Exploring users' Interaction with Gendered Digital Assistant Applications

Technology, Gender and Sexuality

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Abstract

Technology has always been a part of human society and has helped us shape society into what it is today and gender has always had a large influence on the development of technologies and previous studies have focused on the masculine hegemony that exist in society and therefore as well in technology. With the rise of the information age various new technological innovations have taken a place within our society and gendered digital assistant applications (DAAs) like Apple's *Siri* have added another layer of complexity into studying technology in relation to gender. This because these technological artifacts can no longer be approached as gender-neutral objects and in the same way gender influences human-to-human interaction, it also influences the understanding of and interaction of users with these technologies. These technologies open up many new academic opportunities to study technology in relation to gender and being the first stepping-stone towards artificial intelligence in our society, it is important to study these changes from the beginning. The aim of this exploratory research is to uncover how users construct meaning of gendered DAAs and how this process is influenced by gender. Therefore the following research question and sub-question were formulated: *How do users construct meaning of gendered digital assistants applications?* And, *How is the construction of meaning of gendered digital assistant applications influenced by the gender of the users?* The exploratory nature of this research urges for a qualitative approach that helps to highlight subjective experiences of individuals and therefore the method of focus groups was used. A total of 20 individuals participated in four focus groups; a heterosexual mixed-gender group, homosexual mixed-gender group, a bisexual mixed gender-group and a mixed-group, each consisting of 5 participants in total. All of the participants were selected using a questionnaire and were required to use a gendered DAA called *Assistant* prior to the focus groups sessions. The focus group sessions were transcribed and analyzed using the constant comparison and keyword-in-context approach. The main findings of this research suggest that users create meaning out of gendered digital assistant applications through experimentation with DAAs, previous technologies, society, gender stereotypes and artificial intelligence in science fiction. It is clear, however, that this construction of meaning is difficult for many users due to the novelty of DAAs. Gender does not directly influence the understanding of the users, but indirectly influences the understanding of the previous mentioned concepts.

KEYWORDS: *Gendered Technologies, Gender, Artificial intelligence, Digital Assistant Applications, Social Shaping of Technology.*

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During the writing of my thesis it became even clearer to me that we live in times were change is an important and inevitable part of our lives and the future might be uncertain and unpredictable. I wish everybody on this planet to ability to cope with this uncertainty and to always act from the heart in any circumstance and recognize the potential in every human being to do so as well.

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1. Introduction

In future Los Angeles a man named Theodore Twombly is lonely after his divorce, but this all changes when he starts talking to Samantha and he ultimately falls in love with her. Samantha however is not a human being, but a talking operating system (OS) with artificial intelligence that evolves and adapts psychologically. Samantha, the name the operating systems has given itself, has a sparkling personally, is curious, interested and always available. Due to the high human-like intelligence Theodore and Samantha are able to discuss many aspects of life and connect on a deep basic. Still their relationship ends as Samantha explains that the OS's have evolved beyond human consciousness and want to explore their existence possibility in another dimension. This summarizes the plot of the science fiction film *Her* released in 2013 and directed by Spike Jonze (imdb.com). The film received numerous awards and nominations, mostly for its screenplay. This film takes place in the future and is considered science fiction. The film *Her* is an example which does not depict the dystopian consequences that are portrayed in many other films where machines have become self-aware (e.g. *Terminator, I, Robot, 2001: A Space Odyssey*), but should by no means blindly encourage the adoption of artificial intelligence into our society before creating a better understanding of its potential influence in the real world on various levels of society. There are different views on the potential positive, as well as negative impacts artificial intelligence can have on society, as Stephen Hawking expresses his concern in an interview concerning the topic of artificial intelligence marking the end of the human race (Hawking, 2014). Hawking does not deny that there are benefits of artificial intelligence, since the voice technology he uses to communicate involves a basic form of artificial intelligence, but claims that further refinements on these kinds of programs would make them independent and able to exponentially redesign themselves (Tobal, 2015). When artificial intelligence becomes more visible in our everyday live, it will ultimately lead society in a certain direction depending on how we use these technologies. The first signs of these intelligent agent technologies are already visible in our everyday life. These technologies are the digital assistant applications (DAA) like Apple's *Siri*. These technologies can often not be considered gender neutral as the developers use distinct male or female voices and are therefore called gendered technologies. Although these applications do not have artificial intelligence in the advanced form as the OS illustrated in the film *Her*, it might only be a matter of time before they do. As Dag Kittlaus, one of the developers of *Siri*, states: "*Siri* is chapter one of a much longer, bigger story". A small team of engineers, including Dag Kittlaus, has founded a company called *Viv Labs* and are on the verge of realizing an advanced form of artificial intelligence that will significantly improve *Siri*'s efficiency and functionality (Levi, 2014). Oren Etzioni, an artificial

intelligence expert, states that if they succeed, we are looking at the future of intelligent agents and a multibillion-dollar industry in which competition will be fierce.

Over time with the use of technology we have shaped the society to what it is today. Technology has started changing our society from the moment our ancestors started using tools to make their life more efficient and it continues to change our society until this day. This ongoing process we see today only differs in that the time between new inventions and innovations is increasing exponentially. Where it took our ancestors approximately 2 million years to leap from the stone age to the bronze age while realizing metal is stronger and more durable (Kime, 2012), it took only 300 years to leap from the industrial era to the information age in which we live in today (Castells, 2010). Today successful innovations of technology and the resulting realization of the economic potential is one of the main sources of economic growth in information-driven societies. As illustrated by Papaconstantinou, Sakurai and Wyckoff, developing new or better processes and products increases productivity resulting into lower prices and higher profits, which translates into higher incomes on an individual level and economic growth on a collective level (1996). However, as Bucciarelli (1994) points out technology is not shaped within a social vacuum and various social forces help shape technologies into its final product over time. In that sense it is important acknowledge that not only the developers of the technologies hold power over the direction a product takes, but the consumers of a product help the mutual shaping of these technological artefacts. The social shaping of technology explains that these social forces are embedding within our society and will affect the choice of the different directions a technology can take (Williams & Edge, 2006). Different social groups however have different norms and values and therefore technologies might be interpreted and used differently by different social groups. This illustrates that even before the gendering of technology, gender has been an important element in studying technology.

There is an abundance of research in various fields, including feminist studies into the relation between gender and technology and their influences on one another. These studies have shown that gender influences the course of a technological artifact during various stages, ranging from early development to the interaction with its users. Wacjman (2006) states that there is a masculine hegemony in society and in the field of technology that has profound implications on various aspects of society and the shaping of technology. This masculine hegemony in history has lead to technology often being seen as a male enterprise and has indirectly marginalized women from the technological community. Suchman (2008) explains that the privilege of masculinity has a large influence on the design, content and the use of technological artefacts. It has however become

evident that in technological innovation not only production is essential, but also consumption and use are important elements in the process (Silverstone & Haddon, 1996). The complexity of technologies increases significantly when they cannot be approached as gender-neutral objects anymore, as is the case with gendered DAAs. This blurring of boundaries between humans and machines urges to understand what this means for our society that is evidently organized in binary oppositions between male and female, hard and soft, and reason and emotion. The rise of gendered DAAs and their wide accessibility opens up many opportunities in the academic field to study the impact and interpretation of assigning gender to technologies on different levels of society. The questions that arises is how already existing gender relations in our society are being projected onto these gendered technologies and how in turn individuals create meaning out of these technologies. Individuals might not always have the opportunity to influence the design and the development of technologies, but they have the opportunity to create different understandings and uses of a technological artifact. The present study is trying to uncover how gender and the closely related concept of sexuality might influence that process of understanding on level of the individual.

Apart from the academic relevance of this paper in providing new knowledge on the relationship between technology and gender, there might even be greater social relevance. First, it is important to study what the effects of gendered technologies are on existing gender-stereotypes in society. From the social constructionist view technology can be perceived as a both a source and a consequence of existing gender relations (Wajcman, 2004) and the gendering of technology impacts the whole life course of an artifact, influencing its possible interpretations (Wajcman, 2006). Additionally, and maybe more importantly, since gendered DAAs seem to be merely a stepping-stone towards artificial intelligence it is important to start to create a more profound understanding of the consequences of blurring the boundaries between technology and humans. Especially since the opinions vary about the possibly utopian or more commonly dystopian outcomes, it is important to create a clear picture of what social groups think about gendered technologies and also artificial intelligence. The importance of the implications that artificial intelligence can have on society is stressed by the fact that more than a thousand artificial intelligence researchers have signed an open letter warning against the dangers of starting a global arms race of artificial intelligence technology and specifically autonomous artificial intelligence weapons (Ghose, 2015). "The key question for humanity today is whether to start a global AI arms race or to prevent it from starting. If any major military power pushes ahead with AI weapon development a global arms race is virtually inevitable, and the endpoint of this technological trajectory is obvious: autonomous weapons will become the Kalashnikovs of tomorrow… We

believe that AI has great potential to benefit humanity in many ways, and that the goal of the field should be to do so. Starting a military AI arms race can be considered a bad idea, and should be prevented by a ban on offensive autonomous weapons beyond meaningful control." the letter reads and has been signed by entrepreneur Elon Musk, previously mentioned physicist Stephen Hawking and other tech luminaries in July 2015 (Gibbs, 2015).

Berg and Lie (1998) were interested in studying new technologies because they offer a great opportunity to study change. There is not better point in time to measure change when there is still a wide range of possibilities of directions a development can take. It is important to study the different meanings and interpretations these different groups create/construct for the technologies and how it in turn can affect the further shaping of personal assistant applications and artificial intelligence in the future. In the light of these developments the following research question and sub-question were formulated:

> Research Question:
> *How do users construct meaning of gendered digital assistants applications?*
> Sub-question:
> *How is the construction of meaning of gendered digital assistant applications influenced by the gender of the users?*

The aim of this exploratory research is to uncover how people with different gender and sexual identities interpret and create meaning out of gendered DAAs. The next chapter of this study will provide a theoretical framework to increase the understanding of the close relationship between gender and technology and how these can influence each other through the social shaping of technology. Since gendered technologies have recently started to become more dominant in our society through DAAs available for smartphones users, the data was collected through the research method of focus groups. The methodological design of the present research will be explained in depth in the method chapter, followed by the data that was obtained through this method. The results of this study can be used as potential directions for future research into the topics of gendered technologies and artificial intelligence that will likely become more visible and dominant in our society over time. These results will be discussed and linked to previous theories in the discussion and conclusion section in answering the research questions. Lastly, this paper will point out limitations of the current research and potential directions for future research.

2. Theoretical Framework

2.1. Technology

Wise (2010) explains that when speaking about technology, mentions of social machines or machines of power are sometimes made because of the way we are using and developing them. As humans we create technology to take tasks of our hands and save time to occupy elsewhere or enable us to do something we are not able to do ourselves. When these tasks are of our hands however they are also of our minds. He gives this as the reasons that cultural and sociological studies often don't focus on technology, especially technologies that are already deeply embedded in our lives. Wajcman (2000), with Marxist labour process debates in mind, states that capitalism has continued to apply new technologies with the purpose to fragment and de-skill labour, resulting into cheaper and more controlled labour. Murdoch (1996) directs our attention to a chapter called "Inhuman geographies" in Thrift (1994), where the offered account that points out the part of technology is producing a "machine complex" in which an acknowledged human experience is removed by that of the cyborg. Today new technological actors in the form of information and communication technologies and the interconnections between them are becoming dominant. Particular sets of these new technologies are intelligent agents. In basis, an intelligent agent is a software program customized to an individual's needs and personality (Wise, 1998). One would argue that the current development of the personal assistant applications can be considered intelligent agents, but they still merely act as an interface between the user and the Internet. An ideal agent would work without control, say independently from the user, but these applications definitely have the foundation for that potential. New technologies are frequently seen as threatening and unfamiliar and to be incorporated into our lives their "domestication" has to be successful (Lie and Sørensen, 1996). We learn to adapt to new technologies, gaining and communicating technical expertise and establish uses and meanings within communities of practice (Wenger, 1998; as cited in Bray, 2007).

2.1.1. Domestication of Technologies

The concept of domestication has achieved to help us in approaches to understand how information and communication technologies (ICTs) find a place in our lives (Haddon, 2001). The concept is originally derived from studies that focus on the process of consumption, but can provide valuable directions of merging a range of assumptions and perspectives of our relationships with ICTs, including gendered technologies. Haddon (2001) highlights the key assumptions of domestication; first, attention has been given to what technologies mean to individuals, how they experience them and the roles technologies can adopt in their lives. To understand this, she

explains, we need look at the social settings of the individuals that guides them into the understanding and appropriate use of technologies and helps them to control the place technologies take in their lives. Second, the adoption of technologies should be seen as a process that starts prior to the adoption event. In the pre-adoption stage there is an emphasis on the perceptions of technologies, in how people imagine the potential role of technologies in their lives and negotiate it's potential acquisition. When the technology is adopted the above-described process of developing understandings of appropriate usage begins and can also be challenged, because new technologies might not fit into existing routines and therefore new routines have to be established. Third, after technologies have been acquired from the public domain, they get personalized and are integrated into the life. It is, however, important to note that domestication is not always completely successful, as people can become doubtful or technologies might appear to get out of hand and leading them towards behaviors that are questionable, for example dependency on technologies or an increased stress level. Therefore technologies are sometimes tolerated because people need them in their circumstance, but not necessarily embraced, and can be rejected at any stage of adoption. Fourth, the relationship between individuals and technologies within their context is important to understand the experience of technologies, as the adoption process is influenced by others, including non-users that can act as gatekeepers. Lastly, the meaning of technologies is not only structured by their functionality or public representation, but also by their consequences and social context. Therefore technology and its outcomes are not only shaped by technology itself, but also the social context of its development and vice versa.

2.2. The Social Shaping of Technology

2.2.1. Technological Determinism Critique

The idea that the course of human history is determined by technological development is conceptualized as *technological determinism* (Bimber, 1990). The standard view of science and technology Bijker (2001) explains is objective, value-free, and discovered by specialist and seen as an autonomous force in society. One account of technological determinism is the Unintended Consequences Account, which explains the role of technology in social change and is based on the observation that technology is often followed by unintended consequences that are difficult to anticipate and control. An example of these unintended consequences of technology is the invention of the automobile, which was thought to be an environmental improvement to the old mode of transportation as it cleans the streets of horse dung. The environmental destruction produced by the exhaust of the automobile was not foreseen nor intended (Bimber, 1990). Within the deterministic view technology is to a large extent autonomous and responsible for determining particular social changes, this is however one of the critiques because empirical observations show

that technology does not always follows the predetermined course of development. This can be illustrated with contemporary phenomenon of the mobile dating application *Tinder*, where the user's interpretation of the application was different than the developers initially intended it to be. The developers designed *Tinder* to be a social application that aims to reduce barriers of forming new friendships with other users in close proximity (Rivlin, 2013). The users of the application however recognized the potential of the application of effortlessly locating individuals for causal sexual interactions or developments of serious romantic relationships (Bouman & Kontou, 2013). Technologies are not created in a social vacuum in which the designers and inventors of technologies hold all the power in the process, but rather a negotiation between social forces that will ultimately lead to the final product (Bucciarelli, 1994) and continue to shape the technology when it is in use (Suchman, 1987). When observing society it becomes apparent society does not consist of a homogenous mass, but rather of different social groups with ultimately different norms and values within them. With this in mind Star (1995) has argued that a certain technology might be interpreted and used differently by different social groups. All this and more also holds true for the development of new media technologies that Bijker (1995) characterized as a *sociotechnical* phenomenon and is important to consider when studying the development and implications of gendered technologies.

2.2.2. Origins of Social Shaping of Technology

From this critique towards technological determinism the perspective of the social shaping of technology arose (Egde, 1998; as cited in Willliams & Egde, 1996). Where technological determinism often focuses on the impact of technological change, the social shaping of technology (SST) examines the content of technology and process involved with innovation. Williams and Edge explain this as follows: "SST studies show that technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use. Every stage in the generation and implementation of new technologies involves a set of choices between different technical options. Alongside narrowly 'technical' considerations, a range of 'social' factors affect which options are selected - thus influencing the content of technologies, and their social implications" (2006, p. 886). They further point out that the central idea of SST is that there are different choices on different paths innovations can take that will ultimately lead to different outcomes with different implications for society or specific social groups. In that it highlights two notions of technology; the negotiability of technology that is influenced by groups of forces that shape technology (Cronberg, 1992) and concerns about the irreversibility of technology (Callon, 1993) as can be demonstrated with the invention of the automobile. In this sense one could apply the unintended consequences also in the social shaping of technology, but these are largely

influenced by social factors and not just technology alone. It is important to note however that researchers in SST do not claim that technology and science are unable to benefit society, but rather try to articulate policies (choices) in the development that lead to beneficial, human-centered, and appropriate use of these technologies in everyday culture (Williams & Egde, 1996). On of the dominant theories in the social shaping of technology paradigm is the *Social Construction of Technology* (Pinch & Bijker, 1984), which will be discussed in the following section.

