DESIGN
2024

Empathic empowerment: an exploration and analysis of a situated interaction through empathic modelling and role-play

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Abstract

Empowerment is crucial for eliciting designer empathy. This research explores a distinctive integration of empathic modelling and role-play, termed Empathic Empowerment. Through a qualitative study, this research introduces a novel evaluation system, entitled the Empathic Empowerment Scale, designed to support the optimal level of designer empathy in a situated interaction drawn from habitual user experiences. The goal of this research is to empower designers to create the next generation of human-oriented solutions with enhanced inclusivity and social value, through practical experiences.

Keywords: human behaviour, human-centred design, empathy, empathic design, visual impairment

1. Introduction

Empathy is fundamental in obtaining a deep understanding of user needs (Battarbee *et al.* 2015; Bennett and Rosner 2019) and drives creative conceptualisation (Alzayed *et al.* 2020). It is also key to a human-centred design process, which has become fundamental in design teaching (Underwood and Powell 2023). Designers have gone to great lengths to get closer to the user experience particularly in situations foreign to the designer, for instance, due to varied physical or cognitive abilities (Raviselvam *et al.* 2022). One effective method is empathic modelling which simulates the perceptual and physical abilities of users (Nicolle and Maguire 2003). Patricia Moore pioneered empathic modelling by transforming herself into an elderly woman for a long period (1979 to 1982*)*, to obtain a thorough understanding of such users (Moore 2012). This method was also adopted using a 'third age suit', developed by Ford, to replicate of experience of the elderly, which led to a successful and inclusive design. However, such simulations are never a complete replacement for real-life experiences (Raviselvam *et al.* 2022).

This research explores a unique method involving the integration of role-play with empathic modelling, entitled Empathic Empowerment, to discover how empathic design theory is embodied in scenario structuring. Empathic Empowerment was explored through a qualitative study performed in the form of workshops conducted with design students. Participants were invited to role-play a situated interaction in pairs, involving a visually impaired client sitting alone at a restaurant and a server. Their main objectives were to order items from a menu and take the order respectively. Through Empathic Empowerment, this research aims to empower designers to experience the optimal level of designer empathy in a situated interaction drawn from habitual user experiences. In combination with the Empathic Empowerment method, the outcome of this paper is a novel evaluation system, entitled the Empathic Empowerment Scale, which is developed to support and analyse the elicited designer empathy.

1.1. Empathy in the situated experience

Duan and Hill (1996) categorise empathy into two key dimensions. Cognitive empathy concerns understanding another human's situation, whilst affective empathy refers to the emotional reaction. Research suggests that designer empathy can be optimally experienced when a balance is generated between cognitive and affective empathy responses (Battarbee *et al.* 2015; Hess and Fila 2016). Empathic understanding is hypothesised to be situated (Surma-Aho and Hölttä-Otto 2022) since it occurs in situations that are carried out from embedded positions (Haraway 1988; Suchman 2007). Therefore, the notion of situated design experiences is applied in this paper. Various methods and techniques support designer empathy in current situated design processes such as observing users in their surroundings (Patnaik 2009), personas, and journey mapping (Raviselvam *et al.* 2022). Designers have gone to greater extents to empathise with their users. Empathic modelling simulates user experiences that are driven by the need to understand unfamiliar situations, especially those influenced by diverse physical or cognitive abilities (Raviselvam *et al.* 2022). Empathic modelling also aligns with psychology, where simulation was demonstrated to be a key process in understanding other people's beliefs and perspectives (Keysers and Gazzola 2007; Kampis and Southgate 2020). Strickfaden and Devlieger (2011) highlight the criticality of practical experiences that engage the physical and emotional qualities of designers leading to successful design solutions. This implies that simulation enables designers to understand user's thoughts and feelings from a first-person perspective, therefore making it easier to elicit empathy.

