

Leveraging Creepiness to Facilitate Ethical Design: Lessons Learned From a Design Workshop

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Developing novel technologies tends to focus on eliminating or reducing undesirable features and characteristics of novel technologies. However, there is value in exploring the impact of intentionally ‘creepy’ designs that make these unwanted characteristics an explicit attribute. We have conducted a preliminary design workshop with 10 participants to explore the impact of this approach. The results show how, in focusing on creepiness as a resource for design, participants were organically prompted to reflect on the source of creepiness, namely identifying often overlooked attributes or characteristics. This facilitated the mitigation of potential side effects related to ethical issues that could emerge, as designers were informed by creepiness to create better designs of novel technologies. Overall, our work shows how creepiness could become an accessible framework to facilitate reflection on the ethical frictions of designing technologies based on users’ sensemaking and their relationship with interactive devices.

Creepy technology, Ethical design, Design workshops

1. INTRODUCTION

From apps and devices that collect too much data (Shklovski et al. 2014; Seberger et al. 2022) to smart home technologies being used by abusers (Lopez-Neira et al. 2019), or the Uncanny Valley of humanoid robots (Mori 1970; Mori et al. 2012), people perceive certain technologies as ‘creepy’. In Human-Computer Interaction (HCI) this perceived creepiness is often linked to unpredictability (Woźniak et al. 2021) and the normalisation of harmful practices (Pierce 2019), and therefore seen as undesirable. However, approaches such as design fictions (Seberger et al. 2024) and speculative design (Dunne and Raby 2024), and design provocations such as EyeCam (Teyssier et al. 2021) show that there is potential in designing technologies that are intentionally creepy as a starting point to facilitate reflection on the status quo of emerging technologies. We deem that such an approach could be leveraged to facilitate and support the ethical design of novel technologies.

When designing and developing novel technologies, designers aim to make them as user-friendly and desirable as possible (Norman and Draper 1986)

– which means removing or concealing “creepy” functionalities that could be perceived as unfriendly or unethical. Ethical design tools, such as Tarot Cards of Tech (Artefact Group Artefact Group) or Ethical Explorer (Omidyar Network Omidyar Network) help to consider unwanted and difficult to anticipate side effects of technology. While they do not explicitly focus on creepiness, such tools point towards different aspects of technology or its usage that people could find creepy as it relates to the unpredictability, and therefore the undesirability, of technology (Woźniak et al. 2021). As such, thinking about unwanted characteristics of technology could ensure a more acceptable, ethical design. Inspired by these tools, we formed the following research question: *How could creepiness be leveraged to facilitate ethical design?* Or, in other words, how to use creepiness to design technologies that do not cause harm and instead have a positive impact on the users, environment and society?

As the first step in finding the answer to this question, we conducted a design workshop during which participants were asked to assess various technologies deemed “creepy” and design devices

that were both useful and intentionally creepy to reflect on the value of this design approach. Given the different factors that influence creepiness of technology (Ramirez Gomez et al. 2025), we selected examples that could be seen as creepy for various reasons: due to their looks and design, intrusive functionality or potential problematic use when used by children (see Section 3 for details). The results showed how participants were prompted by the explicitly imposed creepiness to reflect on tensions between designer and user goals. This allowed them to identify features that might be unwanted by users and ideate potential solutions on how to mitigate them, thus informing a more ethical design of new technologies. The participants also provided suggestions on how the materials used during the workshop could be used as part of a design process as an ethics evaluation tool.

2. RELATED WORK

When it comes to creepiness, HCI research has focused mostly on measuring it (Woźniak et al. 2021; Turner et al. 2025). Creepiness as a factor in design has come up in research focused on privacy and data use (Tene and Polonetsky 2013; Shklovski et al. 2014; Seberger et al. 2022), digital assistants (Seymour and Kleek 2020), and robots (Strait et al. 2017; Brink et al. 2019), without explicitly exploring what makes these technologies creepy. In addition, Byrne et al. (2022) have explored aspects of ‘spookiness’ in technology – a term commonly understood as or overlapping with the meaning of creepiness (Smith 2016). Their Spooky Technology research (Byrne et al. 2021) examines how the unfamiliar and otherworldly perspective of spookiness could affect the design process by highlighting beliefs and frictions emerging from using technology. Whilst the authors did not explicitly focus on creepiness per se, their work is closely related to our approach by advocating for the adoption of a critical and disruptive approach to designing everyday technologies as a means to facilitate reflection on our relationship with computing systems (Byrne et al. 2022, 2021).