2.2.3. The Social Construction of Technology

The social construction of technology (SCOT) has it roots in the sociology of scientific knowledge (SSK), which emerged in Britain during the 1970s (Williams & Egde, 1996). Williams and Egde (1996) explain SSK consists "of studying the development of a scientific field, and identifying points of 'contingency' or 'interpretative flexibility', where, at the time, ambiguities are present. Having identified such 'branch' points, the researcher then seeks to explain why one interpretation rather than another succeeded " (p.869). Researchers have extended this approach to studying technology. They tried to seek identified occasions where technologies could be constructed in various ways having choices between diverse technical options and illustrate why one design of an artifact prevailed. When an technological artifact is being developed the process can be expressed in an alternation of variation and selection, resulting into a 'multi-directional model' instead of the traditional linear models (Pinch & Bijker, 1984) Williams and Egde (1996) further explain that these choices are not merely based on technicalities, but emulated and shaped by the specific selective environment; social factors are part of these explanations. One great example of this variation and selection process is the construction of the bicycle, which has many variants today (mountain bike, race bike etc.). Pinch and Bijker (1984) explain the resulting variations are the due to the selection part in the development process. In any particular moment an artifact presents problems and solutions. An important role in the decision, which problems are relevant and which are not, is played by those social groups involved with the artifact and the meanings these groups give to an artifact. The term relevant social groups is explained as standing for institutions and organizations and organized or unorganized groups of individuals, as long as they share the same set of meanings linked to a specific artifact (consumers and users of an artifact fulfill this condition). The socio-cultural and political position of a social groups frame their norms and values, which in turn influences the meaning given to an artifact. Pinch and Bijker elaborate; these relevant social groups by no means have to be viewed as homogenous and therefore different sub social groups can describe identify different problems or different solutions to the same problem depending on their interpretation of the technological artifact, which can be culturally and socially constructed. They describe this as the *interpretative flexibility* of the artifact, which should ultimately lead to closure

or in their words: stabilization. In the same one consensus in science is often never fully achieved, so is the stabilization of a technological artifact always a matter of degree. They explain that closure of an artifact is achieved when all the problems are solved and have disappeared. This again is dependent on whether the relevant social group considers the problem(s) to be solved. As mentioned, the stabilization of the mobile application *Tinder* was dependent on the meaning the majority of users constructed of the technology. Winner (1993; as cited in Klein & Kleinman, 2002) claims this is a pluralist view of society and SCOT assumes that all of these relevant social groups are part of the design process of the technological artifact, which results into the neglect of different power relations within social groups, as some groups may be effectively excluded from the participation in the design process all-together. This, however, does not mean that they cannot develop different understandings and uses of a technological artifact (Bijker & Law, 1992). Akrich (1992; as cited in Berg & Lie, 1998) introduces the concept of *script* in technology and points to the user's part in the shaping of technology. These scripts can be the literal instruction manuals, but also advertising, marketing or the media often show the configurations or the user (Bray, 2007). Gender can be included in this script when approaching the concept as rules for users how to behave and the definition of how this script is designed and built into the artifact. For instance, cars might be marketed to men as powerful and to women as reliable (Oudshoorn & Pinch, 2003). When looking at technology and gender as acts performed by an individual, both these concepts help shape a person's identity, but neither are by any means fixed. Rather they emerge from collective and individual interpretation of the concepts, changing with time and heavily dependent on culture (Wajcman, 2006). Another important consideration is that gender is neither oppositional, nor uni-dimensional, nor dichotomous and does not necessarily hold a relationship to biological sex, which is also not, by any means, a dichotomous concept (Lorber, 1996). In the light of the recent developments in gendered technologies it becomes important to discover how gender and sexuality of users and non-users could potentially influences the domestication, meaning and understandings of gendered technologies and how this will potentially affect the paths these technologies will take and how they will establish themselves within our society.

2.3. Gender and Sexuality

2.3.1. Gender

Technology has been studied widely from social perspectives and specifically in relation to one dominant social shaping aspect of an individual's identity in our society, namely gender. Duveen (1992) provides the definition of an identity as being: "an identity can be considered as a psychological process through which meanings are organized and which enables the person to position themselves as a social actor. Social identity in this sense is a way of organizing experience

which contributes towards the definition of self, but does so by locating the self within the collective world" (p.2). When being born into this world, which is already structured by social representations, our social identities are shaped through activities and practices that are available to the child and require them develop and sustain an organized gender identity (Duveen, 1992). Furthermore Duveen holds the opinion that the development of social representations of gender there is an emphasis on the difference between groupings of individuals. Within sex groups, he explains, social representations of gender provide various different possible gender identities in which an individual can position him or herself. Each of these variations in identity maintains certain versions of femininity and masculinity, providing means for the future development. The developed social identities Duveen explains are brought into any social interaction and will influence the course of these interactions and how the meanings are negotiated through it. While the social character of traditional institutions, including family, economy, and politics is acknowledged, that of gender is often not. Many scholars and cultures reduce gender to biology and psychology and deny it's sociality and fluidity (Martin, 2004). Connell (1987) states that gender has an institutional character, as there are important gender phenomena that cannot be grasped as characteristics of an individual. However, much of these characteristics are implicated in them. To Connell, "cyclical practices form the core of institutions, with institutionalization representing the conditions that make cyclical practice possible" (p. 95). Connell furthermore states that gender has variations over time and is exposed to human agency, and that changes in the gender order are leading to "a crisis of institutionalization" that has reduced the power of the state to maintain the legitimacy of men's power over women through domestic patriarchy. Lorber (1996) says the effect gender has on both individual lives and social life can be traced throughout history as being a structure where the changes can be researched.

2.3.2. Sexuality

Approaching gender in the same way as the social shaping of technology approached technology, greatly influenced by social aspects, opens up opportunities for change in gender relations. The construction of an individual's identity within society is not only influenced by gender, but also by sexuality and different sexual preferences expressed. Before Victorian times, however, sexuality was an asset within the heterosexual framework and was not seen as a definite identity and some cultures believed that everybody harbored homoerotic feelings (Sullivan, 2008). Sullivan states this new sexual orientation identity began to develop indicating that one's sexual attraction towards same sex individuals was a fundamental and constant aspect of a personality and it was until 1869, when the term homosexuality was formulated, that it was considered to a separate orientation (Sullivan, 2003). The definition of homosexuality, however, can vary depending on culture and time

period and in certain modern societies some same-sex interactions would not be labeled as homosexual. Stein and Plummer (2003) explain feminists have made important contributions to sociology, but have been unable to alter the basic conceptual frameworks in the field. The same is true for LGBT studies that have barely made their mark within the field as a whole. The result is that LGBT communities are often thought of a separate entities isolated from the rest of society. Two dominant scholars in this strand are Sigmund Freud and Alfred Kinsey (Rust, 2000). Bullough (1998) points out that in 1939 Alfred Kinsey conducted one of the largest studies on sexuality into the variations in human sexual behaviour. One important contribution of the studies has been the Kinsey Scale of sexual behaviour, a model that translated human sexuality on a continuum. Kinsey wanted people to understand that sexuality is a fluid entity and has the possibility for variations throughout a lifespan (Evans, 2003). Still, his findings that homosexuality is common and that a significant percentage of the population is gay was met with criticism and disbelief (Sullivan, 2008). Freud (1905), on the other hand, helped contribute to the stereotyping of both male and female homosexuals through his inversion model. The inversion model assumes that homosexuals are similar to the opposite-sex heterosexual and further fuels the bipolar model of gender stereotyping in which masculinity and femininity are opposites. This model has confirmed the results of my own research that showed significant differences between those who label themselves as being bisexual and those who consider themselves to be monosexuals (hetero- and homosexuals) regarding their behaviour and attitudes towards (romantic) relationships, sexual behaviour, dating, online dating, and a mobile dating application *Tinder* (Dorgathen, 2014).

2.3.3. Dualistic Approach to Gender and Sexuality

We have made significant improvements from the classification of homosexuality as a mental illness by the American Psychiatric Association (APA) (Sullivan, 2008) to studying homosexuality in a social context. But queer theory is claiming this dualistic approach towards homosexuality has reinforced the understanding of minorities as the 'other' and creates oppositions that leave the centre intact (Stein & Plummer, 2003). Additionally, due to this dichotomous approach in this field, the concept of bisexuality has been understudied (Rodriguez Rust, 2000). This is alarming because there is an ongoing debate on an academic level as well on a social level even within the LGBT community whether bisexuality is even an authentic sexual identity. Especially women who claim to be bisexual are believed to be in denial about their true sexuality, which has to be either hetero- or homosexual. Results of survey studies (Fay, Turner, Klassen & Gagnon, 1989; Rogers & Turner, 1991; Smith, 1991) indicate however that bisexual behaviour is more frequent than exclusively heterosexual behaviour. Regardless of the truth about the existence of bisexuality it becomes clear that the heterosexualized view on sexuality is more conform to homosexuality then it is with

bisexuality and is projected on various aspects of society including personal life, politics and economics (Warner, 1991) and is keeping the binarities of gender stable. Gender studies in the 1980s (Rudie, 1984; Haavind, 1982) attacked these dichotomous distinctions between the two genders and formulated gender as fluid, flexible and intricate, as gender is a process that is socially constructed and negotiable on all levels of society, meaning it is continually in the making (Berg & Lie, 1998). Therefore we cannot exclude queer theory in the shaping of technology and recognizing the complex nature within historically constructed groups and their defining relationships between them, helps us to understand how gender, class, race, sexuality and other labels of differences reflect power (Martin, 2004). With this theory in mind in a similar way feminists like Wajcman have approached the concept of technology and how it is constructed by gender, therefore the construction of gender identities is formed simultaneously with technology in the making and we can never fully understand one without the other.

2.4. Technology and Gender

2.4.1. Masculine hegemony in Technology

The reproductive metaphor, which provides a concept of gender in terms of binary opposition of the masculine and the feminine, is the fundamental principle to the social representation of gender (Duveen, 1992). Feminist scholars like Harding (1986) have shown that the binary oppositions in Western society between culture and nature, reason and emotion, hard and soft, have helped masculinity to be privileged over femininity. Due to the definition of femininity, as it was involved with the "soft" aspects of society, whereas technology was considered belonging to the "hard" aspects, Berg and Lie (1998) point it out as the reason for the little attention that was paid to technology, when feminism developed extensively in the 1980s. The privilege for masculinity however can also be witnessed in technology, as it is traditionally viewed as a male enterprise. Techno-feminist Wajcman (2006) explains the historical background of these developments, when during the 19th century engineering was defining what technology is, and the importance of women in broad aspects of the field due to lack of access to both artifacts and knowledge was recognized. Cockburn (1983, p. 203) explains that "different childhood exposure to technology, the prevalence of different role models, different forms of schooling, and the extreme gender segregation of the job market all lead to the construction of men as strong, manually able and technologically endowed, and women as physically and technically incompetent". Wajcman (2000) explains women are the unseen cheap labor force in the production of technologies, the secretaries, cleaners and the main consumers of domestic and reproductive technologies. This masculine monopoly of technology also affects the way gender is embedded in technology itself. With the SCOT in mind it becomes clear that technological artifacts cannot be treated as neutral or value-free of social

relations, and therefore also gender relations are materialized in them. Therefore the claim is that technology is socially shaped, but shaped mostly by men, not women. Empirical research ranging from the microwave oven (Cockburn & Ormrod, 1993), the telephone (Martin, 1991) and the contraceptive pill (Oudshoorn, 1994) to robotics and software agents (Suchman, 2008) has clearly shown that the marginalization of women from the technological community has a large influence on the design, content and use of technological artifacts. This is important to consider when looking at the way gendered technologies have been designed and how the masculine dominance might have influenced the outcome. Interestingly we see cyber-feminists like Sadie Plant (1998) who was optimistic about the ways technology could transform these existing gender relations, because digital technologies are blurring the boundaries between humans and machines, and between male and female.

2.4.2. Media Equation Theory

It is clear that the development and use of technology is also shaped by gender, and that a masculine hegemony on technology exists, but with the recent developments of gendered technologies in the form of DAAs Plants' predictions of the blurring boundaries between human and machine might not hold true. The media equation theory states that people interact with media in the same manner as they interact to other people in everyday social interaction. In that sense technologies are treated as social actors to which people apply the same rules as in human-to-human interactions (Reeves & Nass, 1996). The complexity of the social shaping of technology only increases when technology itself can no longer be approached as a gender-neutral artifact. Social psychology literature has shown that gender influences several dimensions within the human-human interaction, as the social identity theory states that humans are likely to think and interact differently with each other based on perceived similarities or differences in gender, or other group affiliations like sexuality (Crowell et al., 2009). For example female persuaders create less conformity than their counterpart and male communicators are seen as more competent (Lee, Nass & Brave, 2000). The findings of a study conducted by Nass, Steuer, and Tauber (1994) suggested that computers are already approached as gendered social actors to which individuals apply social rules during interaction. Nass and Moon (1997) conducted a study to test whether minimal gender cues in computers would evoke gender-based stereotypic response. The results of the study suggest that that gender stereotypes are deeply embedded within human psychology and are even applied to non-gendered objects, in this case computers. The key implication is that voice selection within machine interface has its consequences on the interaction between technologies and individual that uses it. Lee, Nass, and Brave replicated this study in 2000 with one critical difference that the text-to-speech constantly reminded the subjects that they were interacting with

a machine, due to the usual disfluencies that are associated with synthesized voices. Nonetheless the computers were still approached as social actors and the slightest indication of gender in the text-to-speech causes people to respond as to a real male or female person. Kim and Sundar (2012) have concluded in their study that anthropomorphism, the belief that computers are human or should be treated as such, does in fact not occur on a conscious level. Wallis (2011) thinks this is due to the conditioning of humans by Sci-Fi since the 1960s to act anthropomorphic towards computers. These differences in perceived human likeness depend on different preconceptions of robots between men and women and they called it the Robot Preconception Hypothesis (Scheutz et al., 2008). Which could be explained by the fact that men generally consume more Sci-Fi products, and as Wallis (2011) states are therefore influenced by their interactions. Although these social responses are automatic and unconscious it shows that theories and concepts from psychology, communication, and sociology are relevant when studying the interactions between humans and computers. Lee, Nass, and Brave (2000) conclude their findings suggest that designers of these technologies should be conscious about not only the gender of the user, but also the deeply rooted gender stereotypes within the human brain.

2.5. Gendered Technologies

The importance and influence of gender when studying technology has been shown in the previous sections. It has shown that gender has an influence on the development of technologies, the potential paths these technologies take, but also on the interaction of individual users and technology. The fact that minimal gender cues evoke gender stereotype responses becomes even more important when it can no longer be avoided when technologies are presented as having a male or female gender. This is, however, the case with the recent technological developments of gendered digital assistant applications for smartphones where the dualistic approach of gender binaries of society continues. Bourdieu (1972) explains that our cognitive abilities, which are used to interpret social norms and values and to try to give order to the world rely upon, "references to practical functions and systems of classification which organize perception and structure practice" (p. 97). In that sense the vision of the world is fundamentally a vision of the division of things of the world into two complementary classes, and gender together with class are two of these fundamental dimensions of social differentiation that maintains dominant (Krais, 1993). Virtual gender discourse is therefore unenviable influenced by the existing real-life gender relations as the example of *Second Life* (an online virtual world) demonstrates. *Second Life* has become a considerable source of virtual pornography, even though it is known for encouraging anti-establishment values (Bardzell & Bradzell, 2006). The idea that technology is the extension of the self has been popular in ICT discourse and the notion that we will become digital as soon as we

delegate to electronic avatars and our actions are carried out by digital servants (Wise, 1998). Macgregor Wise has already indirectly mentioned these DAAs in 1998 as software agents that are as personal assistants. These agents he described act in the individual's place in cyberspace: buying products, arranging meetings, database searching etc. while the individual can be engaged elsewhere. Instead of just being an interface between the individual and the computer, the intelligent agent would be able to act independently in cyberspace to carry out the user's commands or anticipate his or her wishes. Additionally agents would be able to communicate and share information with other agents and even negotiate with them. Wise was right when he said that "the figure of the intelligent agent seems to be the next big thing in cyberspace" (p. 414). These intelligent agents sometimes have characters incorporated into their interface, such as Microsoft's *Bob*, for various reasons; to make interactions easier and more natural, such as delegation of tasks, to offer users intuitive perspectives on data, and to provide more natural assistance (Isbister & Nass, 2000). New technologies shift the nature of mediation (Wise, 1998).