Role-play is a simulation method that deepens sensory involvement (Altay and Demirkan 2014) and therefore supports empathic understanding (Moody *et al.* 2011). What distinguishes role-play from other simulation-type methods is its narrative element. Narratives, which are a means of representation and reasoning (Bruner 1990) can be perceived as plausible even in low immersive scenarios such as by watching a video (Cummings *et al.* 2022), which suggests their power to engage viewers. Traditionally, stories contain a narrative arc that starts with an introduction followed by a rising conflict that leads to a climax and ends with a resolution (Dickey 2005). Role-plays do not follow this sequence. They are interactive, emergent, and character-based (Louchart and Aylett 2003), hence they revolve around detailed characters, as opposed to the storyline itself (Dickey 2005). Feshbach and Feshbach (2009) noted that stories related to unfortunate circumstances trigger empathic responses. Therefore, this research aims to explore further the power of the narrative for empathic design scenarios through role-play. In the design field, role-play has been applied as a means of finding solutions to design problems (Moody *et al.* 2011). Design students claim that role-play is interesting, motivating, and offers a closer and more practical experience of real-world scenarios (Altay and Demirkan 2014). It supports learning, which is attributed to the active role of designers in the construction of knowledge and decision-making processes during their journey of achieving a pre-defined goal (Bell *et al.* 1995). The approaches addressed in the study performed by Gudur (2023) to elicit empathy incorporate social constructivism and constructive learning involving design students creating their knowledge through active social engagement that stretches their comfort zone. Fisher (2017) also highlights that the more an individual feels that their behaviour influences the situation, the greater the chance of experiencing a cognitive empathic connection. This indicates that empowerment is a powerful component to elicit empathy, therefore this research explores how the nature of role-play can serve as a tool that simulates situated social interactions and empowers designers to experience empathy towards end-users.

Visual impairment is unrelatable to most designers. This condition has been traditionally simulated through wearable blindfolds, specialised glasses, and goggles (Yao *et al.* 2021). However, for empathy to be elicited, simulating the physical and perceptual abilities of visually impaired users may not always be sufficient. Although the robustness of empathic modelling has been demonstrated (Shah and Robinson 2007), the long-term experience of visually impaired users cannot be fully understood, and the simulation represents a closer experience to those people who have recently acquired visual impairment as opposed to those who have been diagnosed over a long period. Such challenges have inspired this research to determine the requirements of a space for the optimal level of situated designer empathy to be experienced towards visually impaired humans.

2. Methodology

This qualitative study involved multiple workshops held with a total of 57 design students from product design and engineering design backgrounds. A strong percentage of the sample (74%) were male, 14% were female and one participant was gender diverse. Half of the students assimilated to the United Kingdom, whilst the rest of the sample assimilated to other countries in Europe, Asia, Africa, and North America. The students were at a senior level in their studies, hence 77% were at least familiar with empathic design. At the start of the workshop, participants were provided with fundamental knowledge of empathic design to ensure a common understanding. Most of the students (76%) were not familiar with the lived experiences of visually impaired users but 53% of them expressed willingness to learn more. The rest of the participants (24%) could closely relate to visual impairment because of their own experience or of people they know.

