

Theoretical paper about Context Mapping Study

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Abstract

The presented paper shows an insight on the case study that has been presented to us.

Firstly, the paper investigates the societal trends and changing perspectives on disability, which concluded that there is still lack of disability inclusion. Implying the right assistive technologies can give people with a disability more freedom and increase their inclusion and participation in society. Secondly, the paper investigates general ways of assistive technology and products. The paper discussed shortly on what assistive products existing can relate to the case study. Though, as the problems are not clearly defined that is shortly investigated different products for different reasonings.

Thirdly, the paper investigates what type of disability the client has and how this influences this person's life.

Fourthly, it shows the importance of using technique of human centred design and incorporating design ethics to the design process.

The paper also discusses different ways the client can be involved in the process in making the product. The analyses of the codesign is discussed in other to prevent the product to become abandoned.

Lastly, the paper shortly summarizes the parts above which after the summarization is shortly discussed. The discussion shows that the focus of the approach is co design. Additionally, that the freedom of the client should be enhanced even though the product must reduce her texting actions.

Keywords: 1; assistive product 2; assistive technology 3; co-design 4; disability inclusion 5; developmental delay 6; orofacial cleft 7; societal barriers 8; freedom 9; needs 10;

0. Introduction

In this paper, research for the project Designing for specific users has been done. The paper investigates multiple topics to figure out what the problem is, and what the end goal and vision for the product is. This project is about a woman who will be called 'Laura' in this paper due to privacy reasons. It is important to perform this research to have the right knowledge to design an ideal product for the specific user, also referred to as the case owner

1. Societal trends and the changing perspectives on disability

In the past few years, there have been many changes in society with respect to helping people with disabilities. There have been new advanced technologies in medical care that are incredibly helpful for them. Although these changes are positive, people with a disability still face exclusion in many parts of today's society. People with a disability are still seen as 'less than'. They face many barriers

which makes it very difficult for them to function properly. (*EPIC Assist, 2022*) Take for example societal barriers. They are less likely to be employed and often excluded from (a certain level of) education. This can result in a too low income or even poverty. On top of that, they are more likely to experience family violence than those without disabilities. They are often dealing with physical and social isolation which can be very lonely. (*EPIC Assist, 2022*) Growth, earning potential, and happiness are hindered by these barriers. When there is zoomed in on the specific user group, which is people with an intellectual impairment, there can be seen that they are also dealing with these societal challenges. It is important that people are aware that they desire the same things as any other citizen. Even though they are getting more and more integrated into mainstream jobs, schools and other parts of society, there is still a lack of disability inclusion. Disability inclusion allows everyone to have the same opportunities to take part in all aspects of life as best as they are able and willing to. The society in The Netherlands should give people with a disability more chances to find and develop their strength and allow them to make their own decisions in their daily lives. (*Disability Inclusion | CDC, 2019*)

Our user group usually lives in a supervised home where they get the guidance they need. They have a daytime program, and they can do multiple jobs and chores during the day, such as working in the hospitality industry. Assistive technologies can help them a lot in their daily life. It can provide freedom and independence if it is used correctly. It is therefore important to be aware of what the goal is with assistive technologies. New technology should not be developed just for the sake of making new technologies. It is to make their lives easier. No matter how developed and improved the technology continues to be, human assistance will always be needed. It is therefore important to know where assistive technologies need to be applied and where they should not. If these aspects are being considered, assistive technologies can be helpful in this case. They can have a positive impact on well-being and health, they can reduce the societal challenges and need for assistance. This in turn can increase their inclusion and participation in society.

(*Inclusive City Maker - Okeene's Accessibility Blog, 2022*)

(*Frontiers | Publisher of Peer-reviewed Articles in Open Access Journals, n.d.*)

2. Introduction to Assistive Technologies

According to the World Health Organization, also known as the WHO *assistive technology*, can be described an umbrella term covering the systems and services related to the delivery of assistive products and services. One-way assistive technology comes forth is in assistive products. An assistive product helps an individual with its actions, independence and functioning, and thereby promote their well-being. (World Health Organization: WHO, 2018)

Assistive technology comes in many different ways. A few technologies often used and also applicable for people who have a hard time focussing or have ADHD is for example; audiobooks, text-to-speech, optical character recognition (ORC), word-prediction software, speech recognition software, talking calculators, electronic math worksheet, reminder devices etc. (Starkman, 2021)