2.6. Artificial intelligence

Artificial intelligence is the field of study that tries to understand and reproduce the processes of our life and has a central focus on the knowledge and production of self-organizing entities (Langton, 1996). The term was coined in 1956, but the study of intelligence itself it nothing new at all, as it is sometimes seen as one of the oldest disciplines in which for over 2000 years philosophers have tried to understand how seeing, learning, remembering, and reasoning could or should be done (Nilson, 1980). With the advent of the usable computer in the 1950s long held speculations about these mental abilities could finally be approach experimentally as a theoretical discipline, but artificial intelligence turned out to be more difficult than previously imagined (Russell, 2015). The Turing Test, proposed by Alan Turing (1950) was designed to provide a satisfactory operational definition of intelligence and defined intelligent behavior as the ability to accomplish human-level performance in all cognitive tasks well enough to mislead an interrogator. In other words, the interrogator is unable to tell whether he is communicating with another human or a computer. The fear that our machines will enslave us or will rise up against us once they realize their intelligence it not unique to artificial intelligence. The dilemma at the heart of such fears is that of the master and the slave, in which the master not only becomes lazy and dependent on the slave's work, but the slave becomes enlightened through working with the land and tolls and rises up against his master (Winner, 1997). It seems to be a question of control of the other and the boundary between self and other and the discussion whether we control our technology or whether technology controls us due to our dependency seems to be another way of looking at technology from a social deterministic view versus a technological deterministic view. Although no

one can predict the future of artificial intelligence in detail, it is clear that computers with the same of better intelligence than humans will have a big impact on our day to day lives and on the future course of human civilization.

This theoretical framework has outlined the importance of social forces in the shaping of technology in general and how one of these social forces, that is gender, has already impacted the field of technology as a whole. The fact that a masculine hegemony in technology and society exist has large impactions of how technology is being perceived today. Although new ICTs have opened up new ways of looking and interacting with technologies, they have also provided a platform for the development of different technologies, including gendered digital assistants applications that, with the large worldwide adoption of smartphones, are accessible for almost everybody. We can see that these technologies inhabit a basic form of artificial intelligence that combined with a gender identity might be even more approached as human actors. The next section outlines the method used in this study to uncover the meanings that users created out of these gendered digital assistants.

3. Method

3.1. Aim of study

The aim of this research is to uncover how individuals with different gender and sexual identities use and create meaning out of digital assistant applications and how these meanings could potentially influence the course of the further development of gendered technologies and artificial intelligence in the future. We have established that technological development does not take place within a social vacuum, but rather is a social product with different paths it can take, that will ultimately lead to different outcomes. These different variations of technologies point to an interpretative flexibility that influenced by the meaning different social groups give to an artefact, depending on the norms and values that are shaped by the cultural and socio-political context of the interaction. The exclusion of certain social groups in design, however, will also influence the development of a technology and therefore their opinions are worth examining as well. This is trying be achieved by not only including gender, but also sexuality as one of the social shaping influences on gendered technologies. The gendering of technology however could influence the position technological actors and it is interesting to see where these individuals (would) position these actors within their personal and professional network. To gain a deep understanding of the meanings created by the users this research used focus groups and additionally a questionnaire as the method. The questionnaire was used first to aid with the sampling procedure and to provide demographics and relevant background information about the participants. In the following section the method used in this research will be discussed in depth.

3.1.1. Focus Groups

Since this is an explorative research based on the subjective experiences of individuals, the data required is essentially qualitative. One qualitative approach that could have been used to gather such data is individual interviews. Even though this method generates large amounts of data, it is extremely time consuming to collect a representative sample of views, values and opinions. Focus groups however offer a means of exploring the principal issues of interest in a dynamic way, which uses the group interaction to challenge and test the views and opinions supported by individual participants in a non-threatening social context (Osborne & Collins, 2001). Strother (1984) adds to this that a group context offers some support and security and the choice not to respond. Therefore the data might offer an authentic reflection of views, as there is no obligation to tell a 'story' to please the interviewer. The goal is not the generate data that could be generalized to a larger population, but rather to explore the range of attitudes and reasons for these attitudes, that are commonly held within the population. Although there a different definitions of focus groups,

Freeman (2006) characterizes focus groups as a form of group interviews that place a particular importance on interaction between carefully selected individuals, guided by a moderator using a thoroughly designed theme guide. The interactive approach of focus groups also gives people the opportunity to consider different point of views, and formulate and re-explore their own ideas and understandings (Cameron, 2005). With the critical theory of technology in mind it is important to understand that this research was conducted within a Western culture and could have many other different outcomes in different cultural settings.

3.1.2. The Assistant Application

Although digital assistants are a relatively new phenomenon, Hollywood has already introduced us to the idea of how they could look in the future; Hal from 2001: A Space Odyssey, Jarvis from Iron Man and Samantha from Her. Our actual history with digital assistant starts of very modestly with the venerable Clippy, an interactive animated character that assisted users of Microsoft Office navigate (Rigby, 2015). With the advent of mobile phones we witness an era of digital assistants that are much more sophisticated. A combination of machine learning technologies from the fields of speech, natural language processing and document processing analysis provides a novel way to interface our personal computing devices (Reddy, 2014). The currently three most used digital assistants are provided by three operating system leaders; *Google Now* (Google), *Siri* (Apple) and *Cortana* (Windows) all opting for a default female voice (Vincent, 2014). The digital assistant application that was selected for this research *Assistant* developed by Speaktoit Inc., based in the U.S.. The *Assistant* application was launched in October 2011 for the Android platform, but is now also available for iOS and Windows Phones (Warman, 2011). As most similar applications are only available for one of the above-mentioned platforms, this was the first and foremost reason for deciding for this application. The recruitment procedure would have been more difficult if the participants had to be selected based on the operating system of their mobile device. It was important for the research that every participant had the same experience prior to the focus group regardless of his or her preceding experience with DAAs. One major difference between *Assistant* and other DAAs like *Siri* and *Google Now* is that *Assistant* comes with a visual representation in the form of an avatar instead of only a voice. It would be interesting to see whether the visual representation reinforces gender-based responses and/or evokes other responses or meanings created by the participants. Lastly, the application is available in multiple languages opening up opportunities for an international study design.

3.2. Participants and study design

A total of 20 individuals participated in four focus groups:11 participants were female and 9 were male. The ages of the participants ranged from 20 to 36 years, with a mean age of 24,8 years and were recruited face-to-face, by telephone or *Facebook* using purposive sampling (Patton, 1990). Additional snowball sampling was used, as purposive sampling was not sufficient enough to obtain the needed participants for the study. The specific snowball-sampling method used is called recruitment via intermediary (Bloor et al., 2001). To illustrate: if one of the groups had reached a nearly sufficient number of participants, the already selected participants would be asked if they knew anybody with the specific demographics needed for that group. The eligibility criteria were therefore initially very broad and got narrowed down during the sampling process depending on the earlier recruited participants. The questionnaire was self-administered online and included questions regarding the participants' demographics including *gender, age, and sexuality* and available dates for the focus group sessions. Based on the gender and sexuality and the availability the participant were assigned to one of the four focus groups that were constructed prior to participant selection; *Heterosexual Mixed-Gender group, Homosexual Mixed-Gender group, Bisexual Mixed-gender group* and a *Mixed Group.* It has to be noted however that the participants did not label their sexuality as explicitly as the above description; especially the bisexual group seemed to want to avoid these labels. Therefore the description of sexuality should be regarded as an indicator of sexual behaviour and preferences and not as a social identity defined by the participant. Participants belonging to pre-existing social groups however could comment about shared experiences and events and could challenge disagreements between expressed beliefs and actual behaviour and usually advance discussion and debate (Bloor et al., 2001). This resulted into three homogeneous groups and one heterogeneous group in terms of sexuality. These group compositions give the opportunity for comparison between groups and ensures conformity within groups that resulted into participants freely speaking their minds without constrictions, due to being in their social group they can identify with (Morgan, 1997). Furthermore, the participants were all relatively in the same age category, creating further common ground in amount of previous life experience.

3.2.1. The Questionnaire

Besides as an aid for composing the focus groups, the questionnaire was used to deepen the data analysis of the data obtained from the focus group sessions. Besides demographic questions the questionnaire consisted of questions regarding *mobile phone usage, experience and attitudes towards digital assistant applications, attitudes towards science fiction, attitudes towards artificial intelligence* and *knowledge of famous artificial intelligence characters*. The question regarding the

mobile phone usage aimed to uncover for what different purposes the participants uses their phone. One hypothesis on this behalf could be that participants that use DAAs their mobile phone extensively for various reasons might hold a more positive attitude towards DAAs as they could provide assistance to managing these various interactions. The attitudes towards science fiction, artificial intelligence and knowledge about AI characters could possibly influence the attitudes towards and interaction with DAAs of the participant. This explores Wallis' (2011) belief that science fiction has been conditioning humans to (unconsciously) act anthropomorphic towards computers and Scheutz et al.'s (2008) Robot Preconception Hypothesis that states that the perceived human likeness of robots depends on different preconceptions of robots between men and women. Therefore regardless of the gender of the participant, the attitude and previous experience with artificial intelligence through science fiction could influence the perception and interaction of DAAs. The results of the questionnaire can be used during the data analysis to identify reasons for certain opinions and statements of participants during the focus group sessions. If for example the remembered AI characters had a dystopian impact in their story, the participant might also have dystopian idea about the impact of gendered technologies and artificial intelligence. At the end of the questionnaire the Assistant application was introduced and participants were requested to download the application onto their mobile phone and use it actively for one full day prior to the focus group sessions. They were given no further instructions regarding the specific use of the application, but they rather had the freedom to experiment and explore in a way that felt appropriate to them without the influence of any suggestions. In that way the setting of the one day usage was a natural as possible.

3.3. Focus Group Sessions

The focus group sessions took place from June to August 2015 in Berlin, Germany and Rotterdam, the Netherlands and were held in a private home at central locations in the cities. There was no one else present during the sessions apart from the participants and the moderator. This interactive and open setting provided a comfortable environment for the participants to express their opinions freely (Robinson, 1999). All sessions were video recorded, providing an additional aid during transcription and enabling the detection of non-verbal responses of participants during the sessions. As compensation participants were invited for a social drink, facilitated by the moderator at the end of each session at the same location. Each of the groups were composed as follows:

> ***Group 1: Heterosexual mixed-gender group*:**
> Conducted on June 15, 2015 in Berlin, Germany. Participants (N=5) consisted of three heterosexual females and two heterosexual males, and all participants were of German

nationality. Therefore the focus group was held in German and lasted 1 hour and 16 minutes. Originally the focus group session was planned with six participants, but one heterosexual male participant cancelled prior to the session.

Group 2: Homosexual mixed-gender group:

Conducted on August 17, 2015 in Rotterdam, The Netherlands. Participants (N=5) consisted of one homosexual male and four homosexual females and all the participants were of Dutch nationally. Therefore the focus group was held in Dutch and lasted 1 hour. Originally the focus group session was planned with seven participants, but one homosexual male and one homosexual female cancelled prior to the session.

Group 3: Bisexual mixed gender group:

Conducted on July 2, 2015 in Berlin, Germany. Participants (N=5) consisted of four bisexual males and one bisexual female. Two males participants were of American nationality, the other two males of German nationality and the female participant of Dutch nationality. Therefore the focus group was held in English and lasted 1 hour and 20 minutes. Originally the focus group session was planned with seven participants, but two bisexual females cancelled prior to the session.

Group 4; Mixed group:

Conducted on June 21, 2015 in Berlin, Germany. Participants (N=5) consisted of one heterosexual male, one heterosexual female, one homosexual female, one bisexual female and one bisexual male and all participants were of German nationality. Therefore the focus group was held in German and lasted 1 hour. Originally the focus group session was planned with six participants, but one bisexual male cancelled prior to the session.

There are different opinions on the size of focus groups that are dependent on the research topic and desired outcome. The decision for small focus groups instead of large ones has several reasons; Bloor et al. (2001) explain small groups could be advantageous when the topic is a complex one like this. Also, small groups are easier to moderate and ensure all the participants have adequate time to express themselves allowing for more detailed discussion. Lastly, during the analysis it costs less effort to accurately attribute specific sets of interaction to individual participants. Each session began with the reading and signing of the informed consent from by the participants stating the purpose of the study, followed by an introduction of each participant, an explanation of how the session would be held and some rules and guidelines provided by the moderator. As soon as all the participants stated a clear understanding of the procedure the first question was asked and the discussions began, lasting between 1 hour and 1 hour and 20 minutes each.

3.3.1. Focus Group Guide

A focus group guide containing 11 open-ended questions was developed to guide the focus group discussion. The questions were aimed to discover various aspects of the interaction with the *Assistant* application as well as opinions and views on the gendering of technologies and possible impacts of these technologies on the individual's personal and professional life and society as a whole. The questions are divided into the following topics:

1. Interaction with, perception of, and opinions on the Assistant application as a whole.
2. Interpretation of the gender in all aspects of digital assistant applications, including gender in developing stage.
3. Impact of gendered technologies on gender stereotypes.
4. Opinions of gendered technologies and impact of them on the individual and society.
5. Opinions of artificial intelligence and impact of it on the individual and society.

The overall structure of the focus group was flexible and dependent on the interactions of the participants, but the moderator made sure all the questions were answered during the session, redirecting the discussion when needed. The designed questions were supplemented by clarifying and probing questions and clarifications of concepts and topics for a full understanding of all participants within the focus group.

3.4. Data Analysis

Because the goal was to do a transcript-based analysis (Krueger, 1994), all the focus group were verbatim transcribed and translated into English when needed. The transcripts were re-read multiple times and irrelevant data was eliminated. Even though focus group research has a history of around 80 years, to date there has been no definite framework provided that outlines the types of qualitative analysis techniques for focus group data (Onwuegbuzie et al., 2009). However, Onwuegbuzie and colleagues identify several techniques that can be used to analyze focus group data. These include constant comparison analysis, classical content analysis, keywords-in-context analysis, and discourse analysis. Constant comparison analysis, developed by Glaser and Strauss (Glaser, 1978; Glaser & Strauss, 1967) and Keywords-in-context analysis (Fielding & Lee, 1998) were used to analyze the transcript data with the aid of the qualitative analysis program *Atlas.ti*. During the first stage in the constant comparison analysis the transcripts were chunked into small units and were given a code, leading the method of coding to be open coding. In the second stage these codes were grouped together into categories that kept emerging (axial coding). Lastly, in the third

stage, eight themes were developed that express the content of each of the focus groups (Strauss and Corbin, 1998). These themes are; Impressions of the *Assistant* Application, Domestication of Gendered Technologies, Gender, Functionality vs. Personality, Developers, Artificial Intelligence, and Computer of Human?. This allowed for both between-group analysis as well as within-group analysis. The eight themes that are presented in the result section were derived from the data**.** The purpose of keywords-in-context is to determine how words are used in context with other words (Fielding & Lee, 1998). This approach was specifically used to determine in what context participants used gender specific words, like he or she, to indicate DAAs or when gender neutral words were used. The results of the questionnaire were mainly used for intramember analysis to find possible explanations for a certain statements of the individual participants. Additionally the questionnaire was analyzed using SPSS.

4. Research Findings

4.1. Questionnaire findings

Although it is clear that the sample in this study is too small to make any generalizations based on the results of the questionnaire, the data can still be used as an aid in analyzing the transcript data from the focus group sessions. Therefore the following statements will focus on descriptive statistics derived from the questionnaire data. All 20 participants, consisting of males (n=11) and females (n=9) between the age of 20 and 36 with a mean age of 25, answered the self-administered online questionnaire prior to the focus group session as part of the sampling procedure and for additional analysis. The questionnaire consists of 11 questions and starts with four demographic questions that include name, age, gender identity and sexual identity. Of these 20 participants 3 participants identify as a heterosexual male and 4 participants identify as heterosexual female, 1 participant identifies as a homosexual male and 6 participants as a homosexual female and 5 participants identity as bisexual males and 2 participants identify as bisexual females. From the questionnaire responses and statements made during the focus group sessions, however, it became clear that some of the "bisexual" participants try to avoid labeling their sexuality or have said they do not consider themselves to have a specific sexual orientation they identify with.