The merging of role-play and empathic modelling referred to as Empathic Empowerment in this paper was designed to deepen the understanding of a situated scenario involving visually impaired users. This was guided by the specification, The Digital Empathic Design Voyage (Grech *et al.* 2023) designed to empower designers to experience the optimal level of empathy through a combination of cognitive and affective responses. The set-up chosen for this study is presented in Figure 1, depicting the interaction between Perspective A, representing the visually impaired client sitting alone in a restaurant, and Perspective B, representing the server. A restaurant environment was chosen as it offered multiple layers of potential interactions that are feasible in a physical setting. The servers were asked to observe the visually impaired client during the interaction. The students were asked to pair up with someone they did not know too well, to minimise any relational biases and decide which perspective (A or B) to take.
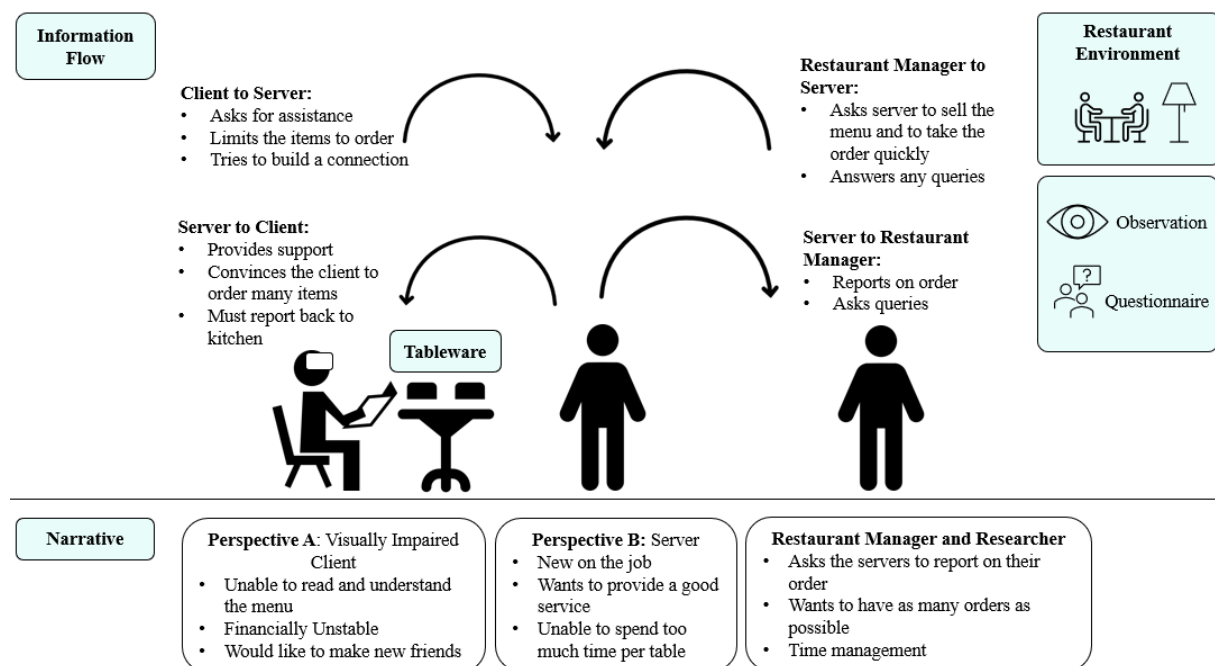

Figure 1. Empathic empowerment set-up highlighting the narrative and information flow

At the start of the Empathic Empowerment method, participants were provided narrative cards revealing the background and key objectives of their chosen perspective, described in Figure 1. The narrative of the visually impaired client (Perspective A) was inspired by the lived experiences of real users which were collated to formulate a persona (https://www.rnib.org.uk/living-with-sight-loss/). The main objective of the client was to order food and drink items from a physical menu. The menu was inspired by cuisine that was verified to be unfamiliar to the participants based on their cultural background to create an added layer of challenge to the activity. The server's main tasks were divided into stages of setting up the table, providing the menu, and taking the order from the client. The servers were allowed to look up information on an unfamiliar menu item using their phone. Glasses simulating visual

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impairment were worn by the client before the table was set up to minimise knowledge biases related to product interactions. The glasses simulated severe blurred vision that presented a challenge for the client to read the menu and fully interact with the tableware. The clients were able to detect colour and changes in lighting. The researcher of this study took the role of the restaurant manager, to manage the restaurant environment in a role that supports the narrative. The goals of the restaurant manager were to interrupt the servers to report on the order and to keep track of time, which was set to five minutes. Students were also asked to improvise any interactions that required information beyond that described in the narrative cards. After the Empathic Empowerment, participants were asked to fill in a questionnaire to reflect on the challenges, thoughts, and emotions experienced from their perspective. The results from the questionnaires were analysed using a mixed-method approach combining a quantitative approach for multiple choice questions and questions answered on a Likert scale and a qualitative approach for open-ended questions, which were analysed through coding. These results combined with the adaptation of the Empathy in Design Scale (Apfelbaum et al. 2021) supported the development of the evaluation system entitled the Empathic Empowerment Scale. This was applied to analyse the elicited empathy in the situated interaction in a design context, which aligns with the aim of this paper. At the end of the workshop, students were additionally asked to individually ideate three design solutions that would enhance the overall experience for the client and the server, documenting their rationale. The ideation activity was conducted to analyse any links between the challenges identified from the role-play and the ideation produced by the clients and servers.

