik at chat agent/veileder er den som må initiere at brukeren skal logges inn i chatten? Hvorfor kan ikke bruker logge inn selv?
  - c. Er det et bevisst valg?
  - d. Er det noen negative sider med dette om bruker selv initiere login?

### **Handover prosessen:**

10. Hvilke faktorer i handover-prosessen anser du som de viktigste for at sluttbrukeren får den informasjonen de trenger?
11. Er det aspekter ved handover-prosessen som byr på problemer og utfordringer med for eksempel flyt i dialog, at kunden må gjenta spørsmål?

12. Med tanke på folk som skriver “lange” essay til Frida for å forklare sin situasjon, hvordan blir relevant informasjon filtrert gjennom all den irrelevante informasjon?
13. Vi har med et bilde fra litteraturen. Hvis du kunne ha tatt en titt på dette bilde. Her ser vi en chat samtale stegvis fra start til slutt. Fra bruker kontakter chatbot, til chatbot overfører bruker til veileder, til veileder fullfører “oppdraget”. Så vårt spørsmål i forhold til dette, er det noen av disse områdene dere legger mest vekt på, eller ønsker å bli bedre på i fremtiden?
  - e. Potensielt hvilken planer har dere?

Tell Me More: Optimizing Chatbots' Waiting Time Experience

NordiCHI '20, October 25–29, 2020, Tallinn, Estonia

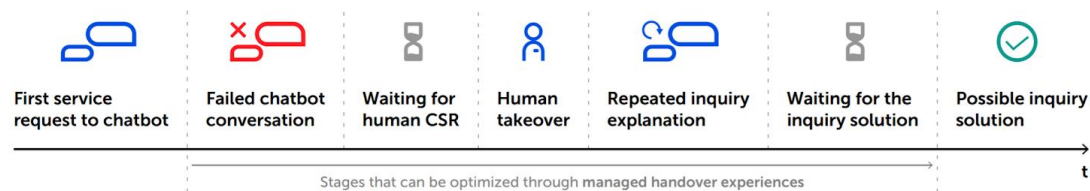


Figure 2: Failed chatbot conversations in customer service need to be handed over to a human service representative. This can create multiple waits and therefore inconvenience, for example when no status information about the process is presented, or when users have to explain their inquiry to the human counterpart again.

### Spørsmål fra litteraturen:

14. Dere bruker i dag salesforce sin funksjonalitet (chat veileder kan invitere leder, eller annen inn i chatten for hjelp/eller rapportere trusler), som gir dere mulighet til at en tredje person får tilgang til chatten, blir dette ofte brukt? (Facilitation)
  - Har dere gode erfaringer med dette?
  - Eller har dere dårlig erfaring med dette?
15. Noen chatboter når de overrekker den til en veileder, så tilbyr de et kort sammendrag av hva chatboten har funnet som den anser som viktig om den personen og den henvendelsen. Er dette noe dere jobber med, eller om det kunne ha vært ønskelig funksjonalitet? (Distilling information, Enriching Information, Context Identification)
  - Hvorfor/hvorfor ikke?
16. Fra tidligere intervju har vi vært inne på dette med funksjonalitet som blir kalt “context topic” som man kunne legge til på hvert fagområde slik at Frida ikke feiltolker oppfølgingsspørsmål selv om navn på ytelsen (som f.eks. AAP) ikke blir nevnt.
  - f. Hva tenker dere er de største fordelene med en slik funksjonalitet, og vil det være noen potensielle ulemper med dette? (for eksempel at Frida blir for fiksert på den første ytelsen som blir nevnt) (Context Identification)
17. I litteraturen har vi sett de har brukt chatboten til å holde de ansatte oppdaterte på prosjekter, gi de tilbakemeldinger, status, påminnelser, hente informasjon etc, hadde det vært mulig eller ønskelig å gi Frida slike typer oppgaver for å hjelpe de ansatte (Personalization)?

18. Har dere tenkt på om det er mulig å trene opp brukeren/befolkningen til å forstå en chatbot? (Hvordan man snakker med en chatbot). Slik at flere tar i bruk Frida, og mindre blir eventuelt sendt videre til chat veileder? (fostering familiarity)
19. I litteraturen så legges det mye vekt på dette med tillit i forholdet mellom bruker og chatbot. Har dere gjort noe arbeid eller tanker, for å øke tilliten de ansatte har i forhold til Frida? (Trust)
20. En annen funksjonalitet er for eksempel at når en chat veileder snakker med en bruker, så kan også Frida komme med forslag til svar på siden av, slik veileder ikke trenger bruke masse tid på å skrive eller finne ut svaret selv. Hadde dette være ønskelig, eller brukbart? (Distilling Information)
  - Hvorfor/hvorfor ikke?
21. Når Frida gjør en feil, eller gir dårlig svar. Hvem står som ansvarlig for dette? Frida, chatbot trenerne, chat veileder, NAV generelt? (Accountability)

### **Fremtiden for Frida:**

22. Hvilken planer dere har for Frida i fremtiden, eller hva dere håper hun skal kunne?
  - g. Eks: automatisert saksbehandling
  - h. Hva er tanken bak disse?
23. Daniel nevnte i sitt intervju sa at dere hadde en "lang liste" med tiltak for å forbedre brukeropplevelsen, har du mulighet til å gi noen eksempler på dette? Eventuelt gjelder dette bruker, eller også chat agent/veileder?
  - i. Samt en liste med teknisk aspekter
24. Vi sjekket ut Posten sin chatbot, og la merke til at den har en funksjon som gjør det mulig å gi tommel opp, eller tommel ned på svarene man får både fra chatboten og chat veileder. Hvilke tanker har dere om en slik funksjon? Ville dette gitt NAV/Firda mer verdi? (Tanken bak dette er at brukerne kan gi en tommel opp om de forsto/likte svarene de fikk, eller omvendt. Det vil også gi veileder mulighet til å se om bruker har forstått svaret, samt det vil gi chat trenerne en litt bedre innblikk i hvilke svar folk liker osv)

Noe annet du vil legge til?

- Fra intervjuguiden, eller tidligere spørsmål?