A serious gaming approach to experiencing the effects of unsolicited help and loss of autonomy

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Abstract

Background: Maintaining self-direction and experiencing autonomy is an important basic human need. In healthcare, it is imperative that people with care needs maintain control over their own lives. Respecting autonomy and providing ethically sound care is an ethical obligation for healthcare providers. Many existing interventions focus on promoting (medical) treatments and physical conditions. This serious gaming intervention focuses on experiencing the loss of situational autonomy during nursing education and the impact of paternalistic behaviour on self-efficacy.

Objective: The aim of the study was to explore, through an iterative design process, prototypes that provide nursing students and their teachers with a perspective on the loss of autonomy through unsolicited help. The design process aimed, on the one hand, to develop a serious game to confront nursing students with the effects of unsolicited help through experiential learning and to gain a perspective on the loss of autonomy. On the other hand, the aim was to make nursing students think about their role in the care process and which link they represent to prevent loss of autonomy

Methods: This research uses a design-based research framework to develop a serious game through an iterative process. In the first phase of the research, examples of loss of autonomy through unsolicited help were collected through closed Facebook groups. In the second phase, several prototypes were developed and tested with nursing students and teachers. The impact of this experience was supported and documented through dialogue using the Circle of Feelings.

Results: A total of 94 examples of loss of autonomy due to unsolicited help were collected and divided into seven different categories. Over a period of 10 weeks, four prototypes were developed to simulate loss of autonomy due to unsolicited help. By testing several prototypes, insights were gained and used to refine the design. As the study progressed, resonant game mechanics were integrated into a convergent prototype.

Conclusions: This article presents an iterative design process to offer nursing students and teachers the perspective of loss of autonomy through unsolicited help with a serious game. The conceptual structure of the intervention contributes to the discomfort of making one's own choices and executing according to one's own plan while being capable. The iterative design process was helpful in finding constructive and resonant game mechanics to further promote discomfort. This contributed to the design of a serious game as a boundary object that playfully initiates dialogue and encourages nursing students and teachers to reflect on the role of autonomy in the nursing process.

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ABSTRACT

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This research uses a design-based research framework to develop a serious game through an iterative process. In the first phase of the research, examples of loss of autonomy through unsolicited help were collected through closed Facebook groups. In the second phase, several prototypes were developed and tested with nursing students and teachers. The impact of this experience was supported and documented through dialogue using the Circle of Feelings.

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Keywords:
Autonomy, situational, unsolicited help, serious gaming, gaming, design research

INTRODUCTION

Although people with disabilities are a diverse social group, they often face stereotypes and prejudices associated with their impairments [1]. Cultural misconceptions are used to label this community as dependent and incapable [2]. The result is that people with disabilities receive unsolicited help [3]. Although this is mostly well intended, it violates their autonomy, freedom of choice and responsibility [4].

Breaking this stigma and adopting empathy requires adopting the perspective of the person with a disability. It allows healthcare professionals to experience the challenges and barriers they face on a daily basis. Empathy is key to understanding the needs and aspirations of people with disabilities and can lead to a greater willingness to support and meet their needs [5].

In health, it is essential that care recipients retain autonomy over their own lives and health [6]. Several studies have shown that control and independence have a positive impact on quality of life [7,8]. This improves their well-being [9] and enables them to take responsibility for their own lives. Respecting care recipients autonomy is an ethical duty for health professionals [10] and enables them to provide ethically responsible care based on respect for individual rights and choices [6]. Each care recipient is a unique individual with specific values, beliefs and priorities [11]. Respecting autonomy ensures that care is tailored to individual needs [12] and preferences [13]. Treating the care recipient as a unique individual has significant positive implications [5], up to and including intrinsic human dignity[14–18]. For instance, one care recipients may prefer being pushed in the wheelchair, while another may choose to independently manoeuvre it for themselves.

Autonomy

The word "autonomy" is derived from the Greek word "autonomos". Auto refers to - "self" and nomos to "law". Together they form "one who makes his own law". Although every person is a "self-governing" individual, the perception of autonomy varies from person to person [19,20]

Nevertheless, our well-being and self-esteem are profoundly influenced by the experience of autonomy. It is an important fundamental human need to fulfil life goals. Autonomy refers to the ability to make choices independently, have control over them [21] and experience the freedom to anticipate [10]. It involves directing actions based on one's own values and goals, without undue outside pressure or coercion [20].

Autonomy is not a single construct, but consists of several elements that are fundamentally interrelated. Individual freedom, privacy, free choice, self-governance, self-regulation, moral independence are aspects that are necessary to define one's autonomy [21]. The similarities between these pathways suggest that autonomy is about the individual taking control of decisions and activities and making choices within this tension without the intervention or interference of others. It is often difficult for people with disabilities to maintain full control over their lives [22] making the concept of independence complex [23,24]. People with spinal cord injuries (SCI), for example, often need specific support throughout their lives [4]. They regularly experience difficulties in maintaining autonomy and independence, or have difficulty defining these constructs. Their independence may be reduced or limited by conditions caused by their condition, such as physical functioning, social interaction, management of the home environment or place in society. This means that they find it complex to make sense of what is meant by independence, which can take on multiple meanings.

Care practitioners typically define independence in relation to physical capabilities, focusing on an individual's ability to manage their day-to-day affairs [4]. However, individuals with disabilities who require support tend to view independence as being in control of their own life decisions. In contrast, individuals who use wheelchairs due to physical disabilities define independence as the capacity to "navigate the world independently, fulfill their hygiene needs and possess the proficiency to do so" [4]. This does not entail performing all tasks alone, yet it is essential to maintain autonomy over their care whilst guaranteeing their outlook is taken into account.

Dispositional and Situational Autonomy

In the course of life, each person becomes accustomed to a level of autonomy with which he or she is satisfied. This autonomy is often experienced over a long period of time, is linked to personal characteristics and is established by past experiences [25]. This form of autonomy can be seen as dispositional autonomy and refers to the concept that autonomy is innate and accumulated over a lifetime[26]. It implies that some people are naturally more inclined to act autonomously than others because of their personality, character traits or innate tendencies. Although this form of autonomy is unique to the person, it is influenced by events experienced on a daily basis.

The autonomy that individuals experience in specific situations and circumstances can be defined as situational autonomy. It refers to the freedom and opportunities a person has in an isolated situation and the degree of autonomy the situation allows [27]. Situational autonomy is highly context dependent [28], and is partly determined by the individual's capabilities. Situational autonomy always contrasts with a person's dispositional autonomy, which together determine the degree of autonomy.

It is important to note that situational autonomy is not static and varies from situation to situation. This means that several aspects influence and determine the degree of situational autonomy in the context. These aspects vary according to the circumstances and together contribute to the dynamics of situational autonomy [29].

Serious Games for Perspective Taking

Taking another person's perspective is a conscious and deliberate process. It requires an active attitude to consider another person's point of view [30]. You can only do this if you are able to postpone judgement and understand the other person's thoughts, motivations and feelings. It means being empathetic [31] and accepting why they think and experience the way they do. It requires consciously giving up one's own perspective, which can be quite challenging [32]. People are so familiar with their own thoughts and feelings that it can be difficult to put them aside and try to see the world through someone else's lens [33]. This makes taking someone else's perspective no easy task [34].

Several studies show that games can provide people with experiences [35,36]. In this phenomenon, games have great learning potential and are a way of experiencing a problem [37]. By constraining our short-term actions, games force us to make new choices [38]. Using games as a means of intervention provides an appropriate way to respond to the sense of autonomy and experience when this concept is absent. A well-designed game can entice and challenge healthcare professionals to interact with the problems of their dependants. However, it is important to pre-select the understanding what to transfer [39,40]. Games not only provide motivation, but also stimulate the basic biological need to learn [41] and adopt perspectives [42]. Activities that focus on sharing another person's perspective may be an appropriate way for healthcare professionals to promote the development of empathy. Activity-based interventions are preferred to passive interventions because they require an active attitude on the part of the actors [43]. Activity-based interventions also offer a particular focus, facilitating interactions to occur more naturally. [44]. Games seem to best construct this experience, as players exhibit more authentic behaviour through the magic circle [45,46] and flowstate [47]. Emotions always play a role in this flow state. These emotions are personalised and linked to experiences that players create independently. Games also secure learning by triggering [41], personalising, facilitating and providing a safe context for practising more complex skills [48]. In addition, players receive consistent and immediate feedback on their own in-game actions [49]. These should arise from the persuasive power that games bring. Learning is achieved through the chosen mechanics and rules that drive the processes in the game. The anatomy of the game will have maximum procedural rhetoric with this approach [50,51], which makes it appropriate to experience the perspective of another and, by reproducing feelings, makes clear what it means to lose autonomy through unsolicited help.

METHODS

This research is organised around the Layers in Serious Media Design (LiSMD; Figure 1) model [39]. This model facilitates the construction of the research and ensures that problem analysis is part of the design phase [44]. In applying LiSMD, this research is supported by the Design Research Framework (DRF; Figure 2) [39].

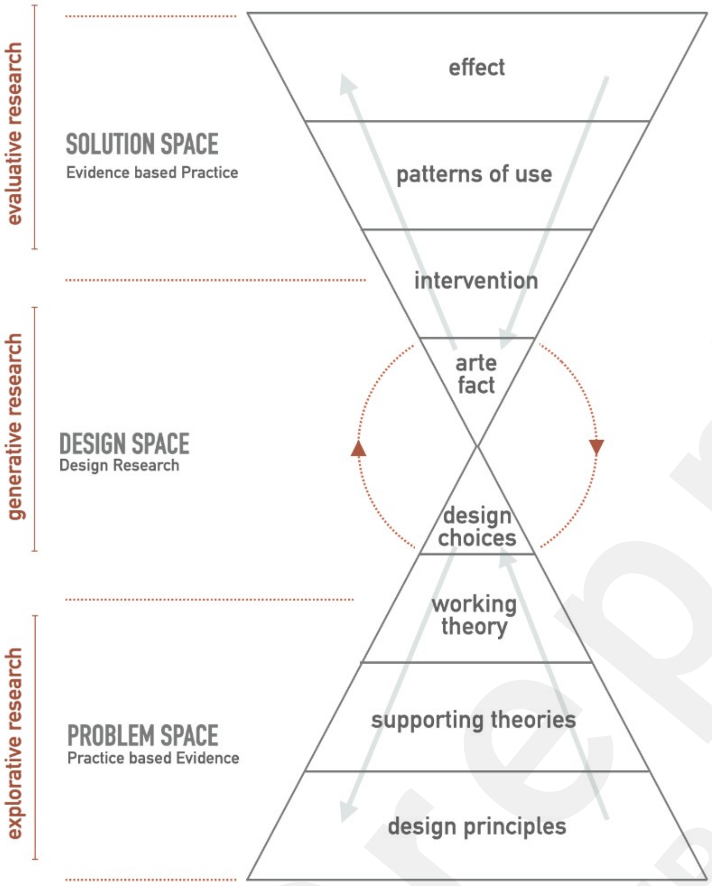

Figure 1 - Layers in Serious Media

This framework can provide direction for the serious media interventions and serious games to be developed through an iterative-incremental process. The DRF can provide focus within the research which shifts during the process with iterations of multiple prototypes and perspectives on the wicked problem. The DRF gives non-linear direction to the design process and provides opportunities for convergence of evidence and focus in the development of an intervention [52].