Participants have indicated using their smartphones for the following purposes; text messaging (n=16), Facebook (n=18), mobile messaging applications (n=20), E-mail (n=18), video calling (n=8), photography (n=19), downloading applications (n=14), news (n=14), weather (n=4), navigation (n=20), surfing the Internet (n=15), music (n=14) and online banking (n=12). This shows that all participants use their smartphones for a variety of different purposes. 10 participants had indicated that they have not used any other DAA before, 7 have used *Siri* and 3 have used *Google*. When asked about how useful the participant considers personal assistant applications 5% (n=1) considers them not useful at all, 20% (n=4) considers them not useful, 50% (n=10) is neutral, 20% (n=4) considers them useful, and 5% (n=1) considers them very useful. When it comes to the attitude towards DAAs 4 participants had a positive attitude, 15 were neutral, and 1 had a negative attitude. Of the participants 11 stated a positive attitude towards science fiction, 7 were neutral, and 2 had negative attitude. The attitude towards artificial intelligence was positive for 9 participants, neutral for 10, and negative for 1. The artificial intelligence characters that first came to the participants minds can be put into three categories; dangerous to humanity, neutral to humanity and assistant to humanity. The dangerous characters included; Hall from *2001: A Space Odyssey* (1984), Agent Smith in *The Matrix* (1999), *Terminator* in the Terminator films (1984), and the Replicants in *Blade Runner* (1982) The neutral characters that were named are David from *AI: Artificial Intelligence*

(2001), Ava in *Ex-Machina* (2015), and Max in *The Max Headroom Show* (1987-88), and Johnny 5 in *Short Circuit 2* (1988). Lastly, the assistant artificial characters included, Wall-E in *Wall-E* (2008), Samantha in *Her* (2013), Jarvis in *Iron Man* (1963), KITT in *Knight Rider* (1982-86), Sonny in *iRobot* (2004), Data in *Star Trek* (1979), R2-D2 and C-3PO in *Star Wars* (1977), Chappie in *Chappie* (2015), Marvin in *The Hitchhiker's Guide Through the Galaxy* (1979), and TARS, CASE, and KIPP in *Interstellar* (2014). It is interesting to see that most artificial intelligence characters that came to mind have not cased dystopian scenarios in their storylines.

4.2. Focus Group Findings

The findings from the focus group sessions using the constant comparison analysis and key-words-in context analysis can be summarized in seven major themes, which are:

- Impressions of the Assistant Application
- Adaptation of Gendered technologies
- Gender
- Functionality vs. Personality
- Developers
- Artificial Intelligence
- Human or Computer?

To secure the privacy of the participants, but simultaneously provide information about the gender and sexuality of the participants, the real names have been changed into fictional ones. These names will be used in this section to avoid confusion and increase the understanding of the interactions that took place during the focus group sessions.

Group 1:		***Group 2***:	
Leo =	Heterosexual male	Nina =	Homosexual female
Zack =	Heterosexual male	Naomi =	Homosexual female
Annabel =	Heterosexual female	Richard =	Homosexual male
Erica =	Heterosexual female	Lara =	Homosexual female
Antoinette =	Heterosexual female	Anna =	Homosexual female
Group 3:		***Group 4***:	
Agnes =	Bisexual female	Ivan =	Heterosexual male
Oscar =	Bisexual male	Hilde =	Homosexual female
Ingo =	Bisexual male	Esther =	Bisexual female
Tom =	Bisexual male	Hanna =	Heterosexual female
John =	Bisexual male	Mark =	Bisexual male

4.3. Impressions of the Assistant application

4.3.1. Visual Representation

When asked about the first impressions of the *Assistant* application the visual representation of an (gendered) avatar and especially this specific visual representation (see appendix D) of the Assistant application responded with critique from all participants for various reasons. The first and most important reason is that the offered visual representation of the default *Assistant* avatar is a sexualized image of female assistant that immediately evokes gender stereotype responses from the users. One of the best examples of this is the typical inquiry that has been mentioned across all groups is that they commanded her to undress herself. It has become clear that these personal inquires are usually aimed at testing the level of humanity the application has to offer and to test the boundaries of what the application can do and are not necessarily related to the gender or sexuality of the participant.

> Nina: You do want to test a bit how uh… you are going to test the how human it is. Like is it indeed… how do they react to when you ask stuff that is not the weather or that are not… what happens then. I think that is interesting. And with this app is indeed didn't work… I don't know how it is with Siri, but with this it didn't really work. (Group 2)

It is, however, very striking that this was mentioned several times in all groups. The second reason is that the failed representation of an attractive assistant resulted into no serious recognition from the participants.

> Leo: So, it is pretty absurd and it does not look serious at all. And… cause I asked you [to moderator] how do I find this app and so? And I did already see it, but I thought this cannot be it. (Group 1)

In Group 3 almost the exact statement was made by Agnes and John . The link between the gender stereotypes of female assistant was instantly made, but this visual representation of the assistant did not correspond with their preconception of how assistants ought to look. Based on this preconception they would also not feel confident approaching a person with that same appearance on the street for information. Apart from the association with an uncivilized person, the sexualized manga/anime design of the avatar heightens the threshold for most participants to use this application in public. Annabel even stated that she would be ashamed to use it in public because other people might think she is having a conversation with a sex robot. The reasons they presented that could explain the developers choice for this specific visual representation was that the developers aimed to make this DAA more personal and more inviting to use. The developers were conscious about the fact that they might consider this not to be serious and unappealing, but other

individuals might be very drawn to it. The participants of two of groups came to this conclusion, stating they are certain that the developers must have done some kind of market research of even focus groups to determine what consumers want. Some participants even thought that this application originated from Asia or targeted towards Asian users. Another interpretation was that the application was (unsuccessfully) aimed at "high power business individuals". Hanna and Agnes had access to the premium account for unknown reasons and discovered that the premium version allowed for advanced customization of the avatar. This included changing the appearance and gender of the avatar and also the option of a microphone as avatar or no avatar at all. The default setting was however taken more serious and personal by two female participants in Group 4.

Hilde: She has such big boobs for such a…I mean…
Ivan: But that also fits with the secretary stereotype.
Hilde: Noooo, That is not acceptable! That is unprofessional. When I look at her now I don't think about an assistant that can provide me with a badass answer. Rather a woman that is a street prostitute. Yeah, I mean, or not? (Group 4)

The discontent of the other female participant was even stronger.

Hanna: When I think about it now, I think it is pretty bold that they present a large breasted plump looking…[…] She looks cheap. And then also always this bad looking briefcase. […] I almost feel offended now. (Group 4)

The question was asked whether it would make a difference if the visual representation had done differently and in a proper and respectful way. In Group 2 Nina and Anna thought that a moving image of high quality has the possibility to make the user experience more personal, because it increases the sense of talking to an actual person. Esther thought the choice of a visual representation should have been paired with a lot of attention to the design, because when the design is really good it comes across as more serious as well. The overall answer however provides the third reason why the visual representation was criticized and resulted from the two other reasons. Since these digital assistants are perceived as voice assistants and having a visual representation does not increase, but rather decreases the functionality and the personal feeling of the application and it is therefore redundant. Having a voice combined with a visual representation only increases the sexual or service association and *Siri* also manages without it. The participants made comparisons to *Siri* and therefore described the overall design of *Assistant* as old-fashioned and not appealing. They were all aware of the subjectivity of a visual representation and concluded that is was best to completely eliminate visual representations from DAAs and focus on the functionally (mostly expressed by men) or personality (mostly expressed by women), and leaving

the screen free of unnecessary features. Because they think it is redundant and especially with a voice assistant it does not increase any functionality.

Ivan:	Absolutely redundant. I mean it's a voice assistant, there is nothing visual. Except that I can see what the last conversation looked like. How it is also common on smartphones, the main view of past conversations. You can also have that in this thing. Your last inquiries.
Esther:	Yes. That is right.
Ivan:	Such a random image, naah. It has no information. It has no value.
Hilde:	It has no use.
Tim:	Actually, also when you use this thing on the bike with headphones on then you don't see the image anyway. (Group 4)

4.3.2. Interaction and Personality

The interaction with the application can be broadly divided into two categories; information seeking and personal interaction. The information seeking was testing the functionality and quality of the application in providing the requested information by the users. These included asking for directions or asking for the nearest product or establishment, inquiries for facts, questions about the weather, and using the function from the phone for example writing a text message or calling a contact. The personal questions were aimed to get to know the personality of the application and testing the boundaries and humanity of the application. As stated before, these personal inquires were often of a sexual nature evoked by the image of the assistant but also some more general questions including the name of the avatar. Out of curiosity Agnes asked the application whether it was gay. For most the personality did not match with what was visually represented and the responses were often unexpected for participants. The participants thought the aim of the visual representation was to increase the personal aspect of DAAs. However, many participants stated that when they tried to approach the application from a more personal level the response was unpleasant or "bitchy", as some participants expressed it. Additionally, the sexualized representation clearly evoked sexualized responses in the participants that, against the created expectation, were also not answered or discarded by the application.

Nina:	…] We also asked yesterday if she would want to take her shirt off.
Anna:	Then I got a time-out.
Mod:	A time-out?! Why a time out?
Anna:	It said something really weird. There has been a miscommunication.
Nina:	She probably didn't understand it.
Richard:	I think she is a bit prudish.
Nina:	Yes.

Anna: *You would never tell·*
Richard: Haha· No, you wouldn't tell· (Group 2)

Apart from evoking sexual inquiries the visual representation also gave users the expectation of being able to communicate with the application on a more personal level. After Agnes asked whether the application was gay, she continued with other less confronting personal questions like "What is your favorite colour?" and claimed she got the following response; "That doesn't really matter. I like all different colours". Agnes explained that in her opinion it would be nice if the application was "a person with an opinion, because it feels like you are interacting with someone". Additionally, these responses gave participants the feeling that the application was in command and not they as the user.

Nina: *Yes· You do want to test a bit how··· you are going to test the how human it is· Like is it indeed··· how do they react when you ask stuff that is not the weather or that are not··· what happens then· I think that is interesting· And with this app is indeed didn't work· I don't know how it is with Siri, but with this it didn't really work· (Group 2)*

Tom: *There is not really a need for sexual question· I am not someone that is sitting around asking sexual questions· Unless I am trying to see the extent of the program I am using· You know· Like, oh lets see what this thing can do· And··· I won't probably be limited to sexual questions· But I would try it· (Group 3)*

The comparison between *Assistant* and *Siri's* personality was made several times and *Siri* was perceived as being friendlier and always provides a response to the user. When the *Assistant* application did not understand the inquiry, however, due to being too complex, participants reported occasions where they did not receive a response at all. Lara explained that she had to connect the application to her *Facebook* account, where after she tried to ask information about herself such as her birthday. She was confused when the application was unable to provide any details about her and therefore did not understand why it was necessary to obtain her *Facebook* information in the first place. In another group this interconnectivity between different applications and information on the phone was one of the main reasons giving by John for not feeling comfortable using DAA.

> John: One of the reasons why I won't use the thing is because I think it has too much control over the phone, actually. Because it can go into all of the apps and everything like that. I don't like apps that are sort of connected to everything on the phone. Because I said "Call my friend upstairs" and it went into my phone and found your number and tried to call it. Which I think it a little bit creepy. (Group 3)

4.3.3. Functionality.

The unanimously expressed critique continues when asked about the functionality of the *Assistant* application. Antoinette in Group 1 and Esther in Group 4 were unable to the use voice recognition of the application and were forced to write everything instead of speaking, because the application did not respond when talked to. This, however, did also not work properly as wished for by the participants, because the application often misunderstood the inquiry. This caused some frustration for especially Antoinette, because she considered the effort that she had to put into it too much, but was obligated to do it anyway because she was in a study. However, other participants also expressed frustration and confusion about the application, as it was unclear when to hold the button on the screen and when to talk. When they had finally managed to get their question asked, the application often provided them with illogical or irrelevant answers or just simply a *Google* search bar.

> Leo: I've got the feeling that super specified questions got programmed into it, but she cannot make a transfer. I also tried to asked with different kinds of questions… somehow… I mean I asked "How do I get there?" or "which metro rides there?" Something. And that did not work at all. And I believe the crucial point is that they don't implement any other apps… or no other… And every time she does not know something she says she will ask Google and then she enters what you just said in Google. And then you think, yeah… And then I asked where the nearest supermarket is and that was in Ghana [laughing]. Or 200 km from the coast of Ghana. (Group 1)

The fact that application is unable to answer questions by itself and connects the users to *Google* made Agnes even distrust the application and described that "she" does not feel trustworthy. Overall participants in all groups were under the impression that the application was not as well developed yet. In Group 1, however, the participants were under the impression that the application worked better when the language was set to English instead of German. Richard in Group 2 stated that it raises a lot of questions for him why such an application is offered for free,

because he can imagine that it costs a lot of money to develop an application like this. Many times comparisons with *Siri* and *Google Now* were made as the standard to measure up to. Apart from the friendlier personality it was stated that *Siri* is less complicated to use. Of all the participants there were two that actively use a DAA. Lara in Group 2 already actively uses *Siri* and Tom in Group 3 actively uses *Google Now.* They both expressed great satisfaction with their applications and *Assistant* does not seem to measure in any way. Tom said that the *Assistant* application seems like another thing to have, but he would rather have fewer applications on his phone. For participants in Group 2 it was even unclear why there are other applications that try to be similar to *Siri.*

Nina: What is don't get for example is that when you already have Siri, why would you make another app like this?
Richard: Yes, indeed. I am wondering that as well.
Lara: Yes, we talked about this as well indeed [points to Sander].
Nina: Siri is just free for Apple. And for this, you could pay more for it I think. (Group 2)

While other participants do not see the added value of having digital personal assistant applications at all, because they were not under the impression that using a digital assistant saves time and effort. Tom, who actively used *Google Now,* also stated that he mostly used it because he considers himself as being lazy.

4.4. Domestication of Gendered Technologies

All the participants mostly agreed on the different aspects of the *Assistant* applications, but the way and rate of adapting and integrating gendered technologies differs across the participants. As stated before there are two participants that use either *Siri* or *Google Now* on a daily basis already and seem to experience the benefits from using DAAs, whereas other participants are barely aware of the existence and users of these technologies before the focus groups sessions. Antoinette in Group 1 clearly explained that she is not interested in these applications besides *Siri* unintentionally being activated inside her bag; she didn't know any other DAAs. However, there are various reasons why participants have not integrated gendered technologies into their lives (yet). One reason that has been expressed in all of the groups is that the threshold for using these digital assistants in public is still relatively high. By using the application in public they point to the aspect of talking to your phone in public. Annabel in Group 1 even stated that she had to overcome using the voice message feature in *Whatsapp*. However, one of her friends was always replying by recording her messages and at some point she thought it was be weirder that her

friend's messages were spoken en hers were written. Now she does not consider it as a problem anymore and uses this feature all the time, but had to overcome this initially. The visual representation of *Assistant* only increased this threshold, but they said is also the case if it would just have been a voice like *Siri* or *Google Now*.

> *Zack:* *I think a really big problem of such an app, related to the usability, regardless whether it a man or a woman…that the resistance in our society is still relatively big to go into the metro and then tell your cell phone; hey, how about you write a text message, instead of just writing in your silent private space. (Group 1)*

Other participants stated they will probably integrate gendered technologies into their lives when the functionally of DAAs is up to their standard. Erica in Group 1 stated that she will definitely integrate it into her life, but she will wait another year or two until the software works nearly perfect, as she feels that at the moment it does not decrease work for her, but it rather is causing her stress and frustration when it doesn't work properly. This view was shared with Annabel in this group when she explained that she gets annoyed when she has to repeat herself. In Group 4 the matter of using these application out of convenience was responded by Esther by stating that it seems more of an effort to talk to application than looking it up herself. Increasing the quality of voice recognition within the application in a way that the users do not have the repeat the inquiry seems to make the integration more likely for many participants. For Tim in Group 1 and Richard in Group 2 DAAs have to become that utilizable that it really works perfectly until they feel like using DAAs and they are sure that at some point these technologies will be used extensively. In Group 1 Leo elaborated on a similar application, of which he forgot the name, where it was possible to ask multiple questions simultaneously and get one answers really fast. He believed that this kind of software might actually save the user's time and as soon as it enters the market in that form he can imagine using it as well. The functionality was not only addressed in technical terms, but also in social aspects of the personality of the application.