3. Results

The Empathic Empowerment Scale, presented in Table 1 consists of four levels of ranking. The unit of analysis was determined to be a challenge encountered when taking a perspective that was reported in the questionnaires. Each challenge was given a ranking based on the respective criteria. A cognitive or affective empathy dimension was assigned based on whether the challenge was linked to a thought or emotion respectively. The target was to achieve a diverse ranking across all levels, and a combination of cognitive and affective empathy responses for designers to experience the optimal level of empathy (Battarbee et al. 2015; Hess and Fila 2016).

Table 1. The Empathic empowerment scale; adapted from the empathy in design scale (Apfelbaum et al. 2021)

Ranking		Description	Criteria
1	C (Cognitive)	No Empathy	Basic and known user challenges
	A (Affective)	No Empathy	Basic and known user challenges
2	C	Comprehension	Cognitive challenges relating to generalised user needs
	A	Comprehension	Emotional challenges relating to generalised user needs
3	C	Mental model	Conceptualised physical and cognitive challenges that involve a deeper level of the user's cognitive process
	A	Mental model	Conceptualised emotional challenges that involve a deeper level of the user's emotional process
4	C	Personal Experience	Cognitive reference to personal relatability to the challenge
	A	Personal Experience	Emotional reference to personal relatability to the challenge

Table 2 describes the Empathic Empowerment Scale applied based on responses from participants taking Perspective A. It was noted that the challenges were induced by the narrative, the surrounding environment, and the participant and were therefore categorised accordingly in Table 2. Additionally, challenges induced by the narrative triggered the subsequent challenges induced by the environment and by the participants. The challenges induced by the narrative led to a recognition of a known or general user need, therefore such challenges were given a rating of 1C and 2C. Challenges induced by the environment led to a comprehension of further needs (given a rating of 2C) and consequent physical

needs, which triggered a deeper cognitive response from the participant and were therefore given a rating of 3C. In the challenges induced by the participant, emotional needs were conceptualised, leading to the level 3A rankings. Deeper psychological thoughts and emotions, influenced by the personal human response of the participant, were assigned 4C and 4A respectively.

Table 2. Empathic empowerment scale applied on perspective A: the visually impaired user

Input	Challenge Faced by Perspective A	Level of Empathy
Induced by Narrative	Reading from a menu	1C
	Reading from a phone	1C
	Pronouncing the menu	1C
	Understanding the menu	1C
	The server was too busy	2C
	Making a connection with a stranger	2C
	Locating and identifying tableware	2C
	Deciding what lies within my budget	2C
Induced by Environment	The tableware and tabletop were of the same colour	2C
	Finding and calling the server	2C
	Distance perception issues - hard to anticipate how far the tableware and the server were	3C
	Lack of orientation	3C
	Bright lighting	3C
	Loud noise	3C
Induced by Participant	Memorising menu items	3C
	Focusing only on keywords from the menu	3C
	Figuring what menu items would be most ideal for visual impairment	3C
	Not knowing if the server was engaging with me or with someone else	3C
	Miscommunication	3C
	Sensations feel overwhelming	3A
	Feeling clumsy due to dropping tableware	3A
	Not wanting to be an inconvenience	4C
	Asking for help without asking for help	4C
	Second guessing	4C
	Wondering if I am being humiliating	4C
	Feeling pressured to spend more	4A
	Feeling pressured to choose quickly	4A
	Lack of trust in the server	4A
	Feeling spoken down to	4A
	Embarrassed to ask the server to repeat	4A
	Not feeling like a priority when the server left to speak with the restaurant manager	4A
	Feeling helpless for not being able to do simple tasks	4A

The servers were asked to infer any challenges that their clients experienced. Fundamental challenges induced by the narrative were understood by the server. The servers also understood certain physical and emotional challenges such as the discomfort felt by the client to ask for assistance and the issue of memorising the menu items. However, level 4 challenges listed in Table 2 were not significantly inferred by the server. The servers were also asked to report challenges encountered from their perspective, depicted in Table 3. Servers grasped basic challenges induced by the narrative. No challenges were

expressed by the servers related to the surroundings, including noise. Higher ranked challenges induced by the servers were related to time pressure and lack of awareness in serving the visually impaired client.