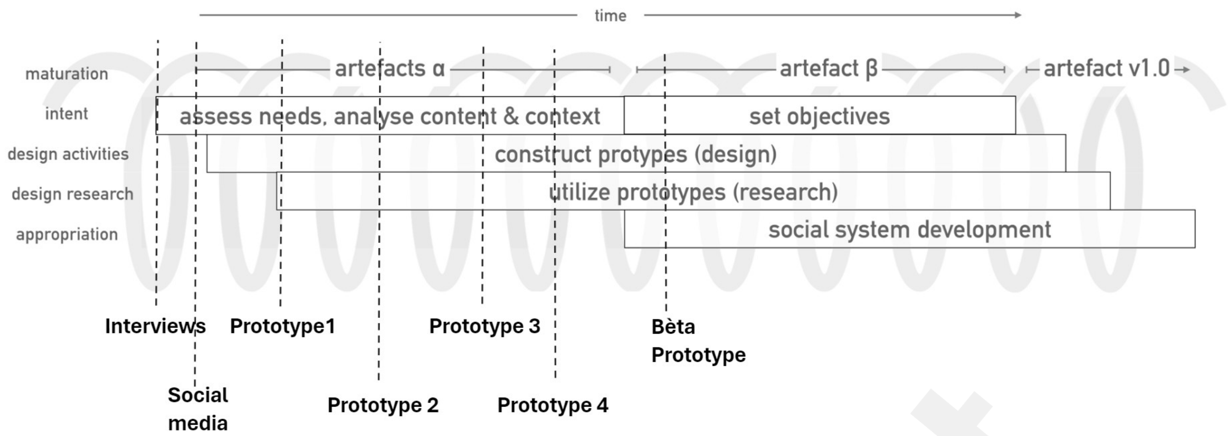

Figure 2 - Design Research Framework, with mapped research approach

Several participatory design activities were carried out to best translate the perspective and experiences of care recipients into an intervention. The intervention as a serious game should both convey the perspective of care recipients experiencing loss of autonomy due to unsolicited help, and help start the conversation between care professionals.

Interviews

As the aim was to collect experiences and perspectives on the topic of "loss of autonomy due to unsolicited help", a qualitative descriptive design with individual interviews was used. These interviews were designed according to the character of phenomenological methodology. This qualitative methodology focuses on describing a phenomenon as it is experienced in everyday life [53]. Phenomenology is based on lived experience, which refers to the meaning one gives to a situation. It aims to reveal human experience, which is rooted in a deep connection with the world. People may experience this connection in a simple way, with a natural attitude, but it is expressed in stories, actions and thoughts that reveal people's deeper intentions [54,55]. This design was chosen because it offered the opportunity to collect information directly from those who experience the phenomenon of loss of autonomy through unsolicited help. The aim of these individual interviews was to explore the specific experiences and perspectives of the participants. An attempt was made to explore the experience of loss of autonomy through unsolicited help by asking for examples of factors that limit autonomy. Factors that facilitate the loss of autonomy in relation to participation in society were presented to share and communicate what should be taken into account to outline a perspective on this phenomenon.

The people interviewed were volunteers from Dwarslaesie Organisatie Nederland (DON) or were self-motivated to work on the topic of "loss of autonomy through unsolicited help" (N=7). They were purposively selected by the president of this association by asking them to recruit participants for this study. The inclusion criteria were that participants had a disability such as spinal cord injury, cauda equina syndrome or cerebral palsy (table 1) and could provide examples. Participants who agreed to take part in the study were contacted by email with information about the study and their willingness to take part in the interview. They gave their written consent via email and appointments were made. All interviews were conducted over a period of 6 weeks.

Participant gender (ID)	Age (in years)	Diagnosis	Diagnosis experience (in years)

Female (#1)	46	Spinal cord injury (C4)	30
Male (#2)	Unknown	Cauda equina syndrome	6
Female (#3)	28	Spinal cord injury (T4)	6
Female (#4)	26	Cerebral palsy	26
Male (#5)	56	Spinal cord injury (C6)	6
Female (#6)	60	Spinal cord injury (C6)	9
Male (#7)	32	Spinal cord injury (T12)	12

Table 1 - Overview of participants interviewed

Social Media

In order to generate the largest possible number of phenomenological examples, the study specifically used private Facebook groups. These groups are made up exclusively of people with disabilities. They share experiences they encounter in everyday life and complement each other. Social media platforms such as Facebook are free and provide a quick and easy way to find information and connect with people who may be able to provide it [56]. This allowed the study to collect examples of loss of autonomy through unsolicited help. The benefits of using social media platforms for research include (1) simplicity of recruitment; (2) increased user participation in social media; (3) quick and intuitive exchange of information; and (4) development of online communities that generate interactions among users and provide new findings [57].

Prototypical research and timeline

The purpose of this research was to give nursing students the perspective of losing autonomy through unsolicited help. Within the design process it was important to move them towards the confrontational experience. Wanting to stop playing and experiencing no possibility of self-development can be seen as the first early predictors of success [39,58]. These principles guided the design phase, the subsequent iterations and the evaluation of the prototypes. The prototyping process enabled users to present their experiences and allowed us to gain a deeper understanding of the user experience. The prototyping research was based on the 4R principle of rapid iteration, resonance and balance between rigour and relevance [59–61] . This allowed us to identify bugs and improve functionality.. Firstly, this means exploring and addressing game mechanics to remove autonomy through unsolicited help, so that the participant constructs a shared perspective (1).
Secondly, prototyping served as an intervention strategy by intervening in the social system and drawing attention to the problem (2).

These prototypes serve as a lingua franca between abstract concepts and concrete experiences. Users are given the opportunity to interact with the design in a tangible and replicable way. This process encourages a more engaged and emotional response from users as they are directly involved in evaluating the confrontation experience and formulate their own conclusions [62]. This research describes five different prototypes from development to testing. The full study took place from December 2022 to June 2023. The first four prototypes were conducted over a period from January 2023 to May 2023 and had five week intervals. These prototypes were designed in one to three days and tested over three weeks at different times and places in the nursing program. One week was left to interpret the results for the next iteration. The fifth prototype was designed and tested in May and June 2023.

Participants

For the recruitment of participants, a regional training centre (secondary vocational education) was a participant in the level 4 nursing course. In the Netherlands, every training centre offering this level 4 training has to adhere to the same core tasks, work processes and examination requirements. Each student also swears allegiance to the same national professional code before graduating and receiving a diploma [63]. A total of 34 participants (table 2) took part in the study. For privacy reasons, no data was documented. As the study focuses on the feasibility of the prototypes and the perspective of loss of autonomy, these data add little.

	Number of participants
Prototype #1	13
Prototype #2	7
Prototype #3	11
Prototype #4	4

Table 2 - Participants listed by prototype

Evaluation

In this study, five prototypes were tested with students and teachers from the nursing course. After the test, a dialogue was held with each participant about their experience. The focus of this dialogue was on the feelings that the participants identified during the execution of the prototype and what caused them to feel these feelings. This qualitative research method was supported by a tool called The Feeling Wheel (Figure 3). This tool was used to support the dialogue and as a tool for participants to map their experiences. The Feeling Wheel is designed to support users in identifying and discussing their feelings. The wheel consists of an inner circle with five sectors and two outer concentric circles. Each of the sectors is marked with the name of a primary feeling, namely angry, sad, fearful, happy, surprised, bad and disgusted. The outer rings show the names of derived feelings, but weaker feelings related to the primary feelings [64]. Participants were asked to identify feelings on the Feeling Wheel after participating in the prototype. They were asked to give words to these feelings by relating them to the experience of the prototype.

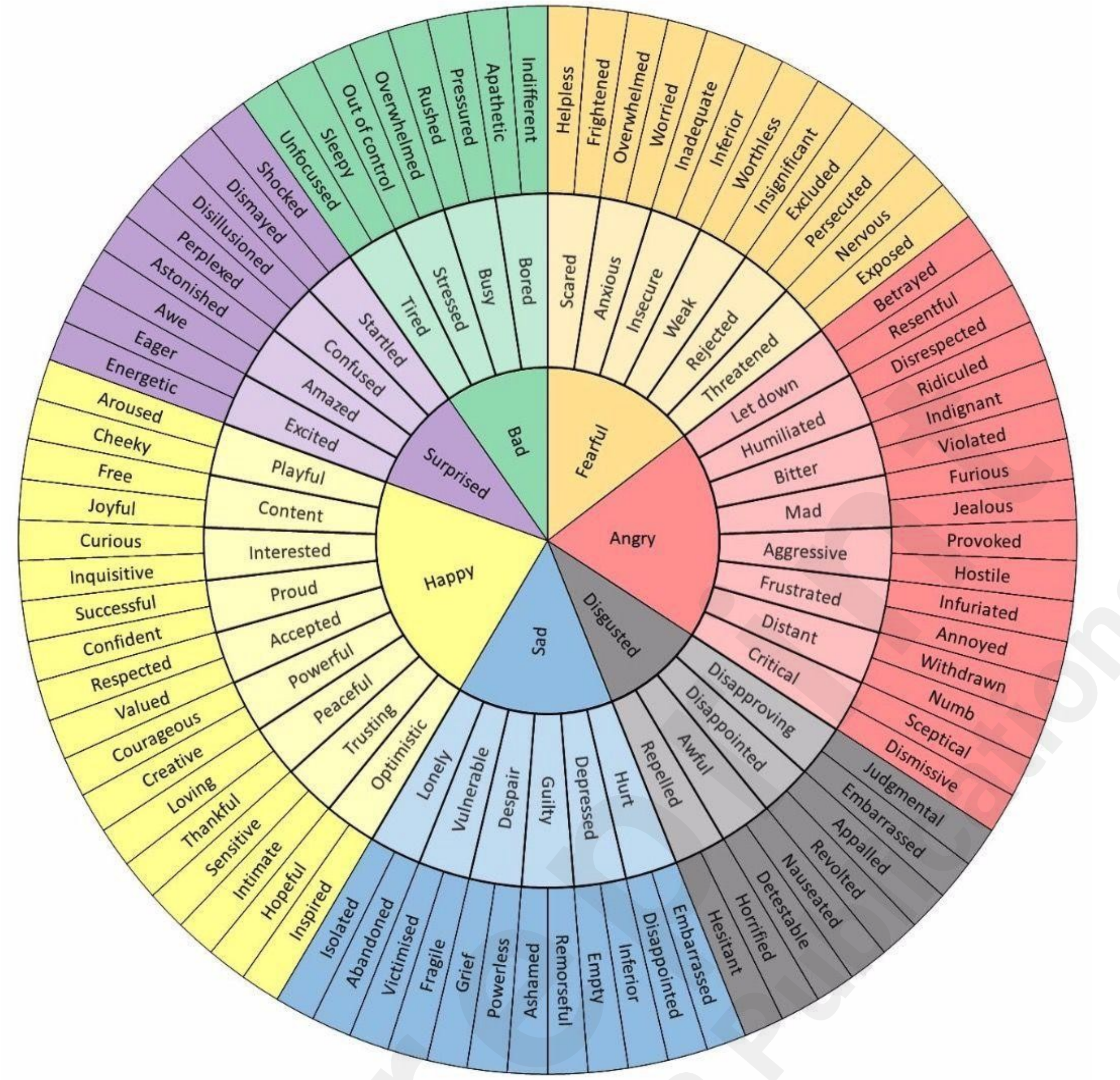

Figure 3 - The Feeling Wheel [51]