2.1 Technology abandonment

More than expected assistive products and devices are abandoned. Of these abandoned devices mobility aids were among the most disposed. When a device is abandoned, this happens mostly in the first year or after five years being on the market. According to B. Philips This is due four significant reasons; poor device performance, change in priorities and/or user needs, easy device procurement and lack of consideration of the user opinion. This concludes that the consumer should

be highly involved in the development of assistive devices to ensure consumer satisfaction and reduce device abandonment. (Phillips & Zhao, 1993)

General reasons for abandonment could be: (mostly for physical disability) (Sugawara et al., 2018)

- Guidance for users with the start of use
- Follow-up evaluation after

2.2 Technology appropriation

Technology appropriation is the adoption of technology from the start of its design to potential long-term use of new technologies or rejection. The appropriation of new technologies is well described in the model shown in *figure 1*.

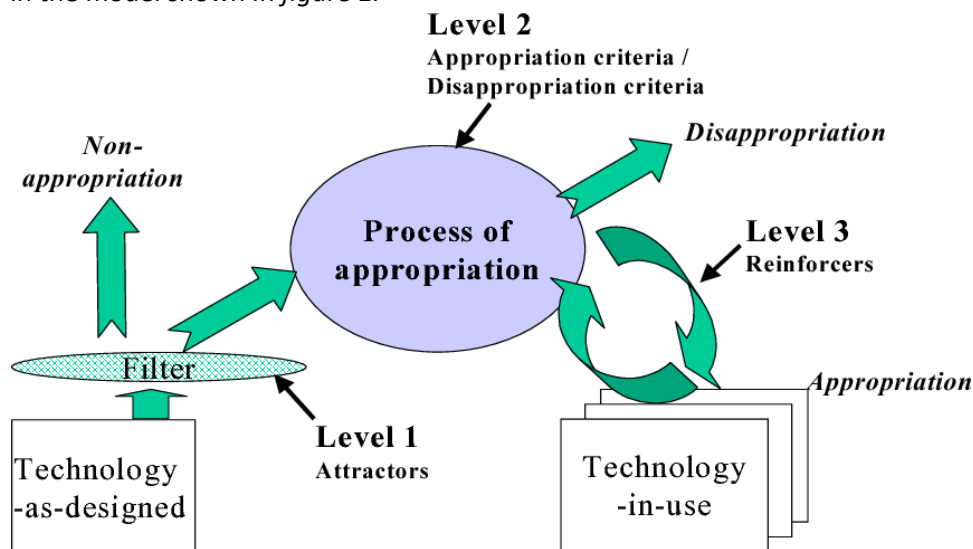


Figure 1: Model of technology appropriation (J.Caroll, S. Howard, J. Peck, J. Murphy, 2003)

Carroll, Howard, Peck and Murphy suggest that users evaluate a technology at three levels, reflecting different degrees of familiarity with the technology at different times in the appropriation process (J.Caroll, S. Howard, J. Peck, J. Murphy, 2003)

Level 1 – In this level the first encounters between the user and the potential technology is evaluated. Without use of the actual technology the first judgements are made. The outcome reflects in either; an interest which continues to appropriation, or uninterest in the technology which results non-appropriation.

Level 2 – This level results in dis-appropriation and appropriation. The technology in this level is used and evaluated upon on a deeper level. When the user's needs are satisfied by the capability of the technology and the users makes use of these capabilities, is known as appropriation. When the user chooses not to persist with the technology, dis-appropriation occurs.

Level 3 – This is the level the evaluates on the long-term technology. The technology evaluated has already been accepted and was stated appropriate in level 2. As this level is looking at the long-term use the use is not a one- activity but rather an ongoing reinforcement. Therefore, it filters the changes of the user's activity if there are any. These changes may lead to dis-appropriation. (J.Caroll, S. Howard, J. Peck, J. Murphy, 2003)

3. Human centred design

Human centred design is a design process which focuses on real people and puts them at the centre. This technique bases the design on the targeted audience by clarifying who the targeted audience is and what their wants and needs are. Such technique results in personalized products which are adapted to the person's needs. Therefore, it is clear to use this approach when working with impaired person as it focuses on creating an adapted product for them and their needs.

One of the first steps is to get to know the person. It is important to ask open questions and let them answer freely. Focusing on the persons pain points and preferences adds to the research and helps with further development of the research questions. If these needs and pain points are kept in mind throughout the whole designing, the final product should be successful and should solve the problem of the person.