Table 3. Empathic empowerment scale applied on perspective B: The server

Input	Challenge Faced by Perspective B	Level of Empathy
Induced by Narrative	Pronouncing the menu	1C
	Understanding the menu	1C
	Taking the order	1C
	Dealing with the time pressure	2C
Induced by Participant	Unable to explain the menu	3C
	Feeling panicked due to not knowing the menu	3A
	Feeling stressed due to the time pressure	3A
	Feeling awkward for having to repeat	3A
	Imagining real-life people in such scenarios	4C
	Feeling sad for the client after realising they were sitting alone on their birthday	4A
	Feeling sad for the client for them having to ask for the menu to be read to them	4A
	Feeling guilty when being ordered to report to the manager when the client needed more assistance	4A
	Feeling guilty for trying to persuade the client to order more items when they told me they could not afford	4A
	Feeling annoyed that the client could not understand me	4A
	Feeling worried due to the client not being comfortable	4A
	Feeling incompetent at the job	4A

The ideation generated by the students following Empathic Empowerment demonstrated that the students attempted to solve the challenges produced in Tables 2 and 3, however it was noted that level 4 challenges were not significantly addressed by both perspectives. In addition, there was a distinction between the ideas generated by the clients and servers. Ideas generated by the servers revolved more around the menu, which played a key role in the interactions involving the server, and policy-related solutions orienting the operation of the restaurant to provide better support to the client. The solutions generated by the client were more focused on their own experience including those related to their environment by having a more calm, quiet, and dimly lit space, and those that involve alternative sensory engagement such as smell, hearing, and touch to complete their tasks more independently.

4. Discussion

Results from the questionnaires led to the development of the Empathic Empowerment Experience Map, presented in Figure 2, which visualises and maps the complete journey of actions, thoughts, and emotions experienced by the client during four phases: the Initiation phase describing participants' understanding of the context and objectives, the Environment and Product Interaction phase which deals with the exploration of surroundings, the Social Interaction phase which represents the social act of ordering from the menu and the Reflection and Ideation phase. The further the participant advances along the experience map, the higher their influence over their actions, thoughts, and emotions and therefore the lower the influence of the prescribed narrative. This aligns with results obtained in Tables 2 and 3, in which the challenges induced by the participant are a subsequent reaction to the narrative. Such challenges also had a higher ranking which mirrors the greater level of intensity of thoughts and emotions during the last two phases of the experience map. Therefore, the experience map also indicates which phase of the interaction resulted in the reported challenge. The results obtained from the Empathic Empowerment Scale led to a diverse identification of challenges and a successful combination of cognitive and affective empathy responses across all levels of ranking, which successfully demonstrates the research aim to achieve the optimal level of designer empathy (Battarbee *et al*. 2015; Hess and Fila