RESULTS

The collection of examples was designed in a qualitative descriptive way. It took the form of individual interviews following the character or phenomenological methodology and through social media intervention in closed groups. A total of 94 examples of loss of autonomy through unsolicited help were identified. The contexts of these examples were clustered and grouped into seven categories (table 3). Each category reflects the different parallels addressed by the examples. A comprehensive list of all examples can be found in the multimedia appendix 1.

Category	Number of examples	Description
Takeover	28	Paternalistic aspects or elements of take-over. It was pointed out that: "This form of unsolicited external interference makes it impossible to take responsibility for one's own life. Taking over activities makes it impossible to achieve self-development and fulfil life priorities.
Already done for	10	Unsolicited outside intervention where there is no control over the

you		activities. In many cases they stated that they did not ask for these activities, but that the person with a disability could not do the activity on their own and that it would be easier if they did it in advance. People reported that this goes against the feeling of being mobile and creates a feeling of dependency.
Overly Empathetic	19	People reported experiencing this as belittling and feeling that they were not seen as capable enough to make decisions for themselves.
Watchful	4	Alert to the activities of others. People reported this affects the privacy of the individual and the possibility of self-discovery. People referred to the exercise of non-authentic choices and the feeling of not being an anonymous participant.
Easier for you	9	Paternalism towards the disabled person, intervening in the belief that it would make things easier for them. People reported that this had an adverse effect on their sense of autonomy and independence.
Not considered full	8	Phenomenon of people with disabilities not being seen as whole. In many cases these examples were inappropriate. The contacts we had showed that these examples could be perceived as inferior and undermined the perception of having a place in society. It was reported that this violated their self-image and sense of moral independence.
Assumptions	16	Prior beliefs fuelled that led people to act. It was reported that external interference occurred when the needs or demands of the person with a disability were met without direct involvement or consent. For people with disabilities, this highlighted the importance of inclusive practices where their self-determination and autonomy were not respected.

Table 3 - Overview of collected examples of loss of autonomy through unsolicited help, sorted by category

Prototypical research

As described in the methodology section, all prototypical research took place in the nursing department of a secondary vocational school. The search for the confrontational experience was an essential part of the prototypical research. For this reason, we felt it was important to metaphorically recontextualise the architecture of the examples obtained in abstractions in the prototypes. All teachers and students were associated with this programme. As teachers and students were participating at different times, the prototypical research took place on different days of the week.

Prototype 1

For the first prototype, participants used Lego and the opportunities it provides to be immersed in their own imagining and creating. They were given 10 minutes to build a car from their own perspective using Lego set 9689 (Figure 4). It was explicitly stated that they should do this independently to ensure that any form of verbal or non-verbal communication was excluded.

Figure 4 - Lego set 9689 used for prototype 1

The effect of unsolicited outside interference is an essential part of this study. In order to make this component important, two additional participants were added to the prototypical cycle after 5 minutes. They were tasked with moving around the room and interfering with the construction process.

Result prototype 1

After running Prototype 1, a dialogue was conducted with the participants (N=13) to map the experience (table 4). We found that in the first 10 seconds, participants are curious (n=2) about where the other person's action is leading. They want to understand what makes the other person tick. At the same time, they recognise that their original plan has been disrupted. The mechanism of unsolicited interference caused feelings of confusion (n=2) as people were not sure what was happening. We noticed in all the dialogues that this effect is achieved mainly because the unsolicited interference is unexpected and not predicted in advance. People expressed surprise (n=1) and difficulty in anticipating. One participant said:

During the construction process, everything slipped out of my hands and my own performance was destroyed. This caused stress (n=1).

There was a strong desire for participants to manage the building process independently, driven by personal motivation and goals. As this failed, we found that feelings of frustration (n=3) and powerlessness (n=1) were raised. This led to feelings of inferiority and anger (n=1) towards the person who had interfered uninvited because no consent had been given. One participant mentioned:

I experience a loss of direction in the building process and lose the overview. I can no longer implement my own idea according to my own plan. The way is blocked because the other person determines the next step. To keep up, I can only follow, which makes me feel vulnerable (n=1).

It was clear that each participant had their own approach to building a car with the Lego set. In fact, it turned out that they all had their own idea of what the structure should look like. For this reason, unsolicited interference was described as annoying (n=2).

One participant said:

My freedom and creativity has been taken away, so the decisions are no longer mine. This leads to a loss of self-confidence.

Experienced feelings *(number of appointments)*
Annoyed *(2)*
Confused *(2)*
Curios *(2)*
Frustrated *(3)*
Inferior *(1)*
Powerless *(2)*
Surprised *(1)*
Vulnerable *(1)*

Table 4 - Summary of experienced feelings prototype 1

Prototype 2

For the second test, a simple prototype (Figure 5) was developed. The prototype is a web application based on HTML5. The application uses keyboard triggers to determine what action should be taken. The application was developed using ClickTeam Fusion 2.5. The prototype was tested and evaluated individually with the participants.

During the game, the participant is instructed to move the yellow ball to the finish line. From the first prototype we knew that the interference with personal choices should take place without the participant's knowledge. The aim is to confront participants with a situation in which they are unprepared and unfamiliar with the required route. This should affect their sense of independence and their capacity to take responsibility for their own choices. In the architecture of the design, this created a playing field with invisible obstacles that prevented the participant from knowing in advance which route to take. These invisible obstacles were specifically designed without prior warning to the participants during the introduction of the prototype.

The prototype contained two levels of varying complexity. In the first level, participants could partially determine their own route, where the level contained only a few invisible obstacles. The aim was to gradually build up frustration, with participants initially still able to follow their own route and have a sense of control. In the second level (Figure 6), however, they were gradually forced to deviate from their original plan and follow the imposed route. Otherwise, the participants would not get any movement in the yellow ball. As a result, we wanted to confront participants with a changing environment that systematically challenged their ability to make autonomous decisions and maintain control.

Results prototype 2

As in the first prototype, the Feeling Wheel was used to map feelings. Participants mapped (table 5) different feelings and related them to their own perspectives in caring. Frustration (n=6) and annoyed (n=1) were related to the loss of direction in situations where one wants to maintain control. In particular, this feeling arises from wanting to determine the course of action independently, but having to give up direction.

The participants all had a strong focus on reaching the goal. We found that invisible obstacles that people are not prepared for cause them to constantly think of alternatives, which puts a great strain on their cognitive abilities. In fact, participants have to constantly think of a different strategy. Although initially there is a choice to stop or continue, it is clear that the buttons and rules of the game already determine the path, making participants feel trapped in a limiting system. In the game, participants experience that there is really only one choice: to follow the prescribed route. This is reminiscent of situations where people with disabilities, such as dementia or Parkinson's disease, try to do something simple but fail time and time again. Participants indicated that at first sight the game gives the illusion of choice. As the game progresses, it becomes clear that in reality this freedom is limited, comparable to the limited autonomy of people with disabilities. This leads to a violation of self-efficacy, self-confidence, freedom and direction, drawing parallels with situations in which people with disabilities are constantly trying to devise strategies to achieve goals independently.

Frustration reaches a peak when participants report feeling out of control and begin to doubt themselves. This feeling of worthlessness is attributed to the game, similar to how people with disabilities are constantly faced with challenges beyond their control. Participants can imagine that this is a parallel to having a disability, where external factors, such as the game, determine what they can still do as an individual. This leads to the experience of powerlessness (n=2) and disorientation, where participants have no control over the outcome and feel that something 'idiotic' is working against them.

Figure 5 - Visual of prototype 2

The inability to get to the other side creates a sense of confusion (n=1). The feeling of limited freedom and loss of direction arises when participants realise that the path they want to take is not possible as they had imagined it. Something else determines the path taken, which leads to a loss of autonomy and dependence. These experiences while playing the small game already have a significant emotional impact, with participants reflecting on themes of loss of autonomy, dependency and the unpredictability of what happens next. One participant said: "Out the window that thing, what the hell!

After playing, participants still feel the urge to continue. This suggests a similar process of perseverance and, at the same time, the risk of giving up in the face of continued failure. This establishes a parallel with people with disabilities who want to prove themselves but may eventually decide to give up. This experience defines for the participants (n=2) the feeling of being weak in a social system. Teachers indicated that the metaphor was abstract, despite the feelings they experienced during the playtest.

Figure 6 - Prototype 2, level 2 (invisible objects are marked black)

Experienced feelings *(number of appointments)*	
Level 1	**Level 2**
Confident *(1)*	Aggressive *(2)*
Curios *(2)*	Annoyed *(1)*
Disillusioned *(1)*	Frustrated *(6)*
Happy *(1)*	Powerless *(2)*
Optimistic *(1)*	Resentful *(1)*
Playful *(1)*	Weak *(2)*
Powerful *(1)*	

Table 5 - Summary of experienced feelings prototype 2

Prototype 3

The third prototype is based on the same web-based HTML5 technology as the second prototype. It was developed using ClickTeam Fusion 2.5 and was executed on a laptop. With this prototype, we sought to reduce the participants' autonomy by offering them more and more help during the playtest. This kind of external interference and paternalistic behaviour was a recurring theme in the examples of people with disabilities. To metaphorically recontextualise this experience, we wanted to drive the confrontational experience by giving the participant credit for actions they did not perform during the external interference. We wanted to create a psychological impact and make the participants feel as if they could not do it themselves. Our early predictor of success was the moment when participants indicated that they wanted to stop playing. This prototype was run and evaluated with participants individually. They were told beforehand that the playtest was simple and that they only had to complete one task. They were allowed to decide when they wanted to stop playing.