Technologies that might be perceived as creepy can highlight trade-offs of undesirable characteristics that could be understood as unethical, e.g. by highlighting violations of one’s expectation of how their data is used (Shklovski et al. 2014). Dozens of various ethical design tools, aimed both at developers and academics, exist that aim to help mitigate unpredictable ethical issues (see Chivukula et al. (2024) for a comprehensive list). For example, Tarot Cards of Tech present provocations that allow designers to consider side effects of their technologies such as putting people

at risk, changing societal norms or unwittingly aiding abusers (Artefact Group Artefact Group). In contrast, the Ethical Explorer card deck (Omidyar Network Omidyar Network) provides a systematic way to assess the technology’s potential to lead to unwanted consequences (e.g. surveillance, exclusion, algorithmic bias) and ways to prevent them. Other tools include The Equality, Diversity and Inclusion Cards (Craigon et al. 2023), Moral-IT Deck (D. Urquhart and J. Craigon 2021) or more specialised tools focused on specific technologies, e.g. ethical AI in clinical settings (Faber et al. 2024). These highlight a desire of practitioners to anticipate potential issues in their designs as they use reflective tools to guide them through speculative and unpredictable events in order to improve the outcome of their design efforts.

Nevertheless, ethics exploration tools offer a narrow perspective of ethics in the design cycle that does not encompass a holistic understanding of the human (end-user) experience. For instance, these ethical evaluation tools are very much focused on a designer’s perspective (e.g., whether their decisions embedded in their design are ethical or moral), which cannot anticipate subjective qualities emerging from the users’ lived experience with technology in everyday contexts (e.g., how the technology is going to be perceived) which cannot be foreseen (Ramirez Gomez et al. 2025; Wakkary et al. 2016). As such, developing new tools that reflect on issues emerging from new technologies challenging end-users’ mental models becomes an imperative avenue of investigation. Accordingly, creepiness serves as the perfect candidate to achieve this, as rather than aiming to remove creepiness as an undesirable feature, we can use it as a starting point for reflection.

In explicitly introducing creepiness, we propose a critical perspective into the design cycle, as designing with provocations can change the way we design technology by facilitating engagement with social and ethical debates (Bardzell et al. 2012). For example, the design of EyeCam (Teyssier et al. 2021) uses provocation to introduce exaggerated anthropomorphic aesthetics (camera looking like a human eye) and encourages reflection on surveillance systems with an open and transparent design, which in turn is perceived as honest. Moreover, Photo BOO-th (Gómez Ortega et al. 2025) explores the use of real-time deepfakes to critique the dangers associated with creating and sharing non-consensual synthetic imagery to reflect on the juxtaposition between technology and consent. This approach can go beyond the creation of critical artefacts, for example, by using the dramatisation of terms and conditions copies (Medic 2025) to reflect

on deceptive design patterns and user agency. All these examples highlight the need for new disruptive frameworks that evaluate the trade-offs of our everyday encounters with technology, to which creepiness sets up a compelling starting point.

3. METHOD

To investigate how well designing with creepiness could facilitate reflection, we conducted a workshop with design students and researchers at a university in Portugal in May 2024. The workshop was integrated within a master's module focused on inclusive design and was conducted in line with the institution's ethical procedures. It sought to explore whether focusing on creepy aspects of technology could encourage "good design" (e.g., more inclusive and ethical) and to gather attendees' opinions about this approach.

3.1. Participants and recruitment

The workshop was open to students attending the module and to a wider academic audience (members of staff, visiting researchers, and other students), as is standard practice. We advertised it through a weekly newsletter that was sent out to the whole University, on the School's social media channels, and email networks.

In total, 10 participants attended the workshop (five women and five men): seven Master's students, one Product Design graduate, one lecturer from the Design School, and one visiting Computer Science researcher. All participants reported having no previous understanding of 'creepiness' in regards to technology and were interested in but not knowledgeable about ethical design. They did not receive any incentives but refreshments were available throughout the workshop.

3.2. Materials and Procedure

The workshop was facilitated by the first two authors and delivered in English and Portuguese with simultaneous translation. It lasted 4 hours, including a break. A summary of the activities is provided in Table 1.