2016). When designing the narrative, the main role objectives were defined. During the interaction, participants managed and resolved any encountered obstacles. This sense of empowerment indicates its key positive influence in the Empathic Empowerment Scale results (Fisher 2017; Gudur 2023).
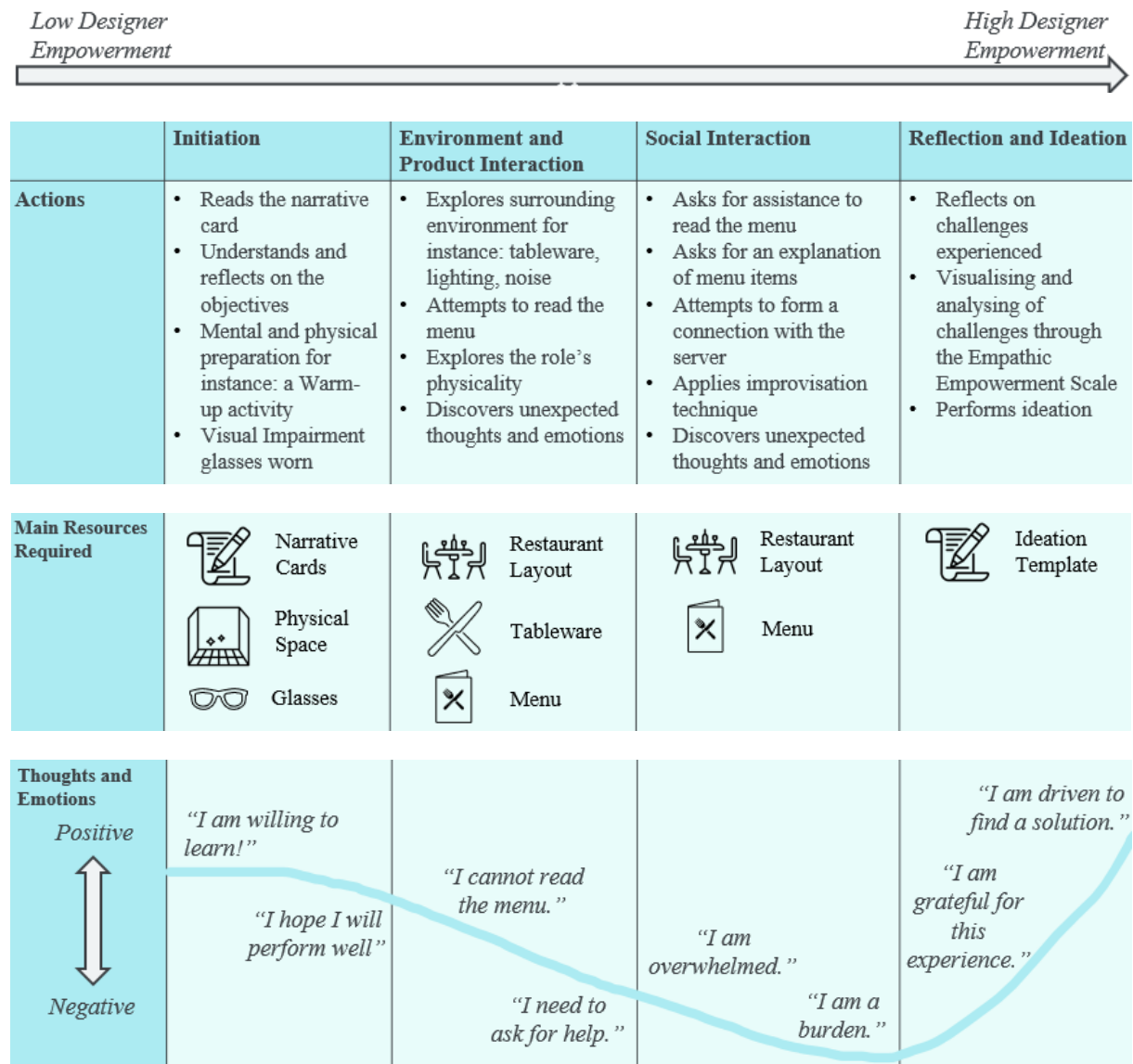

Figure 2. Empathic empowerment experience map depicting the journey of the interaction

Besides empowerment, other factors positively influenced the results. The simple act of ordering food and drink items from a menu established a generally familiar setting for participants which offered rich narrative potential. Having multiple clients and servers transformed the classroom into a restaurant setting which facilitated immersion and consequent environment-induced challenges. The server mirrors the role of the designer interacting with the user. However, servers had a narrative role that went beyond having them interact with the user in the form of an interview. This allowed them to experience the perspective of someone who would directly interact with the users in their daily lives. The restaurant manager's objectives and the unfamiliar menu items added a layer of challenge to the scenario which enriched the interactions. The narrative also provided background information on the long-term user experience, which influenced the reported challenges such as deciding what menu items were within the client's budget. This addressed the limitation of empathic modelling of not being able to reproduce the long-term user experience. Therefore, the enhanced embodiment of the client's perspective with prior contextual knowledge supported a broader understanding of their situation. Figure 3 graphically summarises key mechanisms employed for the successful implementation of Empathic Empowerment.