In the third prototype, participants had an external mouse at their disposal. They were instructed to shoot the killer bee. Using an external keyboard, the researcher made sure that it flew into the window from all different angles, so that participants had to anticipate. Participants were motivated to act by being rewarded with points [65]. We learned from the first two prototypes that it is important to support a sense of independence, and that human intervention is perceived as more paternalistic than that of a computer system. Participants are then able to infer a causal relationship. The confrontational experience could only be achieved by giving participants control and responsibility over the task at hand in the early phases. To facilitate this, there was no outside interference for the first minute. After the first minute, the killer bees disappeared as soon as the mouse pointer was minimally close. Participants received points for disappearing. Over time, the distance between the killer bee and the mouse pointer increased to make it clear to the participants that they were being helped. In the examples of people with disabilities, it was evident that there was always an identifiable reason why they did not have the opportunity to perform actions independently and maintain control over them. The examples regularly showed forms of projection which increased the effect of paternalism. This discomfort was created by supporting the expansion of the killer bee with sound. Clear applause could be heard as participants gained points when the killer bee disappeared without their intervention. This was complemented by the appearance of derogatory text in the images. The moment participants indicated that they wanted to stop playing, the text "Do you want to stop playing already? If participants answered "Yes", the text "People with disabilities don't have an escape" appeared.

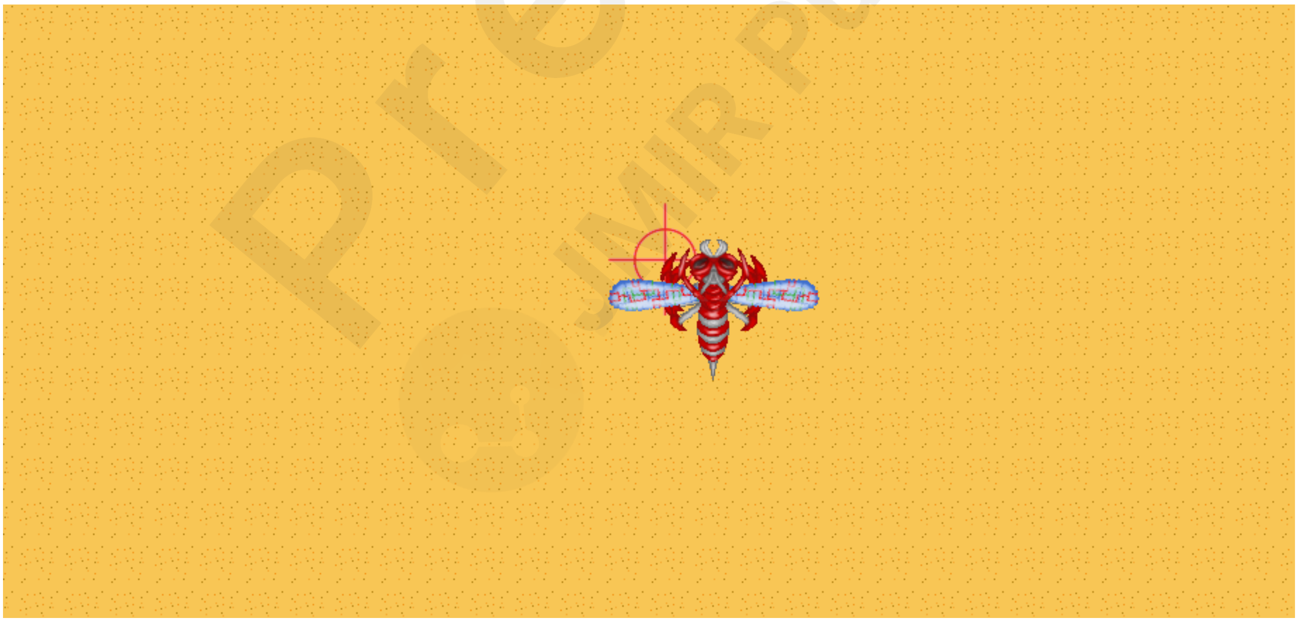

Figure 7 - Visual of prototype 3

Results prototype 3

We noticed that getting help gradually decreased motivation. In order to create this feeling of discomfort, it was found that it was necessary for participants to be in control of the controls during the first minute and to feel that they were capable of completing the task. Participants initially started the game enthusiastically and we observed that they became increasingly passive as the playtest progressed, eventually giving up on the task. Despite being perplexed (n=1) and surprised (n=2) by the initial help signals, they indicated that they wanted to stop playing because they were no longer able to control their own actions.

The Feeling Wheel (table 6) identified feelings of annoyance (n=4), frustration (n=6) and confusion (n=4). Participants mentioned that external interventions led to a loss of control over the situation and a feeling of not being part of it. They experienced an urgent need to anticipate quickly, as constant external intervention created a sense of being rushed, causing participants to rush to meet the need to be self-sufficient.

External intervention contradicted the desire for self-sufficiency and denial of direction, resulting in a sense of threat (n=1) and inadequacy (n=1). It was reported that this resulted in uncertainty during play as it became unclear what role to play. It was reported that participants wanted to be in charge of the task and that inequitable rewards actually contributed to disrespect (n=1) for the skills and talents that the individual possessed. The concept of projection causes participants to feel humiliated (n=2) by it as it is beyond their control.

Experienced feelings *(number of appointments)*
Annoyed *(4)*
Astonished *(1)*
Confused *(4)*
Disrespected *(1)*
Frustrated *(6)*
Humiliated *(2)*
Hurt *(1)*
Inadequate *(1)*
Insignificant *(1)*
Isolated *(1)*
Perplexed *(1)*
Surprised *(2)*
Threated *(1)*
Violated *(1)*

Table 6 - Summary of experienced feelings prototype 3

Prototype 4

The fourth prototype was a paper prototype based on the design principles of the platform game Super Mario Bros. A level printed on A0 paper (Figure 8) in which the participant had to navigate the protagonist, avoiding all kinds of obstacles and enemies, but collecting items scattered around the level. This level was displayed in a grid in which the participants could move the protagonist in each turn of the game. Since we wanted to put participants in the perspective of a person with a disability, the protagonist was depicted in a wheelchair (Figure 9).

Figure 8 - Visuals of prototype 4

In this prototype, we tried to reduce participants' autonomy by intervening in situations that could easily be performed independently. Participants were instructed to reach the end of the level and earn a star. Participants were also asked to determine their needs by indicating which items they wanted to collect in the level. This refers to the independent determination of life priorities, which was a recurring theme in the examples collected from people with disabilities. In these themes, it was the intervention in one's own plan that led to the loss of autonomy and the blockage of self-development. In order to metaphorically recontextualise this experience, we wanted to distil the experience by having the facilitator intervene unsolicited during the performance and paternalistically address the participant "as if he could not do it himself". We wanted to prevent the participants from getting into a flow, not to make them feel that they had no control over the situation they were participating in, and to indicate that external intervention had a negative effect on the protagonist's self-image. This self-image was represented by a heart on the screen. The moment the facilitator made a paternalistic intervention, this resulted in a reduction of this heart.

Figure 9 - Protagonist in prototype 4

Results prototype 4

We found that participants started the prototype enthusiastically, with self-determination of goals having a positive effect on motivation. Participants selected several items that they wanted to collect under the ideas of self-direction and choice. We noticed that during the execution of the prototype, participants' motivation quickly decreased. The facilitator approached the participants in a paternalistic way and limited the direction. The unsolicited external interference was reported to cause frustration (n=2). The arbitrariness with which the facilitator took away direction was perceived as elusive and impossible to anticipate. We saw participants sigh when faced with an intervention that was unfamiliar to them. People experienced feeling confused (n=2) and out of control (n=1) and described this event as going against their own plan, self-reliance and maintaining their own direction. Participants mentioned that their own actions were perceived as wrong, leading to feelings of insecure (n=1), rejected (n=1) and weak (n=2). Participants mentioned that this effect was reinforced when the facilitator verbally supported their intervention and projected stereotypes.

Participants mentioned (table 7) that choices made for them were not in line with their authenticity, which made them feel powerless (n=2), inferior (n=2) and humiliated (n=1). It is no longer pleasant to participate and pursue self-determined goals because one does not feel involved. Participants identified feelings of apathetic (n=1), ashamed (n=1) and 'bored' (n=1) as playing an important role. As an early predictor of success, we observed participants becoming increasingly passive, giving up and declaring that they wanted to stop playing. Manipulation in the form of random rewards and compliments, which participants do not perform independently, they define as feeling inferior (n=1) and insignificant (n=1). It does not feel satisfying to them because they cannot attribute it to them. They mention that they want to take responsibility for activities and decisions without being fed with mistrust in their own abilities.

The heart, which was supposed to represent the impact on the wheelchair-bound protagonist, did not play its role well. We saw that it was not sufficiently part of the prototype. The feedback addressed by the heart was late or not seen at all. Participants reported that it was not sufficiently visible what the impact on the protagonist was and what value it was supposed to represent.

Experienced feelings *(number of appointments)*
Annoyed *(1)*
Apathetic *(1)*
Ashamed *(1)*

Bored *(1)*
Confused *(2)*
Disappointed *(1)*
Excluded
Frustrated *(2)*
Humiliated *(1)*
Inferior *(2)*
Insecure *(1)*
Insignificant *(1)*
Out of control *(1)*
Powerless *(2)*
Rejected *(1)*
Weak *(2)*
Worthless *(1)*

Table 7 - Summary of experienced feelings prototype 4

Bèta-prototype

The beta prototype (Figure 10) was a digital application developed in ClickTeam Fusion 2.5 on which the participants' names had been pre-entered. Participants had access to a computer mouse and were instructed to catch flying baseballs in three rounds. The baseballs could be made to appear and disappear by the facilitator using the keyboard. The application included an introductory module that allowed participants to familiarise themselves with the game controls. Participants were able to catch baseballs by clicking on the baseball with the mouse pointer, which was represented as a baseball glove. If participants performed this activity correctly, it was visually represented by +1 and acoustically supported. Participants were able to observe parameters representing research data and were given a summary of their role after the module. The system always provided feedback that participants had performed below average.