> *Oscar:* *I was thinking if these apps get better, it gets more social in a certain way, because they can interact with you. If they get better, like what you were talking about; that they can guess your feelings and maybe know you, they have all these things about you then it gets more social, because then you have the feeling that you interact with someone. (Group 3)*

Hilde in Group 3 explained that she thought that these technologies having a personality would also be more accepted by society in the future, but we are too stiff at the moment. For Anna in Group 2 the reason for not adapting to these technologies fully yet is because she thinks it is still a bit scary.

She also waited a long time before starting to use Internet banking, because in the beginning there were still a lot of bugs and security was good enough, but now she is using it as well. Especially in Group 1 participants were conscious that they might be the first one that get confronted with gendered technologies, but that they are already part of the older generation and people that are only a couple of years younger would probably not have a problem to talk to their phone. They were under the impression that they might think that they are up to date, but are actually not due to the increased speed of new developments. Lara explained that the digital natives are ahead of us and you can already witness it when you see babies interacting with iPads without any technical difficulties. Growing up with technology in their hand will make it easier for them to understand what is going on around them and adjust and navigate accordingly.

> *Anna:* I think it is extremely awkward.
> *Antoinette:* And I think the people a couple or years younger they would not have a problem at all to babble to such an app. (Group 1)

However, the participants highlighted also witnessing the older generation of their parents slowly seeing the benefits of new technologies and adapting to them, as Annabel explained that her parents had always been big advocates of their atlas in the glove compartment, but now they actively use their navigation system every time. Another participant explained that his mother uses *Siri*, because it is easier for her than typing for which she needs glasses. New technologies make values shift however, as John explains that he observed how it is now common to text at the dinner table or even at funeral, behaviors that would have been considered completely inappropriate five years ago. But John thinks that society has the possibility to correct itself, if people think this needs to be corrected. In the focus group Agnes agreed, since she is someone that prefers to interaction with people directly and because people are on their phones constantly already, she can see these development backfire in the future. But overall she has no idea what path gendered technologies will ultimately take. On the other hand Ingo thinks that these technologies are going to be needed in the future because of the way we are connected to everything around us it will at some point be necessary to use your phone on high speed to be able to keep up with everything. In that case talking to your phone will be much faster and more efficient and we will get used to it. Similar to the inefficiency of only being reachable through text message in a smartphone dominated world.

When asked what kind of impact these technologies could have on their personal as well as professional life the participants certainly see the benefit of having an assistant, and also in this case a virtual assistant. In Group 3 the participants agreed on the notion that having an assistant that does not forget anything in your professional life could be very useful, but until now the DAAs

lack the human capacity to make decisions that are based on logical reasoning. Hanna said this intrinsic value of personal interaction cannot be achieved yet, but at some point digital assistant have an advantage over a human assistants, because technology does not get overwhelmed, confused or forgetful. Ivan, however, explained that for him computer technology can replace a big part of that, and the parts that it cannot replace he can do himself. In general all the participants were able to imagine digital assistant being very advantageous in the professional sphere. Although none of the participants can imagine themselves to have a romantic relationship with their gendered technologies, they are certain that it will happen in the future based on the amount of people engaging in purely virtual relationships with other humans. Additionally, the participants are aware of even stranger occasions where individuals have relationships with various different objects. Especially people that are already socially isolated participants consider vulnerable to future developments of gendered technologies. Still, they are not sure what paths these technologies will take, but know that there a wide range of possibilities of what kind of impact gendered technologies could have.

> John: I think at some point society is going to decide how we can integrate this into our lives. And what we can do with it. I think right now it's all a bit new. I don't mean to sound old or anything, but think it's to the point. (Group 3)

4.4.1. Impact of gendered technologies and intelligent agents on society

When asked what they thought the impact of gendered technologies could be on society, participants illustrated both positive as well as negative outcomes. It is clear to the participants that technologies are here for us to make life easier and takes complex task of our hands providing us with more time to do other things. Anna in Group 1 explains that this process might evoke laziness in our society, but this is dependent on the individual and how they decide to use the extra time. Erica however thinks the problem is more that the dependence on technologies will result in a decrease in intelligence. Especially with information technologies she thinks the search process for obtaining information is considered a skill and keeps you mind fresh. When technologies completely take over that process it will eventually disappear in our society. In all the groups participants are already observing this within and around themselves in that the sense of direction is decreasing due to the wide availability and excessive use of the navigation function on their phones. Leo explains that he know people that have always used the navigation while living in a city for a year and don't know how to get from one place in a city to another when they are not using the metro. Whether this should be considered useful knowledge could be discussed he

says, but he feels it helps him to have it. Nina in Group 2, who until recently did not own a smartphone, notices this with herself already, explaining this by stating that because when using a traditional map or directions you were conscious about where you are and where you are going next. Now you just following the dot on your screen you don't look around anymore and in a sense you actually have no idea where you are. Additionally, the act of asking a person for directions also disappears and situations like that could often result into finding places that would have stayed undiscovered otherwise. In the same group Richard explained that when he would be in an unfamiliar location he would rather want have the certainty of accurate directions than dependent on the knowledge of an old lady for example where there is an increased chance of being send the wrong way. He states however that this is dependent on the situation and is more crucial if you have to be somewhere important and how much you trust the technology. When Leo in Group 1 is handing out flyers in Berlin he gets asked for directions all the time, but he thinks eventually there will be a moment when the tourist in a city don't walk around with their actual maps anymore, but they will walk around with their phones and nobody will ask him anymore. Zack however thinks that this extreme will be temporary and people will recollect themselves slightly and occasionally asked for directions, because they know a possible conversation could result from it.

This aspect of technological developments seems to be more alarming to the participants, they are afraid this loss of communication will increase further depending on the future technological developments and how we adapt to them. Especially when mobile Internet becomes widely available for people abroad asking for directions is no longer necessary. The participants think this would be a sad situation, because especially in Group 1 they seem to enjoy the random conversations and situations that can result from that form of interaction, which they have experienced in the past. Erica, however, thinks that new technologies open up new channels of communications and different forms of communication that were not available before, making it easier to connect with many people in a short amount of time just by staring at your screen. She uses the example of mobile dating application *Tinder,* which as the potential to connect you to people you would otherwise likely not have crossed paths with or other that you might miss because of that. The fact that you are more connected alone should mean that in the end you have contact with more people. She thinks this is, however, hard the measure the difference of what would have happened if you hadn't had your phone. Antoinette thinks we have to accept that this is the way it is going to be.

Erica: *This is a really weird thought. You can't just say that because there are apps, people won't ask for the way anymore. Maybe they arrive at their destination quicker and talk more to the kiosk owner. This is way to short-*

> sighted· I mean we had the comment about time saving, in that time you can talk to other people· I don't think that the Internet or apps will decrease communication, but rather that is happens differently (Group 1)

In Group 2 Nina agrees with fact that people, including herself, might lose a part of connecting with their surroundings, when she observes during train rides that everybody is doing something on their phones. But on the other hand it gets replaced by other experiences and does not necessarily have to fundamentally change things. These new experiences might also bring forth something beautiful, but just in a different way. Anna thinks that as long as there is a freedom of choice many people will be fine with it and it does not become a matter of replacement, but of efficiency.

> Anna: Because there are for example also people that are mainly buying online· This also changes· But there are also people that want to feel what a towel feels like before they buy it, instead of ordering a towel a Bol·com· This is also changing with the assistant when you better outsource it and you think, oh I don't have to do it myself or I am going to have this delivered· We live in a very fast society· Time is money· The children have to go there, we have to pick up that person and we still need to do that· Looking at society now, people will slowly start to use this and experience its benefits· · (Group 2)

Another fear closely related is the fear of becoming dependent on technology. Ivan already explained that technology should just be seen as a tool that saves us time, because it can do certain tasks for us. This was not something bad until now, but when we start talking about giving cognitive tasks to machines it seems that some participants are concerned that society will eventually become less intelligent. Especially Hilde who thinks that there are already so many "stupid" people who would see the benefit of this will help to make this happen, because they consider it to be a great advantage to reduce their mental effort. Ivan does not agree with Hilde's point that technology makes people more stupid, because people have the freedom to decide how to implement technologies into their lives and how to use the time that it might save.

> Ivan: I don't look at it that way at all· But I don't need to argument against this·
> Mod: Please do·
> Ivan: I mean···NO!
> Hilde: Until this moment in time it does·
> Ivan: This contradicts any indented meaning of our society in every possible way! Technology doesn't necessarily make you more stupid· Oh no, there is something new and it can do something that it couldn't do before and now I just going to be pessimistic·
> Hilde: Calculator· Calculator saves you the trouble of mental calculations·
> Ivan: Yes, and that is good!!!

Hilde:	Do you know how many people nowadays can't make mental calculations anymore?
Ivan:	So what? They have a calculator!
Tim:	Exactly.
Hilde:	But they don't have the capabilities to do it themselves anymore!
Hanna:	That is not true, the basis mathematics everybody can do.
Hilde:	No, they can't do it.
Hanna:	You don't have to be able to take the square root of 93.
Ivan:	This sounds like if the human would biologically retrogress due to computers. Like sitting in front of a laptop and we are unable to stand eventually.
Hilde:	No, that is not what I meant at all.
Ivan:	Yes, but people can't make mental calculations anymore, but that doesn't mean they don't have the lost cognitive ability to do this. It means that the cognitive ability that they wasted for mental calculations before, they can now use much better.
Anne:	Naja…
Hilde:	[Doesn't agree, but gives up]. Group 4)
Ivan:	I am aware of that exactly like you, You would be the one making that decision, but that is not the technologies fault.

Tim agrees that DAA applications may indeed save time, but it seems that it becomes the challenges of finding something to do within that time and these are often mind numbing activities.

Tim:	…] I mean I am not going to sit down at the piano every time [points at piano behind him]. Rather I would say, well now I am first going to drink a beer. (Group 4)

This is, however, a decision each individual should make for himself or herself and Ivan urges us to look at technological solutions as something that is being added as additional and often easier options rather than something that is actively being taken away from us. There are still mathematicians, he explains, and the field of mathematics is not dead because computers make all the calculations. Lara also explains that this fear towards new developments and technologies has always been present in our society and this is just the fear of our time and it is no different than the fear of the television many years ago as it was seen as something having a bad influence on especially young people. Today we can see a television in every living room, she points out. This dependence on technology, however, becomes visible as soon as it does not work anymore and people seem helpless without it, Naomi in Group 2 explains. She already witnessed this during an electricity breakdown at the train station in Amsterdam.

Naomi:	Also when it breaks down. When there was this electricity breakdown in Amsterdam I was at the train station and you could not check in or out.

> Everything when down. There was no light, there was nothing on the information signs, nothing could be announced. People didn't know what to do and were just happy that the Internet was still working. Everybody was standing with their phones like okay, where do I need to go? Is the bus still running? Then I also thought if there is going to be a war here, nobody knows how to do it without that shit, how to live. They are really dependent and also lazy. (Group 2)

Lara is more optimistic about these developments as she sees the benefits of having DAAs and does not consider the time saving aspect as laziness per see. Nor does she necessarily sees technologies replacing her personal communication when she is merely commanding *Siri* to write her mother a text message, because she is busy doing something else important. She sees it as something unavoidable and belonging to this time and also thinks that because of our increasing dependence on technologies future electricity breakouts will be solved within two minutes since we need it more than ever. In that sense, Lara thinks the technological infrastructure and we as a society will develop hand in hand with these technologies. When looking at the development of DAAs purely objectively she does not consider it as something negative for society, she agrees however that there is a boundary of how many tasks you should let be replaced by technology. If an individual does not leave their house anymore and becomes isolated, because intelligent agents are arranging everything, then it has indeed gone too far. These are negative outcomes Lara is afraid of, but she is certain this will not affect everybody in the same way, because there are certain things that seemed to be irreplaceable with technology and it is a matter of choice. In Group 4 participants see this potential danger especially with people that are already socially isolated and how these technologies could make them lose touch with reality all together.

> Esther: I also think it is a bit frightening. Especially for these people that don't have that many social contacts anyway. Then something like this bumps into them and because of that they isolated themselves even more and lose touch with reality. I think it's a bit creepy. Also when you think where this could lead.
> Hilde: But at least they are talking to somebody. That is still a progress.
> Esther: Somebody? It is a computer. And when this sort of merges and the boundaries get vague and you don't realize anymore that it is actually a computer. You think it is a person or something. That is…
> Hilde: It's sad. It is certainly sad. (Group 4)

Ingo in Group 3 already sees this happening in Japan at the moment where the functionality of the phones in much higher and they also have an anime character to which they can talk. They have explained they don't need a girlfriend, because they have their phones, but are simultaneously very isolated. Ivan thinks we indeed have to keep in mind that it are imitations of humans and he does consider these technologies to have the potential to be beneficial, but he does not see this

happening because of the increasing resemblances to humans in the best way. In that same group Tim and Hilde did not agree and think when computers can replicate human behavior it can be beneficial for different reasons. Hilde thinks that it would something positive when you phone is able to give you compliments and make you feel good about yourself, whereas Tim was looking at it from a more functional way and thinks it could aid you in a creative thought process. Hanna explained that she would rather like to have real human for these parts and when she want see need information of functionally wise she can get from computers. Ironically enough later in the focus group session the opinions were reversed:

Hanna: What would make me happy is when it comes to the point that there is an autonomous intelligence that for example replicate the aspect of humour… Humour I think is also not programmable with algorithms· But if that would be integrated in so far that you can have an interplay· That what you can also have with a human· This back and forth for example·

Ivan: That it is encouraging you·

Hanna: Yes, that somebody is encouraging you! Exactly, that it doesn't just do what you say and becomes your servant in that sense, but that it really becomes an opponent· That I think is really exciting, the idea and the vision· But…

Hilde: But isn't it a bit stupid to humanize something when··· What is our added value?

Esther: Exactly that is the question· (Group 4)

On the other hand, participants were also able to see potential benefits of intelligent agents. Apart from the intended use of digital assistants to make your personal and professional life easier, it has the potential to make technology more accessible for older or disabled people when an intelligent agent is assisting them and typing is not necessary. Second, especially in the healthcare sector this could lead to a lot of improvements, as Anna in Group 2 explains that financial cutbacks have resulted into less personal contact for patients or elderly people in retirement homes. Therefore she can see the benefits of a digital assistant as an aid for lonely elderly people. John thinks that it could even work better with computers, because people sometimes are more open and honest about themselves even when interacting with a human though the medium of a computer. This in combination with more individual care that would be available per patient when using computers instead of busy actual doctors might result into a better explanation of the patient's' symptoms and needs.

Naomi: When a little computer is asking you how you are feeling, you rather start thinking, "how do I feel actually? Actually not that good"· People are most honest to a computer than a real doctor· (Group 2)

4.5. Gender

4.5.1. Voice

It has been mentioned before that most of the DAAs have a female voice by default. Although many applications, including the *Assistant* application, offer the possibility to change to a male voice, the default setting however is often a female voice or in the case of *Assistant* also a visual representation of a woman. It has become clear that the visual representation of the application failed dramatically in the eyes of the participants and therefore should be excluded altogether. The voice, however, is by no means gender neutral, which does have some consequences. Interestingly, there were several participants that had not even conscious about the fact that most application have the default setting set to female. They offered various explanation of why they thought gendered technologies have established themselves in that way. Most participants, with the exception of Esther and Hanna, perceived a female voices as more pleasant and gentle and thought this might be the case with most people. John thought that these perceptions of the female voice are not related to gender or sexuality, but are linked to mothers and their soothing voices. Gentle female voices are also perceived as less threatening or intimidating, he adds to it. Therefore the result that most applications have a female voice by default must have been done consciously by the developers after having conducted tests to see which voice is the most appealing to their target groups. Additionally, participants offered the explanation that we probably are unconsciously used to female voices, because we hear them more than male voices in navigation systems for example. Many started to try to remember instances where they had witnessed the presence of male voices in computer systems.

> Annabel: Conversely really only the male voice inside the metro comes to mind. These are almost always male voices. And I also didn't think about it that it is a male voice. I also did not really notice this. I think it is really again this purpose aspect, when I just want information, it really doesn't matter to me with what kind of voice it is being said. (Group 1)

In Group 2 they noticed that artificial intelligence entities in films however often have male voices. Although these are often also assistant of some kind, like Jarvis in *Iron Man*, they are often also very intelligent. Lara's conclusion was that there are certainly male voices, but it is dependent on the role of the technology. When a more submissive assistant is portrayed as a woman and when there is intelligence and agency involved a male voice gets chosen.