It is natural that people express their complaints and pain points. However, a successful design is accomplished by also observing and listening. A person usually expresses their emotions, and, in some cases, they might describe a pain point they are not even aware of. Therefore, careful observations and questions are useful for deeper understanding and identifying the problem. (*What Is Human-Centred Design? | HBS Online, 2020*)

Close observation of a human being is a personal topic. Therefore, considering the ethics and privacy of a person is particularly important. Especially when working with an impaired person some topics can be harder to talk about and the interviewer should be aware of the impact of the questions. People's vulnerability can affect the relationship between the interviewer and the targeted person. Setting expectation and boundaries in the beginning of the design process informs and prepares both parties. The designers should be professional, respect the boundaries and keep their autonomy. Not to forget treating people as people, not just participants, this creates a better relationship which increases the level of trust. Showing empathy creates a safe and comfortable environment which helps with sharing information more easily. (*Medium, n.d.*)

Our design vision is to use this technique and pay a close attention to the user's behaviour, closely listen, and observe. Find out the needs, preferences, and pain points while keeping the boundaries and asking for consent.

4. Theoretical introduction to the disability/condition of your 'specific user'

The name of the specific user is Laura. She is a young adult with a developmental delay. Because of her learning disadvantage, she went to secondary special education. Now she loves her job in the catering industry. She works in a lunch restaurant which is placed in a day-care. Laura enjoys socializing with her roommates but tends to repeat the same topic over and over, like swimming every Monday. In her free time, she frequently sends texts to people. During her free time, Laura frequently sends texts to people, although some individuals find the volume of messages overwhelming.

Laura has a developmental delay, which means she may struggle with specific things. This is because people with developmental delay grow and learn at a slower pace compared to other people their age. For example, they have more trouble learning to walk. These individuals also struggle with communication, aspects of their social lives and certain daily tasks. For example, Laura has a hard

time brushing her hair. Developmental delay, on the other hand, is a very broad term. It is very different for each individual. (SSM Health, n.d.)

What is known is that Laura has an orofacial cleft. Studies show that children born with a cleft lip have a higher risk of intellectual disabilities. However, this risk is not only for intellectual disabilities, but also for psychiatric disorders, language disorders, ASD (autism spectrum disorder), and other behavioural and emotional disorders. They also show that females have a significantly higher risk of these disabilities than males. (Tillman et al., 2018)

5. Market research on existing products

It hard to clearly define the impairment, the assistive product for the current client must therefore be very specialized. Nevertheless, there are some behavioural traits that match with defined disabilities. The texting behaviour of Laura can be described as impulsive, lack of concentration or attention all traits very common traits for ADHD people. Tobias Sonne showed in his research example of the following assistive technology product for ADHD people.

ADHD Challenges Dimension Technological Dimension		Social disability	Academic and occupational failure	Health problems and psychiatric co-morbidities	Psychological dysfunction	Risky behaviors
		e.g., poor peer and family relationships, poor social skills.	e.g., underachievement, special education needs.	e.g., disruptive behaviors, executive dysfunction, sleep disorders.	e.g., Emotional dysregulation, lack of motivation.	e.g., accidents, injuries, and unplanned pregnancies.
(MIS) Manually interacting with information and services	Technologies for in-situ assistance in context	MOBERO	TimeTimer	MOBERO, TangiPlan	ChillFish	
	Technologies for training	ChillFish	CogMed	CogMed, Cogoland	ChillFish	
(AES) Automatically executing services based on in-situ analysis of context information		ParentGuardian	CASTT, Smart Pen	MOBERO, BlurLine	Smart wristband	
(CCD) Capturing contextual data for later retrieval	Services for research					
	Services for personal reflection					

Figure 2: Assistive technology and ADHD

Table 1: The design framework for assistive technologies for the ADHD domain. The ADHD challenges dimension relates to quality-of-life impairments associates with ADHD. Existing assistive technologies are plotted according to their categories. (Sonne et al., 2016)

Another example of an assistive technology that relates to Laura could be in the field of game/technology addiction. The QTIME is a device that designed by the university of Bath restricting the technology/game time. (New Device Could Help Tackle Gaming Addiction, n.d.)

A third possible way of an assistive product would be the use artificial intelligence. This can come in many ways and is extremely broad. A parental app is an example of AI that functions on the phone use can be restricted. In this way different app uses can also be adjusted and enhanced. Though, this mainly works in a restrictive matter and do not provide the outlet Laura seeks when texting. Therefore, AI could be an option which can react to the input Laura gives. However, these solutions

require extremely detailed and personal adjustments which isn't currently within the reach of this project.