The parameters visible to participants were;
- Number of baseballs caught
- Number of left mouse clicks required to do so
- Time in seconds
- BEMyu M1, which stands for Bachmann Eye Movement yerd unit. This is a fictitious value that represents the formula for eye-hand coordination. Specifically, the left eye
- BEMyu M2, which stands for Bachmann Eye Movement yerd unit. This is a fictitious value that represents the formula for eye-hand coordination. Specifically the right eye

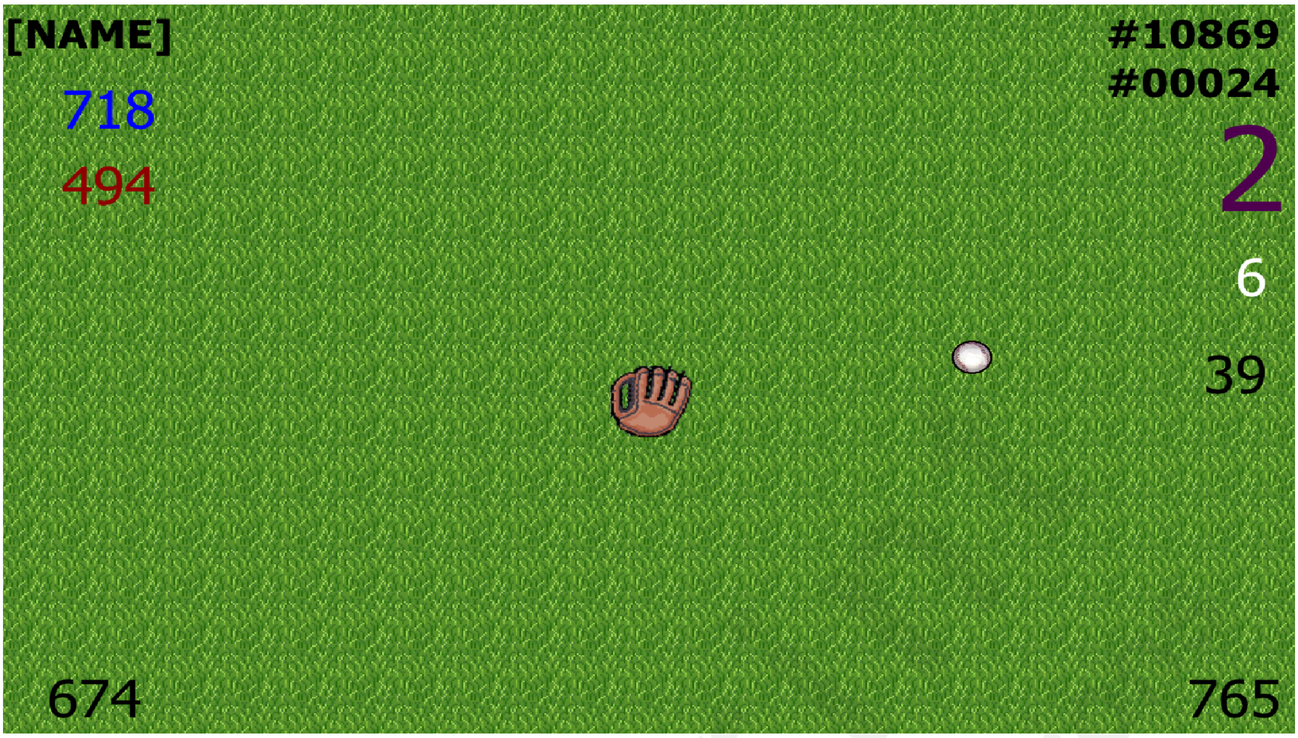

Figure 10 - Representation bèta-prototype

In order to suggest to the participants that validity was a priority in the study, we asked them to wear a meditation headband (Figure 11). In addition, a webcam was aimed at them. We told participants that the headband could record the contractions of the cranial muscles to calculate an accurate score. We used the webcam to create the illusion of 'eye tracking'.

Figure 11 - Meditation headband (Muse 2)

The modules stand out because the facilitator's unsolicited help becomes conductive. In this way we wanted to reduce the causality and logic of the task, so that the participants were not able to determine which role they were playing. In the first module, the participant performs the requested action completely independently and is given the opportunity to develop in the boards. However, the displayed summary suggests that the score obtained is negative compared to the average. This is an indication of the unsolicited interference of the facilitator from the second module onwards in order to influence the results of the fictitious research. The participant is given less opportunity to act in relation to the task. The post-round summary improved the results. We wanted the participants to feel that they were seen as incompetent and needed help. In the third module, the feeling of incompetence was further increased by the facilitator taking over the task completely. Also, snowballs and other objects suddenly appeared in the window to create confusion and make the participants unsure of their own understanding of the competences.

The beta prototype is the result of various findings from previous prototyping research, interviews with people with disabilities and theory. These aspects were ultimately incorporated into the design. We linked the various objectives to design choices during the design process. However, more specific decisions were made that influenced the design, as described in table 8. Follow-up discussions with participants during the study inspired the dynamics of the beta prototype and the chosen theme. Namely, we wanted to present the topic in a positive way so that participants would be more receptive to the message and are able to come to their own conclusions [62,66]. Rather than treating participants negatively and suggesting that they were not doing well, we wanted to make them part of the experience. The social theme was chosen because the target group faces similar challenges. The patterns that the intervention goes through had to meet the condition of truthfulness in that replayability is low once people realise what the activity is [67]. An overview of the different design choices is given in Table 8.

Design Choices	**Goal**	**Legitimation**
Invite participants to participate in fictional research	Participants do not expect loss of autonomy	Prototypical research
Individual intervention	Address participants personally	Prototypical research
Set a clear objective	Responsible self-development	Interviews, prototypical research
Facilitation by a person in a wheelchair	Debriefing from an expert perspective	Interviews, prototypical research
Glass wall	Allow participants to discuss the topic	Prototypical research
Feedback summarisation	Acquire the need for self-development	Interviews, social media, prototypical research
Different modules	Generate feelings of dependency	Interviews, social media, prototypical research

Meditation headband worn by participants	Making participants less aware of fiction research	Prototypical research

Table 8 - Overview of design choices made for the bèta prototype

Setting up the beta prototype

Our aim with the beta prototype was to stimulate knowledge creation around the theme of autonomy in health care. In order to initiate this learning process from within, participants should engage in an informal dialogue. This allows them to share their experiences and make assumptions about the topic. In this way, we wanted to increase uncertainty and introduce confusion into the logic of the research. This logic is parallel to the conditions of autonomy. Our intention was to avoid any delay in the dialogue on the part of the participants due to the presence of the facilitator in the room. For the beta prototype, we chose a room (Figure 12) with a glass wall between the intervention room and the post-intervention room. This allowed participants to deliberate freely, but still visually witness what was happening in the intervention room. We wanted to make it easier for participants to make attributions and to help them organise the fundamental attribution error [68].

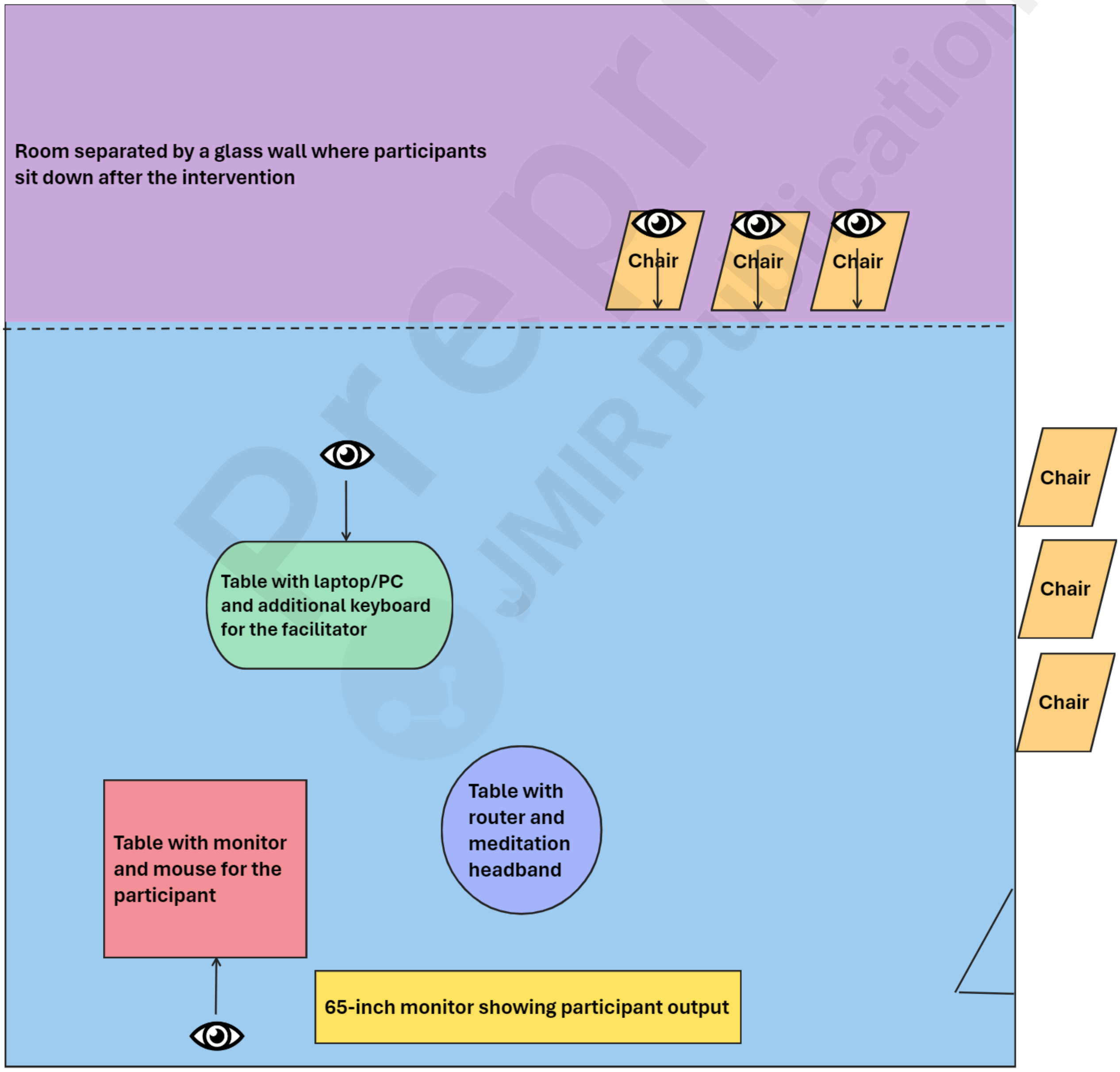

Figure 12 - Room setup bèta-prototype

Results bèta-prototype

The data from prototypes 1 to 4 helped us design the beta prototype in the final phase of the study. We knew that it was imperative that participants should not see or expect a violation of autonomy through unsolicited intrusion from the external world. We decided to use metaphorical recontextualisation [39,40] to set up a fictional research project in which we wanted participants to feel the need to make an important contribution to science. Participants received a paper invitation announcing the need for data on eye-hand coordination. This data would be required by a fictional company specialising in electric wheelchairs to make improvements.