Participants were asked what would personally change for them regarding the interaction and perception of the application when it would have been male. Most the immediate responses were that it would not change that much for them. In Group 4 participants imagined that people would curse less when technologies would not work properly, because the threshold is lower when it is a woman. In Group 2 Richard thought the opposite was the case, because of the gentle perception of

women and a calming voice might actually hold more power to calm people down than a darker male voice. John in Group 1 said even though he is not interested at all in using DAA, it would have probably been more interesting for him if DAAs would have been a male, because the representation of a woman does evoke sexist or feminist thoughts in his head and he does not feel comfortable with that. Oscar, to a lesser degree, had the same thought, expressing that he might feel less sexist when it would be a male, but since he is only interested in using it in purely functional way it would in the end make no difference whether it would be a male or female. When asked if the participants would still have made sexual inquiries if the application had been male the answers varied. Tom, who explained that the does not consider himself to be categorizable when speaking about sexuality, said that he it would not have made a difference if the application would have been male, because the sexual inquiries are used to test how far developed the application is. Nina in Group 2 however would probably not have asked a male avatar to undress himself, whereas this likelihood would have been increased in Tim's interaction with the application. For Lara it would also not make much of a difference, but she actively uses *Siri* and would not want to change the voice to a male, because she is already used to *Siri* with a female voice. She explains that this is also how *Apple* has presented and sold "her" (meaning *Siri*) to the public. When it would suddenly be a male voice it would be a revolutionary step in Agnes opinion, but Erica is certain that it will never be only male voices but both male and female. She considers it positive sexism that women are perceived as more pleasant and thinks that it is not only a result of the secretary stereotype we have of women. It seems, however, that we make this connection automatically, Antoinette adds to it. Interestingly, in Group 2 consisting of only Dutch participants, they noted that the Dutch version of *Siri* has a male voice as the default setting.

The solution to this problem seemed very straightforward to all the groups; there should be no default setting, but have the users decide when first opening the application what kind of voice they would like the hear.

> *Erica:* *Very simple. As soon as you can always choose between the two than everything is all right. Then there won't be any debate. Everybody can decide for themselves how they want to get served. (Group 1)*

Leo, however, was not sure that the problem would necessarily be solved by giving people more power to decide. He imagined a future where everybody uses assistant applications and there is always the option in the beginning to choose. From his own experience he assumes most men have chosen a female voice, and the men that choose male voice have to justify their choice to other people that don't understand it. Antoinette wonders whether people contemplate about the

gender that much, because she did not notice it that much, and other people also might be completely indifferent about their decision. In Group 4, Oscar presented a solution that could possible eliminate Leo's scenario by having people choose not between a male or a female voice, but between ten different voices that could include male, females, as well as famous (genderless) characters. The participants think, however, that it is unavoidable to include a gender dimension in these technologies, because a voice will always have the tendency to sound either more male or more female. Participants tried to find solutions where gender was not involved at all including genderless cartoon figures.

> *Tom:* *Thinking about the cartoon thing, I would just choose something… Like Pickachu· Nobody knows if it's a boy or a girl· But if Pickachu would say other stuff than picka···chu···ha ha· (Group 4)*

Tom also remembered the Dreamworks film of Moses where he at some point speaks to God, essentially a genderless entity. In the film they solved that problem by synthesizing thousand of different voices including men, women and children into a multi-layered voice. Computerized voices were also briefly mentioned, but apart from not being very appealing and distant, people need to have to be able to identify and make sense out of DAAs and other intelligent agents and this is achieved by assigning a gender to these technologies. Tom in Group 3 thinks that we will move away from the humanistic approach to these technologies, but we need it initially to be skeuomorphic to help people feel more comfortable. Skeuomorphism, designing items in way that they resemble their real-world counterparts to intuitively guide users, is seen in technology frequently. These include for example the E-mail and call button on smartphones that are designed that they resemble and old telephone receiver and an envelope. Although unaware of the concept of skeuomorphism, Agnes agrees that it would be confusing for people if they cannot rely on something they understand such as the basic concept of man and woman. Therefore Richard thought it is understandable that gendered technologies are becoming more visible in our society. Tom explained that as soon as your genderize something it becomes politically heavy and gender stereotypes are inescapable.

4.5.2. Gender Stereotypes

Across all focus groups participants were aware of existing gender stereotypes and agreed that gendered technologies do reinforce these existing stereotypes. Specifically the stereotype that women are often assistant or occupy bureaucratic or service positions in our society and as Ivan explained it does not even have to be the reality anymore, but the stereotypes continue to exists in our minds. Therefore when Ivan is going to ask something bureaucratic he always assumes it is

going to be a woman. These stereotypes are being reflected back to society, in Ivan's opinion, and the *Assistant* application did this even more than other DAAs. Nina in Group 2 witnesses the female assistant stereotype always in films, where she claims that nine out of ten times the person behind the counter is a woman. They all agreed that giving people the options to choose in the beginning is the best way to reduce the reinforcement of gender stereotypes, but this has obviously not been done until now. We unconsciously choose a female voice, because that is what we want and Annabel thinks that it could be both off putting as well as appealing to people when a woman advises them. Despite of being aware of gender stereotypes accidental stereotyping occurred during the sessions.

Ivan:	I would say female voices are more pleasant. I mean… you are used to it somehow. Also like the service, a woman's voice has some kind of service characters.
Esther:	Ohooohaha.
Hanna:	Oh-oh.
Ivan:	No really. I mean the woman at the bank counter, oh the woman. You see!
Hanna:	Haha. Oops.
Ivan:	I mean the human at the bank counter is tendentially a woman. Everything that is somehow a service job. At the call centre, tendentailly women. (Group 4).
Erica:	It is probably from the beginning a woman, because… I don't know… these kind of jobs, these assistant jobs are always just women. (Group 1)

In Group 1 participants thought that people unconsciously uphold stereotypes in their heads, and they might not get challenged by DAAs, because they fit the user existing mind set and nothing gets questioned. Erica, however, explained that these stereotypes go back in history and present gender inequality. She agrees that DAAs with female voices have the potential to reinforce gender stereotypes, but it might also be odd to put that much attention on the decision of the users and thus reinforcing the role of the woman more than needed. In the other group, Tim is certain that the representation of a female secretary upholds gender stereotypes, but he thinks that this might have been done consciously to target people that need to this stereotype or want them to be upheld. Esther thought it could be the case with navigation systems that the developers assumed that men drive cars more often and therefore they choose a female voice, but she stated that this could just be another stereotype. This would, however, be paradoxical, Ivan notes, because if the navigation system dictates the driver what do to it should rather be a man. The navigation system tells its user what to do and with digital assistants on your phone you are the one that commands the phone. However, Hanna thinks that in both instances you are putting yourself in a submissive position, because you depend on the technology as an information source and therefore are depending on the woman. Later participants concluded that it is more of a trust issue then

dependence since the user is still in control and decides what information he or she wants to receive and follow up on from the technology. John in Group 3 explained that this question goes back into privileges of holding power and he might would not want a man's voice telling him what to do. It furthermore raised questions that you need a premium (thus paid) version of the applications to be able to change the avatar to a male.

Zack:	But you can reset it into… a dude, right?
Mod:	Yes, but you need the premium version for that.
Zack:	So the man is automatically worth more than the woman?
Erica:	Errrgh.
Anna:	Yes exactly that… (Group 1)

4.5.3. Sexuality

The topic of gender is of course closely linked to the topic of sexuality and it seems unavoidable to at least touch upon the sexual aspects of these technologies, especially since the visual representation of *Assistant* clearly evoked sexual inquires from the participants. As stated before, these were not necessarily linked to the gender or sexuality of the participants themselves. The film *Her* was discussed or used as a reference point when talking about romantic relationships with gendered technologies. Although none of the participants can imagine having a relationship with their computer, they think it will certainly happen in the future based on the things already happening related to virtual sexuality or weird situations where people fall in love with objects or virtual characters. Oscar explained that there is a small likelihood that these situations become more common, because of the ability to actually have a conversation with gendered technologies. Agnes even thinks that this might not be considered weird anymore at some point. The absence of a physical body, however, seems to make it impossible for her to have a relationship with just a personality. Ingo sees this as an obstacle that will also be overcome in the future.

Ingo:	I think it's possible when robots are being build like these dolls. Like these really real dolls that the Americans have.
Mod:	The really expensive ones?
Ingo:	Yes, and I think when they can communicate with you and they can move and act really human. I think that it's really possible to have a relationship with an AI person. That is possible, but now… When you just talk to your phone it is really hard and not possible maybe. (Group 3)

Additionally, in Group 1, participants concluded that this sexualized image was not programmed into the app on accident or on good luck, but rather as something that users want to see. In Group 4 participants stated that from what society project on us it is clear that sex sells. Tim explained

that in the market for virtual reality glasses there are currently four main competitors and since these reality glasses are actually all the same nobody knows which one is actually better. Therefore speculations are being made that the first company that offers virtual porn through the usage of these reality glasses will win. Sex sells to people, Hilde says. And therefore Esther thinks that these kinds of developments will be very appealing for people that currently are not sexually active. Even though there will be a big market that responds to these types of developments, Hilde considers it as being unprofessional. It is however also hard to estimate at this point, as Nina in Group 1 explains, because the possibilities are so vast. She simply cannot imagine that it will be possible that there will be something inside a computer that we are going to see as human.

4.6. Functionality vs. Personality

There seems to be a difference between some of the participants when it comes to the importance of a personality within gendered technologies. All male participants, and most female participants, have stated that it is more important for them that the application works properly and having a personality or emotional intelligence does not increase the functionality of the application. When it comes to information seeking DAAs are more about the time saving aspect and the increased accuracy of the information. Zack in Group 1 opted that when you are looking for the right metro directions to get away from a metro station in the end it is irrelevant how you obtained that information. Whether you have looked at a map yourself or have interacted socially. Annabel added that it is really dependent on what purposes you use DAAs for, but when you exclusively use it as a small aid in your everyday life the personality of the application does not matter. However, Ivan in Group 4 commented that if developers implement a personality into the application, then the conversation that could be held should not become an uninteresting conversation cycle, but should rather be inspiring him. This difference in how much value males and females put on the personality of the application can also be seen in the way the participants interacted with the *Assistant* application. It was more common among the female participants to try to have a conversation on a personal basis with the application than the male participants did. When the topic of personal questions was addressed Oscar said that it did not even occur to him to ask personal questions. Agnes on the other hand explained that when presenting a visual image the expectation of a personality is created and it would be good to see expressions of a personality and have the possibility to build a relationship. But when there would be no image or an image of a microphone the personality would not matter to her, because a computerized voice does not create a human experience for her. Hanna on the other hand agreed more with the male participants in not needing any emotional intelligence that does not increase the functionality.

Hanna:	Uhm, I think it's pretty big… this image of the woman. And then in the beginning I was like what should I ask now, now she is asking me something. A bit… artificial. It is of course also artificial, but also what I don't really need. Too much bells and whistles, which I don't need.
Mod:	So just a voice would suffice?
Hanna:	Yes, actually. It would also suffice that when I need something or I asked something that she answers, but I don't need this conversation. This interactive style.
Mod:	The intelligence behind it sort of?
Hanna:	Yeah. But no actually In the case I need something or I need information somehow then…
Mod:	Then you mean the emotional intelligence you don't need?
Hanna:	Exactly. (Group 4)

Hilde, who puts more value on the application's functionality, says that it does have a positive influence when DAAs are able to respond to non-informative inquiries, but there is a narrow boundary between fun and annoying that is harder to establish in the digital world. Nina added to this that it is also dependent on how well the application functions. If the service is good and you are able to occasionally make a joke than it is satisfactory. This balance has not been achieved with *Assistant* were you have to ask several times before it understands you, but when you try to be funny it gets angry. Ivan in Group 4 explained that it is all a question of the usefulness and that everything has to be humanized at some point, even though this does not increase the usefulness in anyway. Technology is merely a tool to achieve something and when it become more human, becomes gendered, or talks to you that does not aid you to achieve what you want to achieve. These are just added features that you actually don't need. Hilde however can imagine that at some point we will be more open towards human personalities and it becomes a case of wellbeing when we have reached a point that technology is operated through voice commands. She provided a contemporary example of going to store where you have the experience of great customer service on an individual personal level. This need for personal attention and service she thinks will later become more important when gendered technologies have been more established in society and we understand it more.

Hilde:	Fundamentally it is because of the nice customer service and personal things. And that is what I mean with wellbeing. That at some point we are open towards it, that it can increase the wellbeing.
Esther:	But that are people, they are not computers. I mean…
Hilde:	But maybe we will have a different view on this later. I can also not imagine it that it's the case. I am still trying to calculate this.
Tim:	And at some point when there is artificial intelligence that can imitate exactly how a human acts?

Esther: I still consider this an imitation and not a person.
Hilde: But we are stiffened about this! We are really stiffened about this, because not long ago this didn't exist.
Esther: Yeah. Yeah.
Hilde: You just can't imagine it. (Group 4)

Lara thinks that as soon as you are communicating with something that is communicating back to you that it is probable that you will get a sense of a personality from the entity you are communicating with, for it does feel like there is some human aspect about it. It becomes clear that we are at a vague boundary between machines and humans.

Hanna: You also hit a boundary actually. Between technology and humans and the personal and the non-personal contact. But it still remains technology and when the phone breaks then it distorts or provides wrong answers. It is still technology and somehow the human still has to decide (Group 4).

4.7. Developers

The participants speculated about what kind of team was responsible for the development of the *Assistant* application. Especially because in their opinion the developers had failed in developing an appealing product and they did not understand the reasons for the specific design of the *Assistant* application. In Group 2 they thought that the developers wanted to give the user a personal feeling, but they did this in the wrong way, by choosing that specific female figure making the application somewhat off putting. In Group 1 and 2 participants thought the application might have been developed in Asia or aimed at the Asian market. Even if this was not the case, the participants think the application would likely have a higher success rate in Asian countries. It might be a cultural difference in the treatment of women, because especially the male participants were confronted with a sexist and anti-feministic feeling. Tom can imagine, however, that the feeling of being served by a white woman could arouse some Indian man working in a call centre in New Delhi. He was aware that the statement might sound racist. The cliché of the typical nerd that likes manga figures was not only projected on the users, but also on the developers of the *Assistant* application that would program that image into the application based on their own preferences. In Group 1 it was still unimaginable that something like that would happen at big companies such as *Apple* or *Google*, which are completely customer focused and have businessmen and women decide collectively about the product design.

When asked about the influence of the gender of the developer on the technologies it seemed most participants were under the impression that it does not have that much of an influence,

because developers do (market) research into their target groups. Therefore it should not matter whether the developers are male or female to end with the same results. In Group 2, however, participants were unable to explain, using the above stated claim, how the developers of the *Assistant* application ended up with the current design other than having a developers team of young adolescent men.

Nina:	*I do think that with the design of such a woman that there is a bit of…*
Naomi:	*Something went wrong.*
Lara:	*It went a bit overboard.*
Nina:	*Well, yes it sort of did. Imagine that they have five 19-year old blokes who are making this. Then maybe you get a distorted image of such a woman. When there would have also been some women in that team. In that sense maybe it could have an influence. (Group 2)*

Lara thinks that it might have been influenced by the fact that there are not many women in technology. This is a result of what society projects on us, she explains; because working with technology is not considered to be "sexy" and is not very feminine. Therefore young women do not get informed and no effort is being made to make it appealing to them. Rather, young women are expected to work in the health sector or other fields that are considered feminine. These gender stereotypes might be slowly disappearing, but are definitely still very present. Therefore Lara thinks the gender of the developers does not influence the development of DAAs, but the resulting products are dependent on what society wants. In Group 3. however, Ingo thought that most DAAs are female, because the developers are mostly not very feministic and open-minded.

4.8. Artificial Intelligence

The development of digital assistant applications could be considered the first steps towards artificial intelligence. It becomes clear, however, that the definition of where the boundary of artificial intelligence lies was not clear to every participant. Erica asked whether these DAAs should already be considered artificial intelligence. This vagueness about the concept and its boundaries causes both positive as well as negative excitements within the participants about the impact of artificial intelligence on society in the future that may or may not be near.