Figure 3. Empathic empowerment key mechanisms (generated using Icograms®)

The Empathic Empowerment Scale demonstrates the fantastic capability of humans to comprehend the physical and emotional needs of another person following a situated interaction. Level 4 challenges reported by the servers in Table 3 were an expression of empathy towards the client, whereas those expressed by the clients on the same level of ranking were more self-oriented. Despite this, when asking the servers to infer the challenges experienced by the clients, level 4 challenges expressed by the client in Table 2 proved harder to identify. This could be due to the inner monologue of the client that was not verbalised, or the lack of eye contact limited by the glasses worn by the client and requires further investigation. This also indicates the value of a third person for observing and analysing the interaction. The clients were also able to express level 4 challenges to a third person more openly - in this case - the restaurant manager and researcher.

Whilst both perspectives generated valuable design solutions, the clients generated ideas that limited their reliance on the servers, whereas those by the servers provided more specialised assistance to the client. This could lead to contradictory ideation and highlights the importance for designers to embody multiple perspectives of the same situated design scenario to obtain a holistic visualisation of the user experience (Grech et al. 2023). The ideation generated by both perspectives aligned with the challenges identified in the Empathic Empowerment Scale. However, level 4 challenges were not significantly addressed in the ideation compared to challenges that ranked lower. This could potentially be due to a greater focus on satisfying a more physical or tangible need and less consideration given to deeper emotional and psychological needs. The Empathic Empowerment Scale provides an enhanced visualisation of the challenges across all rankings. Therefore, besides applying it to analyse the quality of empathy experienced, it also supports designers to visualise deeper psychological needs of users, leading to design ideation that is more human-centred. Future analysis requires the application of the Empathic Empowerment Scale as a tool for designers to link the challenges identified with the ideas generated and support greater considerations of level 4 challenges.

Limitations of this qualitative study are related to potential biases from participants stemming from the relatively low sample size and cultural heterogeneity. In the future, further studies should be conducted to increase further the size and diversity of the sample. To enrich the diversity of participants, studies should include professional designers with different levels of experience, and participants from various institutions and cultures (Li and Hölttä-Otto 2020). A practical challenge of this method may be related to gathering sufficient information from real users to create the narrative. Pre-trials of the method are advised to verify the required balance between what the narrative prescribes, and the level of empowerment given to participants in the scenario. Although all challenges in the Empathic Empowerment Scale were reviewed by the co-authors to ensure high reliability in the results, the identification and analysis of the challenges in the Empathic Empowerment Scale remain prone to a level of subjectivity. However, the Empathic Empowerment Scale served as a solution for designers to deeply understand the long-term experience of visually impaired users and provides a foundation for further analysis of other situated scenarios.

5. Conclusion

This research explores a unique method, termed Empathic Empowerment, that integrates empathic modelling and role-play to empower designers to experience the optimal level of empathy in a situated design scenario. A qualitative study performed in the form of workshops with design students led to the development of a novel evaluation system entitled the Empathic Empowerment Scale to analyse the challenges experienced in contextual interactions. Results demonstrate that Empathic Empowerment successfully facilitates a deep psychological understanding of user challenges stemming from a combination of cognitive and affective empathy responses. The Empathic Empowerment Scale results also provide enhanced visualisation of such challenges, which is a valuable tool for design ideation. Future work of this research intends to analyse design solutions generated from the application of the Empathic Empowerment Scale and to evaluate whether the reported challenges expressed by designers match the challenges of actual users in similar scenarios. The research also serves as a foundation for the exploration of other users and different situated contexts. Its applicability lies in both industrial and pedagogical settings and can also be broadened to other fields including healthcare, architecture, computer science, and any other domain where empathy towards another human is vital. The future goal of this research is to digitally transform Empathic Empowerment in novel situations such as using Virtual Reality (VR) to empower designers to optimally empathise with users from multiple perspectives through augmented immersion and perspective-taking. Ultimately, this research aims to reach a step closer to producing the next generation of human-oriented solutions that enhance inclusivity and social value through practical and empowering experiences.

Acknowledgement

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