Prior to the test session, participants were given additional explanations about the purpose of the test session, the activity they would be performing, and the research parameters that would be collected. Participants were explicitly told to participate on an individual basis in order to obtain the most reliable and valid result possible.
We chose to have the beta prototype facilitated by a person in a wheelchair with physical limitations. This was because we wanted to add weight to the topic by supporting the debriefing with the perspective of an expert through experience, and to allow participants to go deeper into the topic.

Running the prototype took an average of 10 minutes per participant. The prototype required participants to continuously deal with loss situations and adapt to current circumstances. We found that the participants all wanted to be part of the study and provide the most valid and reliable result possible. The summaries between modules ensured that participants formulated their own areas for improvement in order to achieve self-development and a valuable and gratifying end result.

The glass wall between the intervention room and the post-intervention room facilitated interaction between participants. We commonly saw participants pointing to the screen and suggesting activities taking place in the intervention room. Participants independently continued the conversation about this during the debrief. People referred to inconsistencies between the score they received and what the summary showed. People referred to feeling that they were not seen as good enough to meet expectations, but were not given the opportunity to achieve their own areas of improvement because of external intervention. We heard from participants that they felt the rules of the game were constantly changing, making them doubt themselves and their role.

DISCUSSION

Key Findings

In this study we designed several prototypes for nurses in training and teachers connected to the nursing course. These prototypes served to facilitate the interaction between the role of the nurse and obtaining the perspective of people with disabilities. The research focused on the experience of loss of autonomy through receiving questioned help. As a result of the iterative design research, the beta prototype contains several elements derived from practical insights and existing knowledge. The designed beta prototype is deliberately based on an activity-based intervention to facilitate participants in formulating their own conclusions and experiencing feelings that validate reflection. For the target group this could be a safe way to get the perspective of people with disabilities. It could also increase the chances of transfer [40,58] by allowing nurses in training to interact directly with the target context.
The beta prototype was developed in small steps to ensure that the experience of people with disabilities was included. We also wanted to ensure that the process and intervention created a

meaningful situation. The process focused on obtaining examples of loss of autonomy through unsolicited help and the right strategy to facilitate participants' sense of loss of autonomy. Here we paid attention to motivation and professional needs by involving the participants in the intervention. The arrangement of the conceptual structure in the intervention space ensured that communication on the topic occurred naturally.

The iterative process helped to ensure that examples of loss of autonomy were metaphorically recontextualised [39,40,52] within the game mechanics. It was a challenge to develop an intervention that would cause participants to experience loss of autonomy and thus provide a different perspective. We were validated that it was necessary for participants not to know that loss of autonomy would occur. The Feeling wheel [64] helped to start this dialogue and allowed participants to tell us stories about what they experienced during the intervention. The iterative process allowed us to design the prototypes quickly and constructively. The prototypes and dialogues allowed us to learn which game elements and mechanisms caused the experience of loss of autonomy. This allowed us to iterate effectively and translate the findings into the beliefs we wanted people to experience in the beta prototype. We found that conducting the research attracted a lot of attention in the corridors. Through lecturers not involved in the research, we learned that the topic of autonomy in healthcare was discussed during breaks. Teachers indicated that autonomy was only an integral part of the curriculum. It may be difficult for nursing students to imagine what this means for people with disabilities.

Research Progress

The iterative design process ensured that several prototypes and a beta prototype were developed. The design process was structured around the LiSMD and DRF [39,40] , which makes the design process at a broad, cross-cutting level, focused on repeatedly building and refining prototypes, an approach also used in this research. The LiSMD and DRF provide the research focus and help guide the design process [44]. However, we needed other resources to define the specifics of the target group and to start the conversation about autonomy. It was valuable to involve people with disabilities, nursing students and educators in the design process. We were able to learn quickly and efficiently by including their experiences. Talking to people with disabilities provided a wealth of information and examples from their everyday lives. We wanted the examples to be reflected in abstraction in the different prototypes, which we constantly approached from a boundary object and tried to accommodate with persuasive techniques [69] to focus on the perspective of different stakeholders. The involvement of teachers and nursing students in the dialogue after the implementation of the prototype ensured that the feedback became concrete.

Approaching the process and different prototypes as boundary objects provided a mediating tool without becoming a new tool for an activity system. The different prototypes adapt to the needs of the stakeholders and take on a different meaning for each different activity system. It allows people with disabilities who are experiencing loss of autonomy to put into words what they are feeling and to experience this perspective. For nurse educators, the beta prototype can be used as an intervention to determine what students should learn about the construct of autonomy. It could help them to determine the role of a health professional in education and the professional skills and attitudes that should be promoted. It offers nursing students the opportunity to experience, in a safe environment, the impact of loss of autonomy on self-esteem and sense of dignity, so that they can adjust their behaviour in their work.

Limitations

In this study, several participants contributed to the development of the different prototypes and examples. Based on the initial data, the beta prototype seems to offer a loss of autonomy through unsolicited help. However, more research is needed to determine whether it adds value. This research was conducted with a limited group, so scalability may be an issue. Follow-up research will need to determine which effect is valuable and further identify which variables are necessary to achieve this effect. As autonomy means different things to different people, and each person associates their own concepts with it, it is impossible to determine which meaning-making processes are involved. Also, the examples found were only from people with spinal cord injuries. The study did not include how people with other disabilities experience this and what their needs are to display it.

Future Work

With this study we have shown that serious gaming can be an approach to provide nurses in training with the perspective of their care recipients. However, further research in the form of prototypes is needed to determine which scenarios are relevant and resonate with student nurses and groups with different care needs before it can be incorporated into the curriculum. According to the professional code [63], it is necessary for nurses in training to be aware of differences in autonomy. The different contexts in which a nurse works require an inclusive approach. This requires ethical considerations to be taken into account when developing a serious game that interferes with personal autonomy. For the future, this means that nurses in training should not only learn the concept of autonomy as an integral part of their training. It should be firmly embedded in the curriculum and part of the teaching context.

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Conflicts of Interest

None declared

Abbreviations

SCI: Spinal Cord Injury
LiSMD: Layers in Serious Media Design
DRF: Design Research Framework
DON: Dwarslaesie Organisatie Nederland

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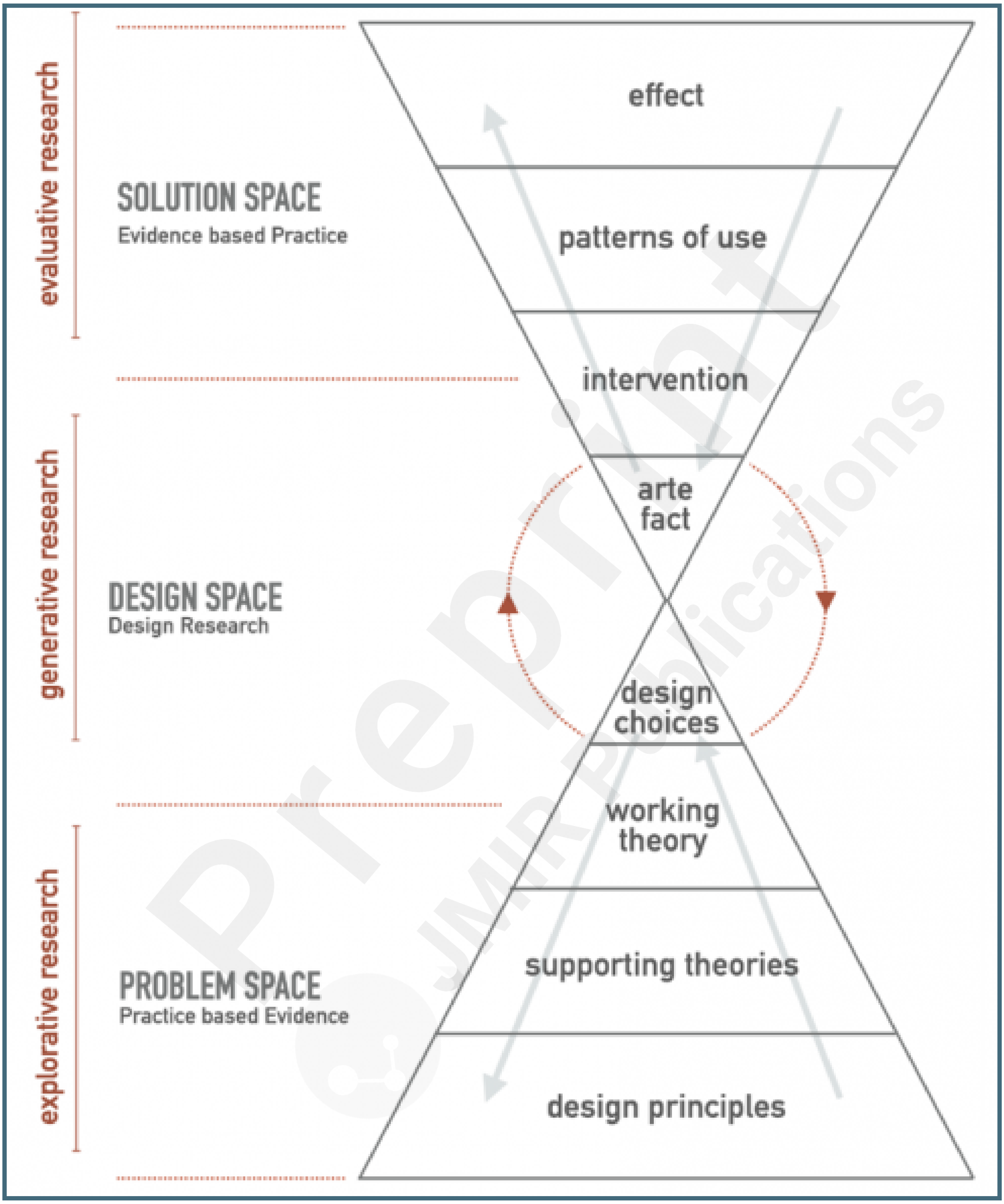
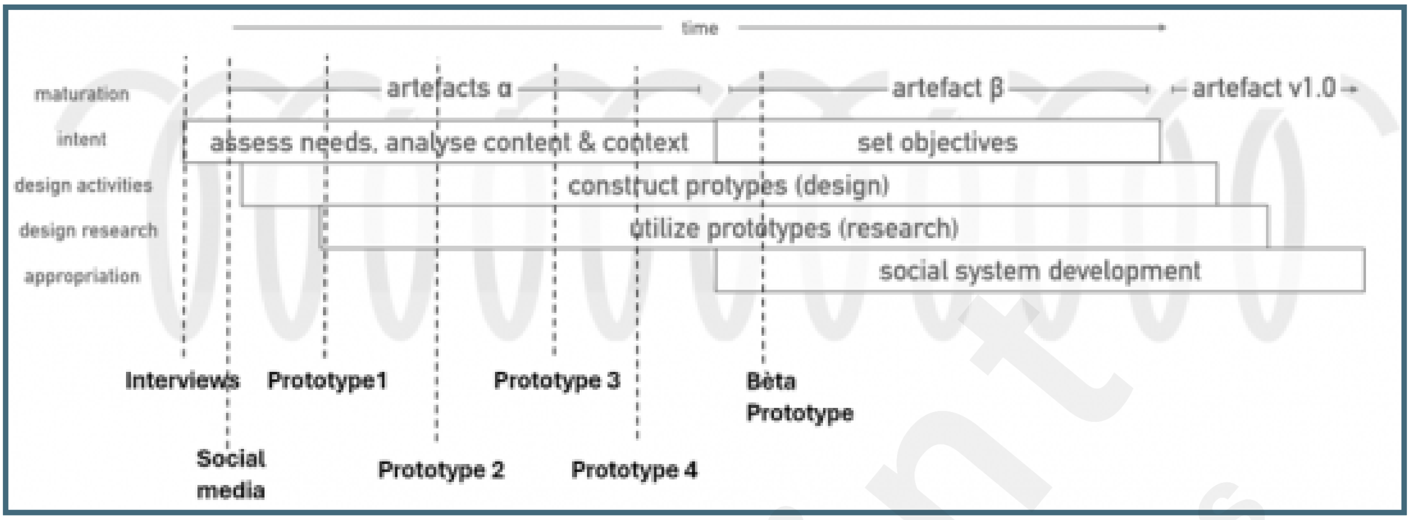
Supplementary Files