Based on the literature outlined above (e.g. Woźniak et al. (2021)) and contextual factors influencing creepiness identified in our previous research (Ramirez Gomez et al. 2025), we prepared a table with questions to facilitate thinking about different aspects that could lead to perceived creepiness, such as visual design, the purpose of technology or its capabilities. The questions outlined in the table emerged from a thematic synthesis of the related work, and our aim was to contextualise the

Table 1: Overview of workshop's main activities

Activity	Purpose	Materials
<i>Activity 1: Introduction</i>	Warm-up to introduce and reflect on existing emerging technology	One example of existing technology per group (e.g. smart mirror; AI image generator; teddy bear voice assistant)
<i>Activity 2: Creepy assessment</i>	To assess existing technologies	One example of a previously identified creepy technology per group: Furby robot, Alexa-enabled fluffy toy, Alexa-enabled children's kitchen and market set, smart mirror, ChatGPT
<i>Activity 3: Re-design</i>	To reflect on how to make technology less creepy	One example of a previously identified creepy technology per group (same as Activity 2)
<i>Activity 4: Creepy design</i>	To design a system for personal use that is useful and intentionally creepy	One type of technology per group (e.g. robot, social media, AI, smart home system, voice assistant)
<i>Activity 5: De-creepification</i>	To make recommendations on how to make creepy design concepts less creepy	Design concepts from previous activity

different points that contribute to the perception of creepiness and the areas of the user experience that it might apply to (see Table 2). We also provided an empty table printed on A3 paper so that workshop participants could write their comments directly in the relevant cells (e.g. Figure 1E). The materials were available both in English and Portuguese.

By way of an introduction to the theme and as a warm-up activity (Activity 1), participants were divided into three groups, and each was assigned a different technology. The groups were asked to identify the benefits of their assigned technologies (i.e., a smart mirror, AI image generator, a teddy bear with a built-in voice assistant), reflecting on who the users might be and the appropriateness of their features (e.g., inclusion and accessibility). The devices were selected from Mozilla's Privacy Not Included website that lists 'creepy' technologies (Mozilla Mozilla). Next, we delivered a short presentation to introduce the concept of creepiness. It summarised the research on creepiness in the context of technology and included examples from the literature. We also introduced the table with creepiness questions, describing its dimensions and how it could be used to evaluate technology. Working in smaller groups, participants were given a different type of technology and were asked to use the

table to assess how creepy they could be perceived (Activity 2). The activity finished with a general discussion. Next, the groups were asked to redesign their assigned technologies in a way that would still retain the benefits but make them less creepy (Activity 3). Participants were free to interpret what they meant by “less creepy” and used the table and its questions as guidance. The activity ended with a discussion and a short break.

After the break, we presented examples of technologies designed as creepy on purpose (e.g. Eyecam by Teyssier et al. (2021) or Skin-on Interface by Teyssier et al. (2019)) and talked about the side effects of technology. The aim was to encourage the participants to think about how creepy designs could help them consider (and ideally design out) potential ethical issues. Each group was then assigned a different broad type of technology to focus on (e.g. robot, smart home system, AI) and asked to design a device or a system that would be both useful *and* intentionally creepy (Activity 4). The activity ended with presentations of the concepts. For the final activity (Activity 5), the groups swapped their designs and were asked to re-design each others’ ideas to remove/reduce their creepiness, while keeping the benefits and desirable features. The workshop ended with a discussion about creepiness and ethical design. We used Mentimeter.com, a tool for supporting audience engagement during lectures, to capture key comments and participants’ feedback.

3.3. Analysis

We did not record the sessions but took notes to summarise the key points and used participants’ Mentimeter comments. The researchers took turns when presenting and running different activities, and when one was in charge of facilitating, the other took notes. They both took the notes during discussions and expanded them if necessary when participants were busy with the activities. We also retained and photographed all workshop outputs, which included notes (annotations on the materials provided, post-it notes, and comments on sketches), sketches, and prototypes. As we were interested in the discussions and design ideas that thinking about creepiness can provoke, we analysed our notes thematically to identify general topics and reflections. This was done by identifying preliminary themes and discussing them with the last author during team meetings. We also compared ideas from Activity 4 and Activity 5 to see how they changed and whether participants were successful at making them “less creepy”. In the end, we arrived at two broad themes focused on *creepiness as a starting point for reflection*, and *designing with creepiness*, which are discussed in detail below.