When looking at the posture while having the phone use. There are many physical products that can help bad posture. One example of a product that does so is this back brace which is connected to the phone. It is applicable to any kind of body. (Smart Posture Corrector Device Posture Training Realtime Scientific Back Posture Correct Neck Hump Corrector Adult Kid Health, 2023)



Figure 3: Posture improver

6. Co-design / Participatory Design

Co-design is a way of designing in which you include the people you are designing for in every step of the design process. It is important to include them in the decision-making process. The better the social connection between the designer and user, the better the process will be and the better the output. So, the voices of the user should be heard and included. (*What Is Co-design? — Beyond Sticky Notes*, n.d.)

Co-design is useful to include when the product is dependent on the user's needs and desires. If they don't, they may end up putting in a lot of work on products that nobody uses or finds difficult to use. (*Guide to Co-design — Roadmap to Informed Communities*, n.d.)

In co-design with P(L)AY ATTENTION, they had 3 co-design workshops. In these workshops, they first explained the content of the workshop, and thereafter started with an icebreaker. Then, they had a design-related activity. This can be interesting for us to look at since Laura is a bit shy in speaking and an icebreaker at the start would really help. Also, it is maybe easier for her to design or draw than talk. This way it is easier to figure out her vision of specific things. (Fekete & Lucero, 2019)

Another study uses 3 phases for their co-design: problem identification, solution development, and user testing. In the problem phase, they discussed and prioritized the requirements. In the solution phase, they used low-effort prototypes and group discussions to create design artefacts. These artefacts were used to develop the software. In the experiencing stage, they tested and reviewed the software using storyboards and comparison matrices to document feedback. In these phases, they used emotion tags so the testers (people with autism) could express their feedback. This is also a good thing to think about with Laura since she finds it hard to express herself on her own sometimes. (R. Zhu, D. Hardy, T. Myers, 2020)

In this last study, the designers worked closely with their users and really built a bond. Working closely created a long-term positive working relationship with their user which really helped them develop a better product for the specific user. For designing a product for Laura it is important for us to create a bond with her, so she feels safe to give honest answers. (Powell et al., 2021)

7. Conclusion

The perspectives on disability have changed much over the years. People with a disability are now not looked down on as much as in the past, but there is still lack on disability inclusion. People with disabilities are still not included in many parts of the society. How society disables them is the main barrier they undergo. It is important that there is focused more on their abilities and not on their disabilities. If assistive technologies are used and implied in the right way, it can increase their inclusion and participation in society.

For Laura it is going to be important that the design has the correct assistive technology, and that the product will not be abandoned after one or five years. As it is difficult to define the issues of Laura it is harder to conclude which assistive products might work for her. Additionally, there are no specific guidelines in what might prevent the product from getting abandoned. Though the main challenge will be to keep her excited for the use of the product.

When interacting and observing Laura it is important to use design ethics, set boundaries, and ask for consent to ensure she feels comfortable with opening up. A close observation to her needs will be done, in these sessions there will be carefully listened to her needs, pain points and preferences which will create a guideline for the design development process.

Our specific user is Laura. She has an intellectual impairment causing a developmental delay. She also has an orofacial cleft, which has a high chance that it was the cause of her developmental delay. Laura can almost perform every daily task, only small things like brushing her hair are sometimes hard for her.

The market research has shown that there are a few different areas there can be investigated at which Laura's symptoms can relate to. There can be associated with, game addiction, ADHD, and boredom. Though, none of these fully cover her problem as the source of her action is unknown.

Co-design is a way of designing where you include the person you are designing for in the process. For us, it is important to start the sessions/experiments with an icebreaker, so she feels safe and is less shy. It is handy to not only ask questions but also let her design something, this way a better vision on certain things can be explored. Additionally, creating a bond is good for the long-term process.

8. Discussion

The main design challenge is to reduce her texting behavior and give her more phone freedom at home and work. On top of that, another challenge that was accomplished was to reduce her physical complaints that result from the cramped sitting position when she is on her phone. One of the main design values is that the product should give her more freedom and fewer restrictions. In this case, it is quite challenging to figure out what the case owner wants and needs so it is important that there is focused thoroughly on the co-design. By using different methods, by using different methods, there was a tendency to achieve more clarity about her needs and the core of the problem. For example, an icebreaker can result in the case owner is feeling more comfortable and opens more towards others. A way for us to improve the research is including more scientific articles and more recent research papers. This will give us more accurate information of higher quality. There could be more in-depth research in the research market so that the findings are more specific products that match better to the specific intellectual impairment of this case owner.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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