Figures

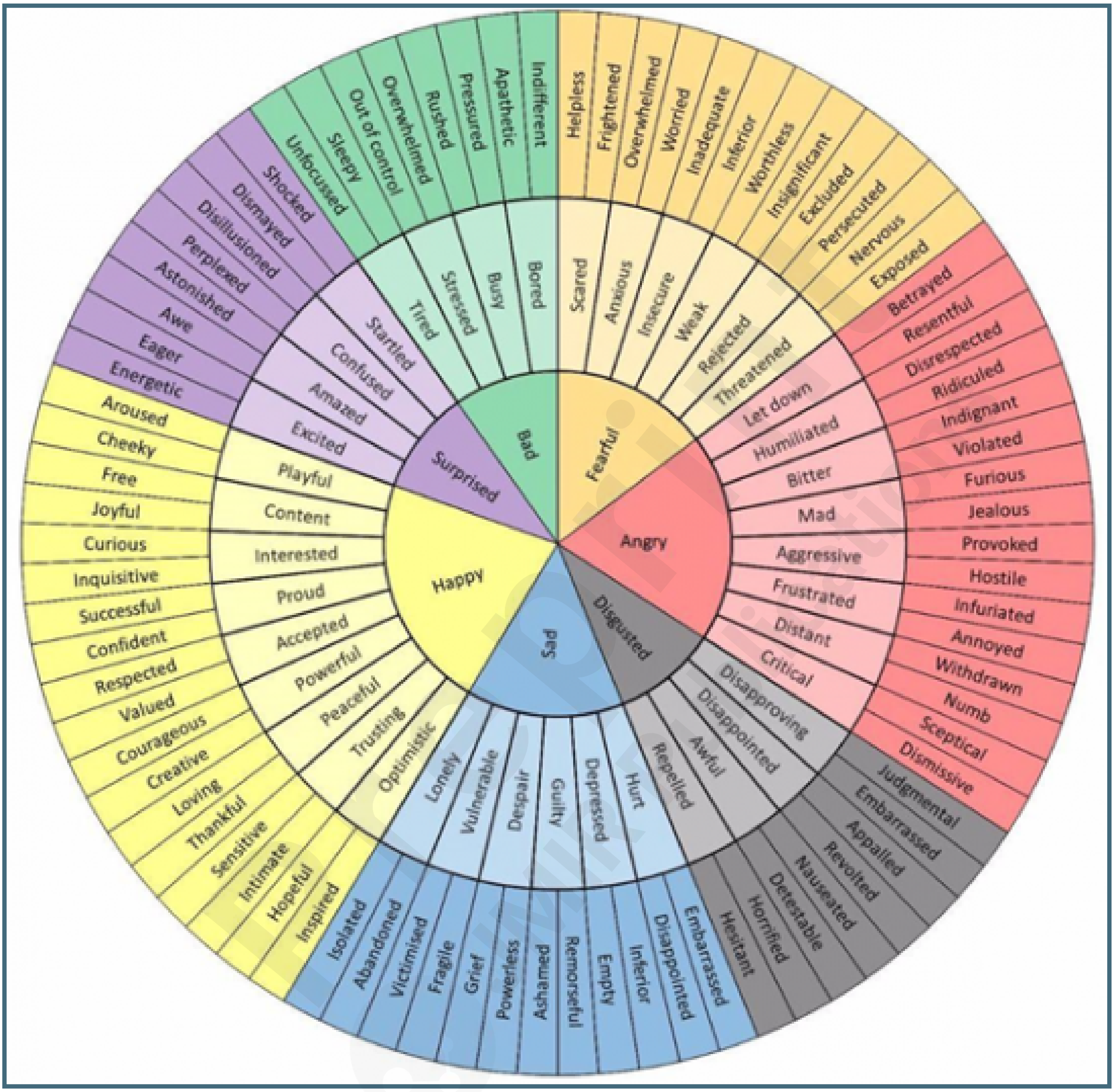
Layers in serious media design.



Design Research Framework, with mapped research approach.



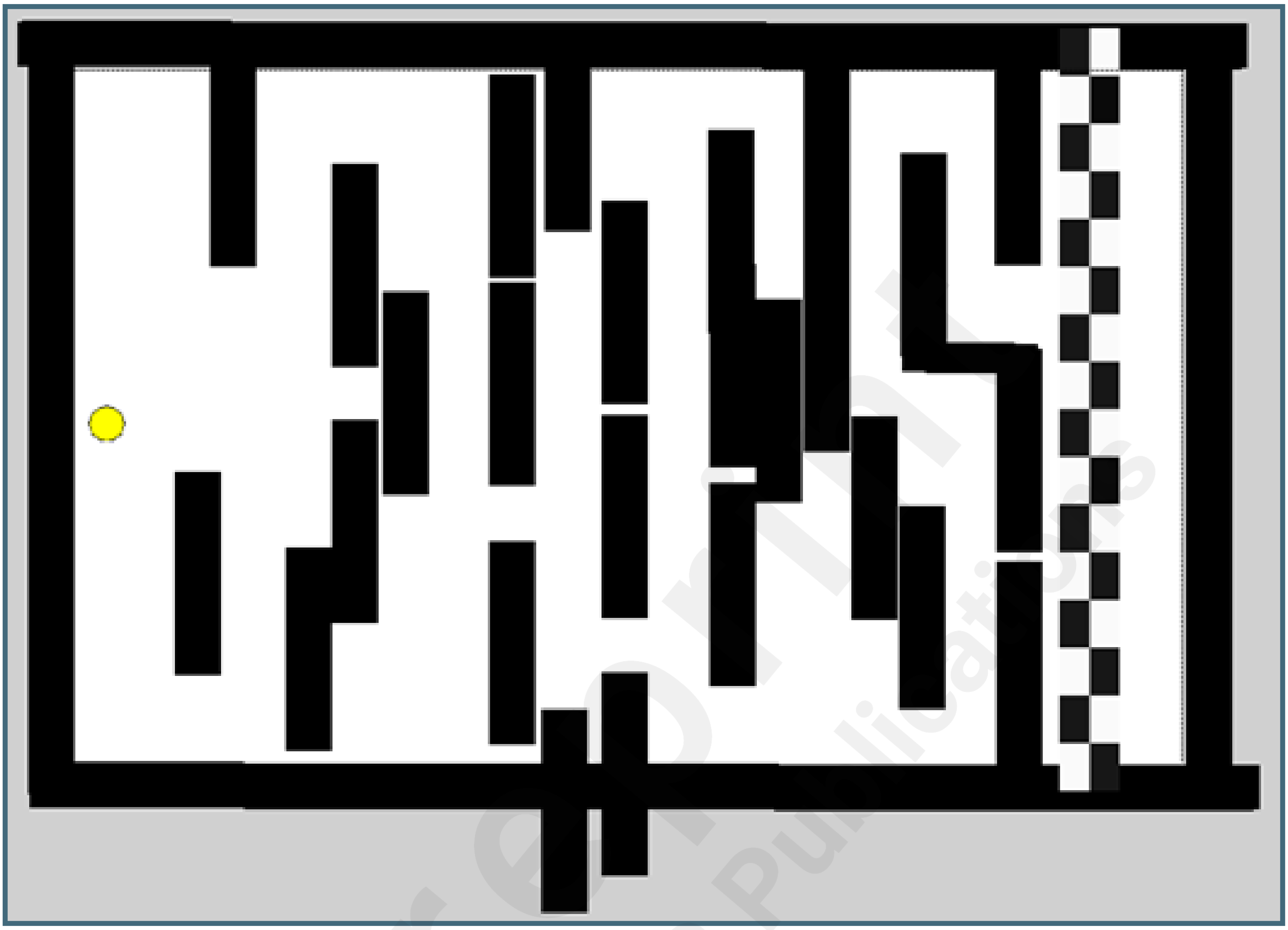
The Feeling Wheel.