4. RESULTS

The outcome of the first discussion highlighted examples of technology that could be perceived as creepy, even though we did not bring particular focus to the phenomena during Activity 1. Instead, participants were asked to focus on potential target users and benefits, including aspects relating to inclusion as per the focus of the module. Only one group pointed out more negative issues that fell within the scope of creepiness. This provided a nice contrast to focusing explicitly on the negatives and also allowed these types of concerns to emerge naturally amongst the groups. Some of the workshop materials and outputs are available in Figure 1.

4.1. Creepiness as a starting point for reflection

Creepiness was a factor that encouraged participants to think about things that they might usually have overlooked. As an overt design feature, it was identified as a compelling way to make certain technology traits transparent and thus enable users to make decisions about their suitability for different scenarios. For instance, discussions around making a video camera look like an eye (Teyssier et al. 2021) revealed that it was deemed outright creepy by some. However, for others, it was a useful and easily understood reminder about different sources of creepiness (e.g. reminder of surveillance, naturalistic eye movements and the fact the technology exists in the first place) that can sometimes be concealed or downplayed in a device. In short, this creepy design was perceived as more “ethical” than, for example, a teddy bear with Alexa built-in as it was more honest about what to expect from technology. Further discussions on how creepiness could be advantageous tentatively explored if designing in creepy features could be a route to more inclusive designs or even a way to advocate for disability rights and representation through provocative designs.

Identifying aspects of technology that could be perceived as creepy and then aiming to redesign them while keeping useful functionality was an interesting exercise that generated new, innovative ideas, such as a smart home with ears (Figure 1D), a smart mouth that blows air to help cool one’s food (Figure 1F), an app that helps to imagine one’s body after plastic surgery (Figure 1G), or a social network and a streaming platform for people who like to attend funerals. However, when discussing the updated ideas, one participant (a researcher) pointed out that many re-designs focused on addressing the most obvious creepy characteristics whilst ignoring other underlying problems. As an example, they mentioned that one group focused on changing the look of the technology they had been assigned (see Figure 1D, a smart home that

Table 2: The creepiness table with questions related to different dimensions to help guiding the exploration of and reflection on the potential creepiness of a given technology.

	<i>How this technology affects different stakeholders</i>	<i>How this technology aligns with what the users know</i>	<i>How this technology fits in the world and user's life</i>	<i>How this technology contributes to the societal context of the application area</i>	<i>How this technology benefits the users</i>
<i>What this technology can achieve</i>	How well do users understand what this technology can achieve?	How do users' expectations match what this technology can achieve?	How appropriate are this technology's capabilities to the user and their setting?	How do this technology's capabilities contribute to the area of application?	How do this technology's capabilities change the user experience?
<i>What this technology is used for</i>	How well do users understand the utility of this technology?	How does the use of this technology meet users' expectations?	How appropriate is the use of this technology to the user and their setting?	How does the use of this technology affect the area of application?	How does the use of this technology meet user needs?
<i>What is this technology</i>	How well does the user understand why this technology exists?	How do users expect this technology to look like?	How well does the existence of this technology adapt to users' lives?	How does the existence of this technology contribute to improving society?	How does the existence of this technology change the user experience?
<i>What happens next</i>	How is this technology going to affect different stakeholders in the long term?	How will this technology disrupt users' mental models?	How will this technology affect the users' experience in the long term?	How will this technology affect the way society works?	What will be the results (positive/negative) of continued use of this technology?
<i>What this technology does</i>	How well do users understand how this technology works?	What do users expect this technology to do?	How does the way this technology operates fit the users' lives?	How well does the performance of this technology benefit the area of application?	How does the way this technology operates to meet users' needs?

shows that it is listening) as a way of making it less creepy, while keeping the voice recording and camera that the participant felt had much creepier implications. In response, other participants (all students) said that they did not find cameras and always-on microphones creepy as they were used to them being everywhere. On the one hand, this may be an example of differing levels of interpreting the creepiness (e.g. the tension between the need for always-on recording and concerns about how this data could be misused). On the other hand, it could be viewed as a shift of the “creepy line” (Pierce 2019), as these features are becoming increasingly familiar and integrated into everyday technology.

Given the inherent layers of creepiness and its dynamic nature, participants suggested that the creepiness table we prepared could be used as part of an iterative design process to help identify different layers of creepiness. It could also help people

with different sensitivities and experiences think systematically about potential sources of creepiness and related ethical issues to identify areas in which their subjective feelings about the technology might differ. However, as discussed in the next section, it would need a different format to do so effectively.