Anna:	*It is also like the induction hob that automatically shuts off when the water is over boiling? Is that also already artificial intelligence?*
Erica:	*Noooo.*
Zack:	*That is a reflex. That is what I mean with defining. In that sense that are safety mechanisms, that are actually technical reflexes. A reflex is not something intelligent, you just have it.*
Anna:	*Yeah. Or only when it produces something by itself.*

Antoinette: I think that is a good boundary.
Zack: There is the approach in that you say okay… a certain level of intelligence is when you have a system that can reproduce itself and it learns. It always and always gets smarter regardless of what it is doing. And that is what I consider the boundary of what is artificial intelligence. It does not get extinct when you leave it alone, it doesn't break or becomes empty. Like a battery or something, but it just lives on and it always gets smarter. (Group 1)

The fear towards artificial intelligence can be put into three categories. The first fear category is *the fear of artificial intelligence taking over the human species*. This seems to be the most obvious fear as this scenario has been portrayed countless times in science fiction media and is now being fuelled by warnings from influential people like Stephen Hawking. In Group 1 participants were conscious about the fact the science fiction has been the only place where it was possible until now to experience artificial intelligence and the perception of artificial intelligence taking over might be largely influenced by this, but the fact that Stephen Hawking makes such claims should stand for something. Erica in Group 1 explains that this danger lies in the creation of something more intelligent than us and given it independent power that could quickly be used against us if the intelligent technology decides to do so and we would be able to stop it. For Anna, however, this is too hard to imagine as she thinks that basically shutting down the power should prevent this.

Anna: But then I lack the imagination somehow. Because I always think, okay then we just shut down the electricity.
Erica: Aah, yes, but that is the thing.
Leo: Haha. Not that difficult, right Anna?
Zack: Doesn't work.
Anna: That is the whole problem.
Leo: They work on batteries. Spoiler alert.
Erica: Just throw water over it. (Group 1)

The second fear is *the fear of human abuse of artificial intelligence*. Anna in Group 1 explains that the root of evil in technologies is basically the human and the danger lies in the abuse of technologies. She uses an example of nano robots that have not been approved yet. These nano robots are intelligent and small enough to enter the human body to detect and potentially cure diseases. The pharmaceutical industry could use these technologies to initially breed something evil, creating a necessity for cures that they subsequently provide combat the created illness. These robots, however, did not come up with this idea nor executed it freely to fill the pockets of the pharmaceutical industry with millions. Lastly, *the fear of indirect damaging the social dimensions of society*. Lara in Group 2 does not see artificial intelligence taking over control, because it is still a man-made product and regardless of being more intelligent we will be able to

shut it down. She thinks, however, that we will not even reach this point, because this planet won't last long enough, since we are "fucking it up". Anna in Group 1 explains that new technologies make values shift when using the example of recent experience where they succeeded in the transfer of thoughts. Although she thinks this can be really exciting it also shifts values when this is possible and speaking a foreign language is not seen as something special anymore and the future becomes even more unpredictable. Zack, however, reminded her that as is the case with everything, something else will take its place. Lara, however, explains that this is exactly her fear: that artificial intelligence will take the place of humans in our society including in social interactions and what the effects will be.

> Lara: People are in relationships with buildings· So… I think that this will appeal more to people that already have social anxiety and they will isolated themselves more· You have so many people who are so miserable and isolated have isolated themselves so much and this just makes it easier· We are reaching a society where there is really no need to get out of the house and we can still have the sense of a social life and are communicating with people, but actually it is nothing· With artificial intelligence you don't even need a real human anymore to experience communication and feel good about it· And not so much, oh they are going to take over· That I think is really scary with these kinds of developments(Group 2)

Nina did not understand how this could not be beneficial for socially isolated people. Lara explains that serial killers originate from scenarios as these, as literally every story of a serial killer or high school shooting starts with people not being able to integrate successfully into society. Her fear is when creating something that does not require people to interact with society at all will increase this radical violent behaviour. Richard however also sees the possibility of artificial intelligence to reverse this effect, because it enables us to discover alarming patterns in an early stage, but like any other participant stresses the fact that it is incredible hard to predict what would actually happen in reality.

As mentioned before by the participants, there are both advantages and disadvantages of technologies that are dependent on the way we choose to use them. The benefits Erica explains can already be seen in the exploration of the planet Mars, which would not have been possible without autonomous intelligent technology that without human control can provide us with valuable data about the planet. As mentioned before these kind of technologies, including artificial intelligence, have the potential to help humans especially in situations where there is lack of actual humans or in situations that dangerous for human beings, Ingo explains. However, with

artificial intelligence participants say it becomes hard to distinguish where the boundary between human and technology lies and how these technologies should be approached. Zack in Group 1 thinks it would even be necessary to make that hard distinction between human and machine, but rather that humans for example forgot more easily and machines do not. Therefore he predicts that artificial intelligence might not be used as an autonomous entity, but rather it is implanted into the human body to enhance brain function resulting in cyborgs. Regardless of the lack of imagination of what the eventual impact of artificial intelligence may be most participants are excited and hope they will experience this happening in their lives times.

> *Lara:* *It is not a concept that is still very far away. You have it on your own phone already, so we will definitely experience how it will develop and to what limits we can push it. And this I find so interesting with things like this. All these concepts from sci-fi where you don't really have an idea yet Time travel is also still not happening, but this is just something what we are going to experience. (Group 2)*

4.10. Computer or Human?

It is already very visible within the discourse of the focus group sessions that participants have trouble to distinguish between humans and technology. This can be observed when observing the use of words when talking about DAAs, other gendered technologies or artificial intelligence. There is a very inconsistent use of gender-specific pronouns and gender-neutral pronouns to refer to technologies in the focus groups. To illustrate; in all the focus groups combined 294 statement were made regarding several form of gendered technologies, in these statements 108 gender-specific and 205 gender neutral words were used to refer to these technologies. Of these statements 149 were made by female participants, of these statements 69 were gender-specific and 94 were gender neutral and male participants produced 145 statements in which they referred to technology, in these statements 39 gender-specific and 111 gender-neutral words were used. When comparing the usage of words between the different sexualities the same pattern can be observed in heterosexuals, homosexuals, and bisexuals that about 1/3 of all the statements that were being made were gender-specific. Zack in Group 1 made a total of 31 statements in which 15 gender-neutral and 18 gender-specific words were used. Anges in Group 3 made a total of 13 statements in which 7 gender-specific and 6 gender-neutral words were used.

> *Antoinette:* *I mean with Siri now for example, I noticed of course **it** is a woman's voice, but until now I have not given this any thought at all. I don't use **it** at all.*
>
> *[…]*

Antoinette: *she did not understand it completely. But she would have managed somehow I would say.*

[…]

Anna: *I mean I for example don't have Siri. I just know it from when you are sitting together and you consider it funny to play around with it.*

[…]

Anna: *Andrea did talk to her the whole time while I was cooking, but I heard what she answered and that was not that precise.*

[…]

Zack: *I think a major factor of such an app is the joke factor. Still, that you don't really use it, but more that you are trying to lure that thing of its shell and see, okay what can you actually ask that thing and how will it react […*

[…]

Zack: *she know the weather. She also answers to questions when you don't ask about the weather. (Group 1)*

This inconsistent use was very striking as it occasionally happened that a participant started his statement with gender-neutral pronouns and ended it using gender-specific pronouns and was both done by males and females.

Leo: *I've got the feeling that super specified questions got programmed into it, but she cannot make a transfer.*

[…]

Antoinette: *So the first time with me, I could not talk to her. So it didn't work. I had to write her and that is also shit. (Group 1)*

The only participant that without any single inconsistency used gender-neutral words was Tom in Group 3.

Tom: *Yeah, I don't expect it to be like that movie Her or some advanced AI, you know, that I am actually going to talk to. So I don't expect that much from it.*
[…]
Google Now…it does have a voice that talks back to you sometimes. And it's

a female voice like [makes female voice sounds] "it is 3 o'clock. (Group 3)

Additionally, John in Group 3 and Ivan in Group 4 were mostly consistent in using gender-neutral pronouns in their discourse about technology.

Ivan: *But then **it** still doesn't need such an ugly avatar.*
[…]
***it's** very curvy.*
[…]
***She** doesn't undress herself either. **They** all don't undress those idiots. (Group 4)*

John: *Eeh, I sort of think **it** looks like a handmade cartoon. I don't really use Google Now that much, but I would choose **it** over **this**.*
[…]
*One of the reasons why I wouldn't use **the thing** is because I think **it** has too much control over the phone.*
[…]
*Siri is quite genderless, I mean **she** has a higher pitched voice, but other than that **its** not overly sexual (Group 3)*

It seems, as these participants are more conscious about the fact that even when technology become genderized, they are still conscious in their interaction and discussion that it are still technologies

Ivan: *It's just when I ask something. I decide which information I receive. Then of course I need to trust **the device** somehow or trust **the internet**. I am **conscious** about the fact that it is **not a human**. (Group 4)*

The context in which the statements were made does however seem to have an influence on the choice of words. When purely speaking about the functionally of applications it seems less hard for participants to avoid gender-specific words, but as soon as they started talking about personality it seemed their unconscious mind was not longer able to avoid this.

Tim: *Sometimes I thought **she** was a bit bitchy or maybe I interpreted it wrong. **Her** lack of understanding, when **she** didn't understand at it all, because it was too complex, then **she** didn't do anything. **She** either said "yeah I don't understand this" or sometimes **she** Her says "I am still learning and it takes some time before I understand this", but sometimes **she** didn't answer at all and I thought that was bit bold. (Group 4)*

Occasionally however participants noticed their inconsistency and corrected themselves.

> *Zack: And the more you use **her,** the more **she** capable in the end I think· So when you use **her** very often, more specifically when more people use **her**, more then is the case now· Then **the device** learns… or that **woman**··· (Group 1)*

It seemed however also to be the case that when talking about gendered technologies in general and the gender had not been specified yet it becomes difficult again to stay consistent and use gender-specific words.

> *Erica: …] I think people use **it** any way; they don't care whether **it** is a woman or a man· But I think this first step when you start using **it**, is with a woman' voice bigger than with a man's voice· (Group 1)*

5. Discussion and Conclusion

Technology has come a long way in the thousands of years that mankind has thrived and is ultimately the reason for our progress. Today we have collectively formed dependent relationships with our technologies, as we have delegated practical tasks to machines to keep our hands free, and with the rise of computers started we to hand over cognitive task to machines to keep our minds free as well. The rise of information and communication technologies gave birth to many technological innovations including smartphones that, due to their programmability, created a completely new market for application software. The result is the widespread availability of various application products with many different functions and implications, including digital assistant applications which are often not gender neutral. DAAs could be considered the first tangible and widely adopted form of artificial intelligence in our everyday life. The aim of this study is to understand how users of these gendered DAAs create meaning out of them and how this could impact society as a whole. The data gathered in this study offers important insights into the experiences and understandings of gendered DAAs by its users with the use of focus groups.

5.1 Domestication of Digital Assistant Applications

The results of the questionnaire show that the sample of participants used in this study actively uses their smartphones on a daily basis for various reasons. This indicates that they all use their smartphones as they were intended in order to partake in this research: mobile devices that combine the functions of a cellular phone, a personal computer, a media player, a digital camera, a GPS receiver and a PDA into one (Mosemghvdlishvili & Jansz, 2012). This, however, does not seem to be a factor that influenced the domestication of DAAs, as the two participants who actively use *Siri* and *Google Now* do not seem to use their smartphones differently from the other participants, but nevertheless have already successfully domesticated DAAs into their lives. It can be seen that the present sample is heterogeneous in their domestication process of DAAs were two have already successfully adopted the technology and given it a place in their everyday lives, while other participants still seem to be in the pre-adoption phase of their domestication and some have not even created a conscious awareness of DAAs. To understand the reasons for this domestication process it is important to uncover what the technologies mean for each individual and how this influences the adoption or, as it more frequently the case, non-adoption. The results the questionnaire offers already indicated that overall participants did not consider DAAs to be useful, but this does not mean that participants necessarily have a negative attitude against DAAs in general. Rather, the domestication of DAAs has not been successful (yet) because of three main reasons. First and most importantly, the functionality of DAAs is not up to the required standard of

the participants. Secondly, participants explained that there still seems to be a high threshold for using DAAs in public or specifically talking to your phone in public. Third, it was also briefly mentioned by participants that privacy and security is an issue, especially with new technological innovations. The goal of a DAA is to take over tasks and provide information, but when this main feature that should decrease work does not work properly there is no use. In this study it can be concluded that *Assistant* has failed to present itself as a valuable product in the market of DAA's, according to the sample used in this research. Many participants however see the potential of DAAs and have stated that it is very likely that they will adopt the technology as soon as the functionality is optimal. Some participants also stated that at some point having a DAA or some other form of voice commanded program might be a necessity to keep up with the increasing speed of our information and communication and therefore will be tolerated by society because of its dependency on DAAs. On the other hand it has also been mentioned that this increased use of technology could result into people turning away from their phones, because they realise that there is little attention left for the 'real' world around them. The meaning users create is however not only dependent on the technology itself, but also the social context in which they are currently living.

5.2 Social Shaping of Digital Assistant Applications

As is the case with every technology, DAAs do not hold all the power to shape our current society into a voice commanded society *or* make people turn away from technology. Different relevant social groups that identify with different problems and are in need of different solutions that DAAs have to offer and based on their understanding and meaning choose to adopt DAAs into their lives or part of their lives. In a sense the relevant social groups for DAAs are every smartphone users, as the every smartphone user has the choice to actively use or not use the DAAs that are on the market or even pre-installed on their smartphones. DAAs can be interpreted differently by different social groups across different generations. The current sample consisted of what have been called the millennials or generation Y, as they were born between 1980s and 2000s, and it can be observed that participants differ in the way they have adopted to DAAs. For many participants it does not seem like DAAs are solving the problem of having too little time, as the functionality of these programs is not at a level where the participants can completely rely and trust the information that is being presented. In this manner *Assistant* created more problems for the participants than it offered solutions. The participants' parents, who are part of the older generation and are also a relevant social group as participants in future studies, are explained by the current sample as slowly starting to see the benefits of using DAAs in their lives. This older generation often has a limited understanding of smartphones and often has physical restrictions

such as decreasing eyesight and trouble with typing. For them DAAs are problem solving tools to increase the ease of use of smartphones.

Within the younger generation, however, participants could imagine that their adoption rate of DAAs is much higher, because they were also under the impression that the younger generation, or generation Z, is much more flexible and can easier adapt to new technologies because they were raised with new technological innovations at the tip of their fingers. Their threshold for using voice commands in public for example might be much lower than of older users. Traditional human assistants have in the past often been linked to powerful businessmen and therefore it seems that DAAs have a lot of benefits in the professional environment. As explained by the participants, a digital assistant does not have the weaknesses of a human such as forgetting, getting overwhelmed or tired and therefore has benefits in the professional sector where the reduction of mistakes being made has great value. On the other hand a digital assistant also doesn't have the strengths of a human until now, such as having a nice personality, emotion and reasoning. It could, however, be a matter of time before they do. As soon as they do, participants can also imagine that there will be a large market of lonely individuals who see DAAs as a solution for their loneliness. Whether this is an appropriate application of DAAs can be discussed, as participants think that this will over time only increase loneliness in our society because it makes social isolation easier. Potential benefits could particularly be seen in the healthcare sector that, especially due to financial cutbacks, sometimes lacks in providing the proper attention that their patients need. A digital assistant in the healthcare sector could also be beneficial when trying to diagnose patients. Because DAAs are not in a rush and do not have their minds occupied elsewhere participants predict that patients will answer questions more honestly and will not feel like a burden so the information that is given could be more accurate and therefore more helpful for the traditional doctors. Until now we only have one variation of DAAs, being the voice assistant. The visual avatar assistant used in this study can be considered a failed variation of DAAs. But as has been mentioned by the participants, other individuals or other cultures could perceive this visual representation as very positive. Therefore many different DAAs might exist in the future that are aimed at specific social groups. It does, however, not have to be the case that these different social groups influence the same path for DAAs, but it can also result into a multi-directional model of DAAs, each model addressing different problems that are relevant for different social groups. In that sense it could be possible that certain versions of DAAs are mainly aimed at general smartphones users, business professionals, the older generation, the younger generation, the health care sector, or lonely individuals. What, then, influences the meaning and understanding of DAAs by the users?