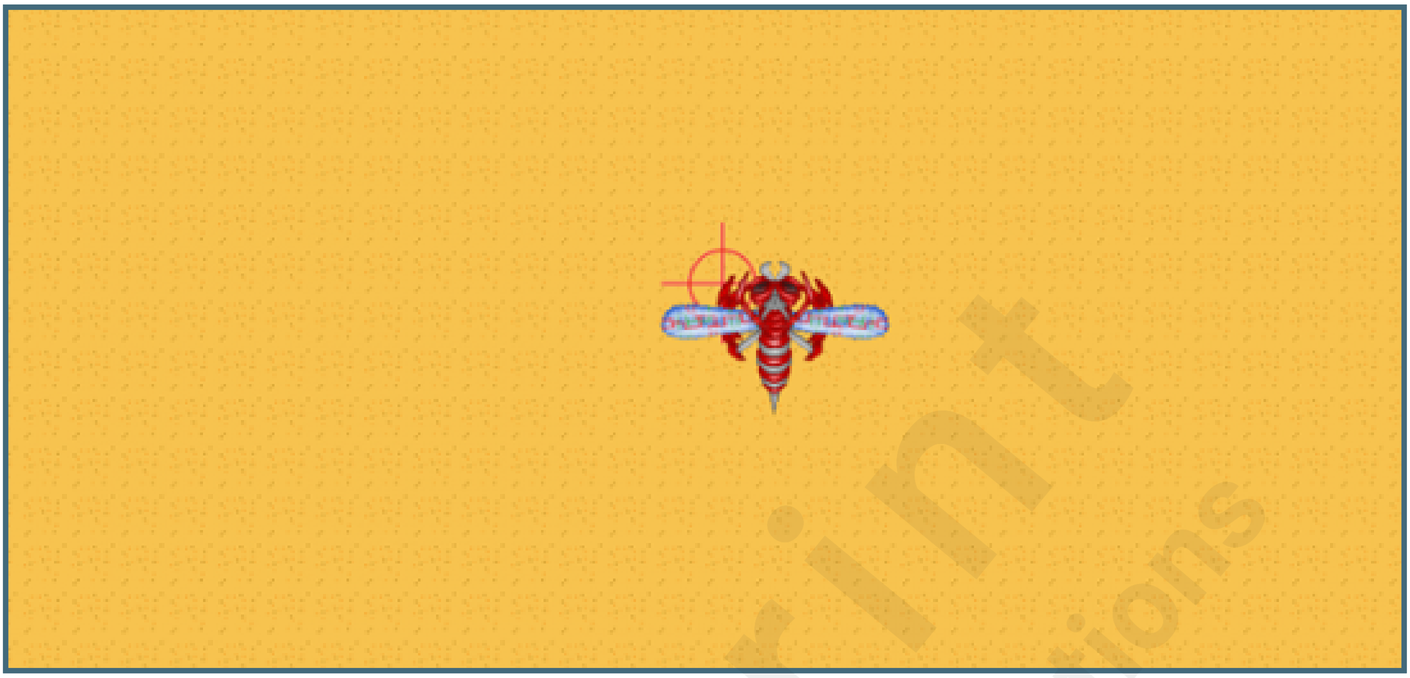
Lego set 9689 used for prototype 1.

Visual of prototype 2.

Prototype 2, level 2 (invisible objects are marked black).



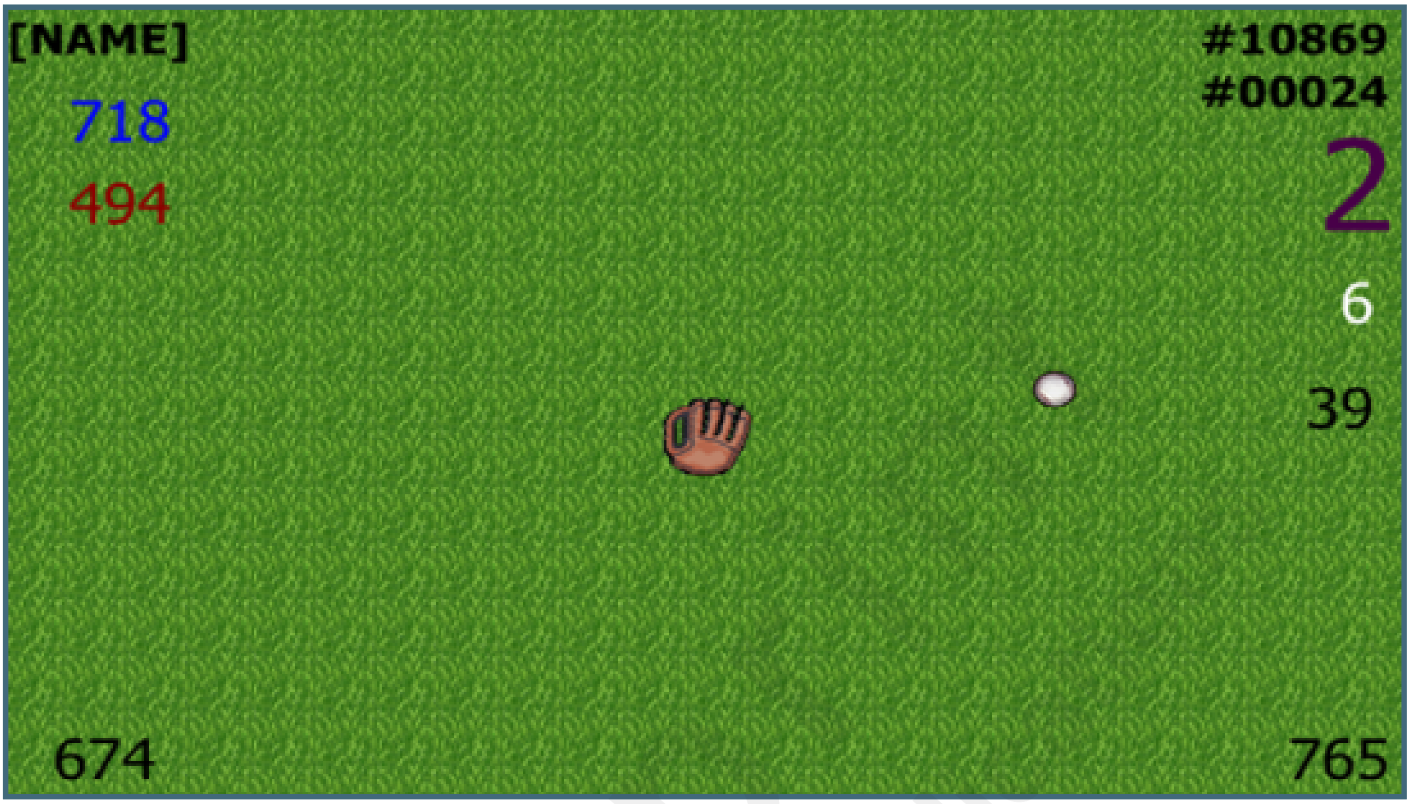
Visual of prototype 3.



Visuals of prototype 4.

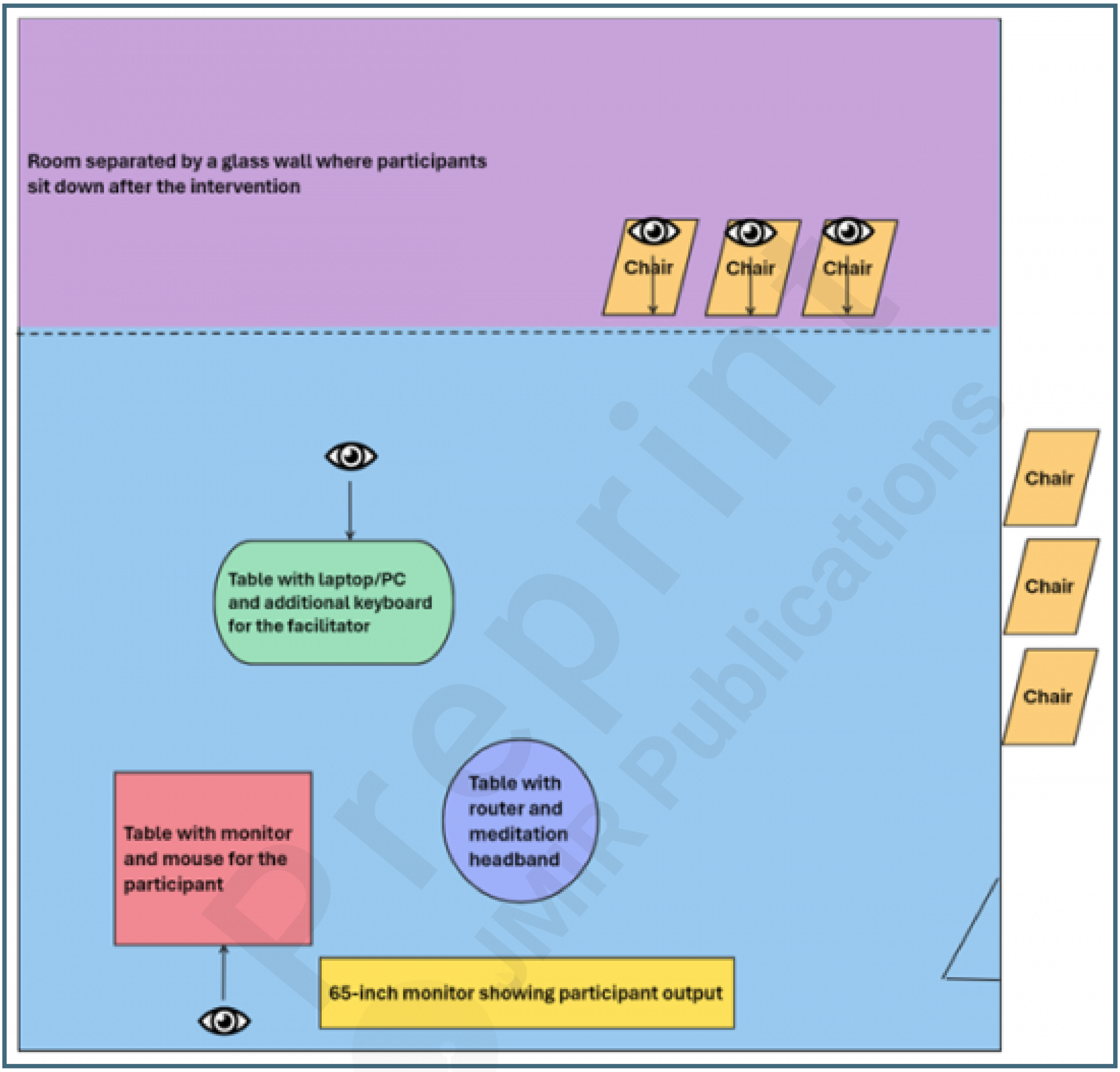
Protagonist in prototype 4.

Representation bèta-prototype.



Meditation headband (Muse 2).

Room setup bèta-prototype.



Multimedia Appendixes

Comprehensive list of all examples loss of autonomy.
URL: http://asset.jmir.pub/assets/28e067c2c1c8d35e48d19a51ee5b27a9.docx