4.2. Designing with creepiness

The feedback we received on using the table with different dimensions of creepiness helped us identify areas for future work. Participants reported that the table helped them evaluate existing technologies. For example, one participant wrote on Mentimeter:

“I found [the table] a useful and extensive way of understanding the implications of a design.”

Participants generally felt that using the tool led to them noticing things they would not have otherwise

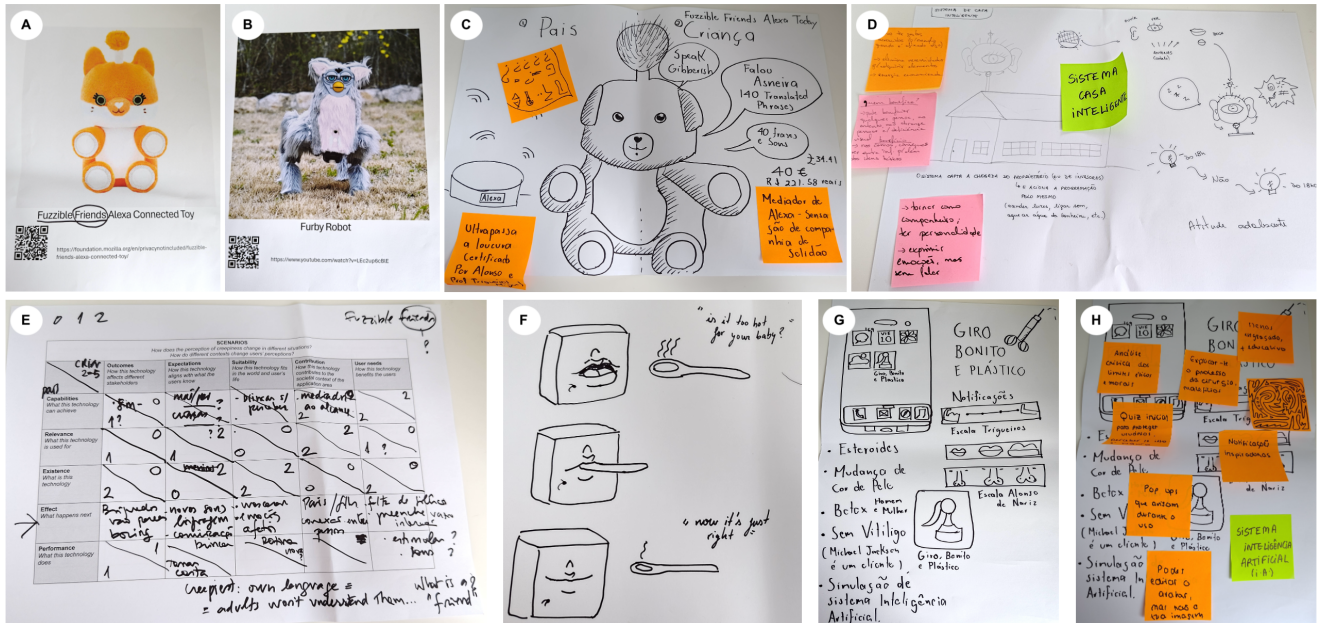


Figure 1: Workshop materials and outputs: A-B: materials used in Activity 2 (Alexa-enabled Fuzzible Friends toy and a Furby robot). C: Result of an analysis of the Fuzzible Friends toy. D: Ideas of how to design an intentionally creepy smart home. E: the table with the assessment for the Fuzzible Friends toy. F: Design of an intentionally creepy device that checks the temperature of baby food (Activity 4). G: Design of an app supporting plastic surgery planning (Activity 4) and H: Its de-creepified version (Activity 5).

thought about and highlighted the benefits of starting with creepy designs:

"It's very interesting because the shock factor can highlight aspects that otherwise could go unnoticed."

"Creepiness has a way of attracting us so I think this is a good way to bring attention to issues we don't normally think about."

Some participants saw value in utilising the table as a source for ideation because it helped them think about aspects of the design or user needs they would not normally consider.