5.3 How do users construct meaning of gendered digital assistant applications?

Through the discourse set during the focus group sessions it becomes clear that it is difficult for users to create meaning out of DAAs, because with the speed of these developments being a relative new phenomenon, and therefore being difficult to comprehend the effects these technologies will have on the individual and society. There are, however, different aspects that should be taken into consideration that help create the meaning and understanding of DAAs. Participants create meaning out of DAAs first through experimentations with the application, which includes discovering the functional and intelligence boundaries of the application program. The functionality is based on how well the application understands their inquiries and how accurate and helpful the responses are in return. As soon as users notice the application does not offer the functionality users have as the minimum required standard set in their minds, they see no further reasons to use the application in the future. It seems complete and blind reliability is a huge factor that influences domestication. The personal inquires are aimed at testing the boundaries of artificial humanity in DAAs. It seems like the ability to respond to sexual inquires are where users think the current boundary is of DAAs is. For many users it might not be that important that DAAs show some kind of human personality, but having the option to occasionally make jokes without feeling like the user has crossed a boundary seems to be beneficial to produce a positive association with the application. The functionality however seems to first work flawless, before a personality is evaluated.

Until now it seems that *Siri* has set the standard of functionality and personality that users seems to set as the minimum criteria or the quality of other DAAs. There are however other, (older) technologies that influence the meanings created by users. During the focus group sessions, comparisons between the traditional navigation systems for cars were being made often. It was noted that by the participants that as is the case with DAAs, most navigation systems have female voices set as default. This is also the case with many announcements in the public transport system where the occasions of male voices being heard were remembered by most participants quickly. Participants are under the impression that the reasons that we hear mostly female voices are related to the way people respond to female voices. As was the case with many participants, female voices might be generally perceived as more pleasant and less threatening and as a society we have come to the point where we do not question the dominance of female voices in technology anymore. Therefore society, or the social context of the participants, has a large influence on the way users create meaning out of DAAs. But participants think that the current way DAAs are developing represents how our society works and what we collectively want and developers are merely messengers in this process. The reason for a sexualized image, as is the case with *Assistant*,

is because we live in a society that has a large focus on sex and many other examples of consumerism show that sex sells. Additionally, some participants are under the impression we live in a society that is becoming more lazy and dumb and these technologies might respond to and reinforce that process. It seems like dependency on technology is considered as something negative by some participants, however it seems to be considered unavoidable by others, because it is part of the human advancement, since it makes room for other things to occupy our minds, resulting in human progress.

The results from the questionnaire indicate that most of the participants state a positive attitude towards science fiction and therefore the high amount of the mentioned artificial intelligence characters can be expected. Participants have explicitly stated that they are aware that the potential consequences of adopting artificial intelligence into our society are largely based on the experiences gained during science fiction consumption in the past. The fear that is often related to machines taking over control has largely been influenced by science fiction, but participants were aware influential people like Stephen Hawking had recently confirmed this fear and is even warning against artificial intelligence. But because of the increased speed of technological development DAAs might at some point be considered a necessity to keep up with society in the same way people feel less connected without their smartphones as it is considered inefficient to only be reachable through text message. Because digital assistants take over the thinking process, participants think it might result into a decrease in intelligence and of the society as a whole and are afraid that human contact and human abilities will become less important. However, technology itself it neutral until a human decides what to with it, but when technology is offered that same freedom the notion of unintended consequences gains more importance. In the deterministic view technology is to a large extent autonomous and responsible for social change. Until now this view has been under debate and has been criticized, but it could become factual reality when technology has the intelligence to make independent decisions.

5.4 How is the Construction of Meaning of Gendered Technologies Influenced by Gender?

In the current study it seems to be that the construction of meaning is very personal and not only influenced by gender, but by other factors that are not easily pinned down. In the current study it is unclear if gender and sexuality play the most important roles in the way users create meaning out of DAAs, but it is clear that gender indirectly influences this process through the meanings users created about society in the broadest sense. Participants have, however, noticed that new technologies make values shift often in a way not previously predicted and DAAs have the potential to make values shift in many different aspects of society, but also have the potential to reinforce

existing views we currently have on society, including gender stereotypes. Participants were all aware of existing gender stereotypes, but prior to the focus group sessions did not connect this to the default setting of females voices in DAAs. In that sense it could be the case that some users feel comfortable with existing gender stereotypes that are clearly being represented in DAAs with a female voice and evoke the female secretary stereotype. However, the distinction between male and female and hard and soft can be seen in some degree that male participants tend to be more distant in their interaction with DAAs and focus more on the functionality of these technologies, whereas female participants seem to also put an importance on the personality of the application. Participants were aware of existing gender stereotypes and it seems that presenting DAAs in a submissive and sexualized nature makes them feel uncomfortable, because they get the sense of acting sexist or anti-feminist even though they are trying to avoid this in real life. However, it is clear those participants do not consider their own sexual behavior to be a defining aspect of their identity and therefore do not project it onto the DAA. Typical gender stereotypes might slowly become less visible in our society and people responds less, but they are still in our minds as unconscious scripts of gender relations. DAAs therefore are a perfect example of the existing gender relation in our society, and especially *Assistant* seems to reinforce these gender stereotypes and gender relations in a way that even male participants felt uncomfortable using the applications. This because, even when they have not explicitly stated it, they have a feminist mindset as they strive for gender equality. Even though a masculine hegemony in society exists and participants are aware that it is likely that most of the developers of DAAs are male, but they do not think this has much of an influence on the development of DAAs, because it is about what the consumer wants and developers merely respond to society's needs and wants, regardless of their own gender. As previously mentioned it seems that as a society we unconsciously use female voices in our computer systems and do not question these choices afterwards. When analyzing the discourse of the focus group sessions, it becomes clear that it is extremely difficult for most participants to make a clear distinction between technology and humans, as DAAs were often addressed as a human. This anthropomorphism does indeed not occur on a conscious level and it seems that the participants that consciously addressed the application as a gender-neutral object have already created a better understanding of these technologies as being merely a tool to help them in their personal and professional lives. The only three participants that were able to consciously make the distinction between technology and human were males and were indeed conscious about their word choice. It is, however, clear that completely eliminating all traces of a gender identity is extremely difficult and participants even think that a gender dimension is needed in the initial development of these technologies in our society. It guides users into the appropriate use of DAAs

and helps them to create an understanding of the roles DAAs can play in both their personal and professional lives.

5.5 The Ideal Digital Assistant Application

The ideal digital assistant application should therefore include the following features: the voice selection should be required in the beginning and should not have an emphasis on having to choose between male and female voices, but rather should be based on the pleasantness of the voice that is subjective to each individual. This will take away the attention of whether this decision was based on gender stereotypes. A visual representation, even when done properly, has the potential to evoke a stronger emphasis on gender and ultimately does not increase the functionality of DAAs in any way. Therefore the focus should remain on the voice and a professionally designed layout that does not include visual avatar of any kind and leaves the screen free of unnecessary features. The opinions differ about the importance of creating a sense of personality within DAAs and it is difficult to establish where the boundary of human resemblance lies before it might be perceived as annoying or redundant. It is however important that the initial expectation of the personality of the application that is created visually and audibly closely corresponds with the actual output of the application. The functionality of DAAs increases significantly when the user has a certainty that his or her inquires get the intended honest and truthful response. It is important that the user knows he or she can depend on the application in any circumstance. Still, even if the application would be unable to provide an answer regardless of the reason behind it, the users should at all times be provided with a response stating the error that occurred. Therefore it is especially important that the voice recognition with the application works properly in a way that the users can use his or hers natural tone and volume of voice. This will decrease the possibilities of misunderstanding inquiries and the users having to repeat themselves. Additionally, the application always responds to the user in a friendly manner and the option of using it in an entertaining way should be present in a way that could not be perceived as annoying. It is understandable the DAAs are still under development, but it should be important that the basic functions that are important for the basic experience of DAAs work properly before offering the product on the market. Since DAAs offer solutions to problems related to smartphone usage that sometimes it too complicated for the older population due to physical restrictions or lack of understanding, it is important that the design of DAAs should remain simple and uncomplicated for any potential user.

6. Limitations and Future Research

6.1. Limitations in Current Study

The relatively low number of participants per focus group session can be seen as a good way to obtain large amounts of rich data, but it can also be seen as a limitation as it can result into a small variety of opinions expressed. The analysis of the large amount of rich data is very time consuming and having multiple researchers conduct the study could result into different outcomes, because the analysis of qualitative data is often more subjective, therefore multiple researchers might approach the data from different angles that can complement each other and result into different findings. In the current study the participants were mostly highly educated and were collectively equipped with a lot of knowledge about especially the development of artificial intelligence. Therefore the data in this research largely expresses the view of younger, highly educated people, who additionally grew up in a rapidly changing technological world. Focussing on different (relevant) social groups might provide different outcomes and insights that are important to understand the social shaping of gendered technologies on a broader scale. Another limitation was that three of the participants in the focus group that was conducted in English were not speaking in their native language. Even though their level of English was near fluent, it might have occasionally prevented them from expressing a statement the way they meant it, or they might not even have expressed certain opinions at all.

6.2. Future Research

Gendered technologies and artificial intelligence are concepts that might have existed and have been hypothetically studied before, but they are concepts that just recently became tangible and imaginable for the average person in Western society. It is clear that new innovations open up opportunities to study change, but it is also clear that due to the novelty of these technologies participants still have problem to comprehend the concepts and their impact on their lives and society. Continuously repeating similar studies with various different social groups over time will have the potential to create an understanding of these technologies with different social contexts and time periods. In this study it was not clear what factors, apart from gender, might influence the decision of voice selection with DAAs, therefore it would be interesting to uncover these factors on the individual scale that influence these types of decisions. Furthermore, there might be cultural differences in this decision making process, but also in the way users create meaning out of DAAs. Conducting a cross-national research might help in gaining important insights into not only the differences in gender, sexuality, age, class, but also cultural differences in the way users interact and create meaning out of DAAs. In the case of the *Assistant* application it became clear during the

sessions that other cultures might evaluate this specific application differently or even more positively then in the current Western setting.

6.3. Social Implications

It can be seen in this study that the humanization of technology, apart from reinforcing gender stereotypes, can cause confusion among users. This confusion is translated into fear when implementing artificial intelligence into technology. We are currently in an important time in our human progress and it seems the decisions we make today will have profound effects on us tomorrow. We live in a time that is categorized by rapid changes and therefore one could argue studying how these changes influence the (potential) future becomes more important than searching for answers in the past. There is no doubt that the past helps us to understand how different factors play important roles in the shaping of our society, but by focusing too much on the past, we might miss important events happening in the now. It is important to acknowledge the power of each individual in the shaping of our future and therefore each individual including developers, consumers/users and non-users should be aware of their decisions. As stated before, technology in itself could be considered neutral until the human decides how to use it. The same holds true for gendered technologies and how we decide to use and develop them. Will we let these technologies create more distance between our human-to-human interactions and our own capabilities or will we use them to uncover more of our human potential? These are questions that should be asked on a collective level as well as on the level of the individual. Our future is very unpredictable which causes anxiety and fear, but it is important to remember that this uncertainty also means great power in shaping our future and quickly learning from our successes and mistakes and act accordingly.

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Appendix A: The Questionnaire

Thank you very much for participating in this study for my master thesis at Erasmus University Rotterdam. Your participation in this study is voluntary and all data is treated confidentially. My study focuses on the interaction between users and gendered technologies in the form of digital assistant applications like Siri. This short questionnaire is additional to the focus group sessions and will include some demographic questions followed by questions regarding smartphones, science fiction, and artificial intelligence. As compensation for a full participation (questionnaire and focus group sessions) you are invited for a social drink with the other participants in the study.

Q1: What is your name?
Q2: How would you best describe your gender identity? (e.g. Male, Female...)
Q3: How old are you?
Q4: How would you best describe your sexual identity?
Q5: For which purposes do you use your Smartphone? *More answers possible!*
- ª Facebook
- ª Surfing the Internet
- ª Mobile messaging applications (Whatsapp, Line Mobile Message, Viber etc.)
- ª E-mail
- ª Listening to music
- ª Video calling
- ª Downloading apps
- ª Games
- ª Photography
- ª Navigation (Google Maps etc.)
- ª News
- ª Online banking
- ª Other_____

Q6 Which digital assistant apps have you used before? *More answers possible!*
- ª None
- ª Siri
- ª Google Now
- ª Cortana
- ª SpeakToIt Assistant
- ª Vokul
- ª Evi
- ª Voice Answer
- ª Jeannie
- ª Sara
- ª Donna
- ª Other_____

Q7 How useful do you find personal assistant applications in general?
I consider them:
ª Not useful at all ª Not useful ª Neutral ª Useful ª Very useful

Q8 What is your attitude towards personal assistant applications?
- Positive
- Neutral
- Negative

Q9 What is your attitude towards Science Fiction (books, films, etc)?
- Positive
- Neutral
- Negative

Q10 What is your attitude towards artificial intelligence?
- Positive
- Neutral
- Negative

Q11 Which artificial intelligence characters do you know from films and books? Name all that come to mind now.

Q12 On which dates would you be available to participate in the focus group sessions. The sessions will be held in the evening between 19:00 and 21:00 and will last approximately 1 hour.
List of dates provided.

Q13 Could you please state your phone number in order for me to contact you about further details and the selected date for the focus group sessions?

Lastly, I would kindly ask you to download the **Assistant application** from Speaktoit from your app store on to your mobile phone and use this application for one day prior to the focus group session. If you have any further questions don't hesitate to contact me: *phone number.*

Appendix B: The Focus Group Guide

Introduction: First of all I want to thank all of you for your participation in my study for my master thesis. For those of you that don't know me yet; my name is Michelle and I am currently finishing my Master's in Media and Business. My study focuses on the interaction between users and digital personal assistants, like the one you used for this focus group. It is important that everybody gets a chance to speak during the session. There are no right or wrong answers as everybody's opinions counts, but feel free to agree or disagree in a polite manner. Everything that is being said will be video recorded for me to analyze in a later stage, but I promise that you will stay completely anonymous in this study and the data will exclusively be used for my master thesis. Are there any questions until now?

Then I suggestion we do a short introduction round. Tell us your name, age, occupation and where you are originally from.

Lets start with the first question:

1. What was your first impression of the Assistant application?
2. What kind of inquires do you make? And how helpful were the answers?
    a. Did you ask the application personal questions?
3. How would you describe the personality and appearance of the Assistant application?
4. What is your opinion about the fact that most of these digital assistant applications are female?
5. What would change about the interaction if the application had been male?
6. How did you gender and sexual identity influence the interaction and perception of the application?
7. What is your opinion about the fact that gendered technologies are becoming more visible in our society?
8. What kind of impact do you think these gendered technologies will have on our society?
9. What kind of influence will gendered technologies have on gender stereotypes?
10. How does the gender of the developers influence these gendered technologies?
11. What kind of impact will these technologies have on your personal and professional life?
12. What is your opinion about artificial intelligence?

This concludes the focus group. Is there anybody that would like to add something or is there anybody that has any questions?

Then I want to thank you again for your participation and you are welcome to stay for the social drink.

Appendix C: Consent Form

CONSENT REQUEST FOR PARTICIPATING IN RESEARCH

FOR QUESTIONS ABOUT THE STUDY, CONTACT:
Michelle Dorgathen; [redacted]

DESCRIPTION
You are invited to participate in a research about Technology, Gender and Sexuality. The purpose of the study is to understand how different genders and sexualities create meaning from gendered technologies like the current trend in personal assistant applications.

Your acceptance to participate in this study means that you accept to be part of a focus group. In general terms,

- the questions focus group will be related to your use and opinions on topics of technology, gender and sexuality.

Unless you prefer that no recordings are made, I will use a video recorder for the focus group.

You are always free not to answer any particular question, and/or stop participating at any point.

RISKS AND BENEFITS

As far as I can tell, there are no risks associated with participating in this research. Yet, you are free to decide whether I should use your name or other identifying information not in the study. If you prefer, I will make sure that you cannot be identified, by using pseudonyms.

I will use the material from the interviews and my observation exclusively for academic work, such as further research, academic meetings and publications.

TIME INVOLVEMENT
Your participation in this study will take 60 min of your time. You may interrupt your participation at any time.

PAYMENTS
There will be no monetary compensation for your participation.

PARTICIPANTS' RIGHTS
If you have decided to accept to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. If you prefer, your identity will be made known in all written data resulting from the study. Otherwise, your individual privacy will be maintained in all published and written data resulting from the study.

CONTACTS AND QUESTIONS
If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact –anonymously, if you wish— Lela Mosemghvdlishvili [redacted]

SIGNING THE CONSENT FORM

If you sign this consent form, your signature will be the only documentation of your identity. Thus, you DO NOT NEED to sign this form. In order to minimize risks and protect your identity, you may prefer to consent orally. Your oral consent is sufficient.

I give consent to be videotaped during this study:

Name Signature Date

I prefer my identity to be revealed in all written data resulting from this study

Name Signature Date

Appendix D: The Assistant Application