"It works for making prototypes that can help nourish unmet needs in a way it could inspire more product making"

However, at the same time participants agreed that the table we prepared for them, in its current format, was too cumbersome to be used in an expedient design process. Specifically, they reported that the questions were too detailed and potentially ambiguously similar and, hence, might not be relevant to all technologies. One participant commented that while they could see the nuance and small differences between questions, for many technologies the answer was the same for multiple cells in the table. This was also evident in how some groups chose to use the table, for example, creating their own scoring system (as shown in Figure 1E). Participants suggested that developing

an official scoring system or a sliding scale could then feed into a visualisation scheme, such as a spiderweb diagram. This could help to rapidly assess the perceived creepiness of a given technology, allowing for targeted design interventions that could either reduce or remove creepy attributes or even leverage them for benign purposes.

5. DISCUSSION

Given the potential of creepiness to induce reflection (Teyssier et al. 2021; Gómez Ortega et al. 2025), our goal was to explore how we could leverage creepiness to facilitate reflection on ethical implications of novel technologies. The results showed that thinking about different dimensions of creepiness could enable designers to account for and reflect on the contextual elements of creepiness, the complex relationship between these dimensions, and situations in which creepiness can emerge.

5.1. Designing with Creepiness

The results emphasised the compelling and engaging nature of creepiness. We are drawn towards things that are spooky or scary in leisure (Kjeldgaard-Christiansen and Clasen 2023; Scrivner et al. 2022), so creepiness could be used as a way to attract interest, and be a catalyst for reflection by considering things users and designers have not considered before (Gómez Ortega et al. 2025; Teyssier et al. 2021).

The workshop feedback highlighted the potential caveats on the applicability of some reflective dimensions to different types of technology. Most notably, participants pointed out that sometimes more explicitly visually creepy designs reduce the overall creepiness of the device by exposing the otherwise hidden functionality that has creepy connotations – which in the case of camera designed by Teyssier et al. (2021) was intentional. Moreover, the results suggest that the table we produced to help our participants systematically think about different dimensions of creepiness could be developed as a visual tool. For instance, as a visualisation mechanism, it could help evaluate creepiness; or as a card deck, a common practice in the design community (Chivukula et al. 2024), it could facilitate iterative reflection with playful dynamics. They also suggested developing a more formalised ‘creepy scale’. Given that similar scales already exist (e.g. Woźniak et al. (2021); Turner et al. (2025)), developing a more complex scale that looks at different dimensions of creepiness and relevant contextual factors would be an interesting next step.

Finally, focusing on creepiness can help to guide reflection on the potential ethical implications of emerging and future technologies, lending itself to the speculation about how to mitigate their negative effects and dysfunctions by design. This raises questions on strategies and methods we can engage in as a community of HCI practitioners to increase technology acceptance, enhance user experience and mitigate the negative effects of creepiness. Although it might sound obvious to readers familiar with HCI practices, the different aspects of creepiness inherently advocate for the adoption of methods supplementing user-centered design to increase people’s active participation in the design and co-development of emerging technologies (Björling and Rose 2019; Antonini 2021). As such, research and development objectives play an important role in the perception of creepiness, putting the user and the wider context in which they live (Chen and Atwood 2007) at the centre of attention, considering the social and ethical impacts of emerging technologies.

5.2. Limitations and Future Work

Some of the workshop outputs might have been strongly influenced by the examples we showed participants during presentations (for example, the smart mouth (Figure 1F) was clearly inspired by the Eyecam designed by Teyssier et al. (2021)). However, as the purpose of the workshop was to encourage participants to think about possible implications, the actual designs they came up with were less important – and they did spark relevant discussions.

Our aim is to turn the creepiness table we used in the workshop into a design tool, and the aim of future work is to identify the right form factor. While participants suggested scales and spiderweb charts, another approach could be a set of cards for supporting ideation (perhaps similar to Tarot Cards of Tech), a more formal framework, or a design process similar to Effect-Led Design that outlines specific activities and formalises the design steps, including developing intentionally ‘bad’ designs (Scott 2024). Future work should aim to explore these different avenues, for instance, using more creative approaches such as role-playing scenarios or design fictions (Ramirez Gomez and Stawarz 2025), allowing the designers to examine the value of envisioning potential “Creepy Futures” as we strive for more responsible design.

6. CONCLUSIONS

The increasing adoption of Emerging Technologies raises critical questions about their impact towards designing responsible futures. In this paper, we presented the results from a preliminary design workshop exploring the role of creepiness as an evaluation, ideation and reflection tool in the design cycle. The results highlight how reflecting on disruptive qualities, such as creepiness, could impact the design of future responsible computing systems. Indeed, adopting a critical approach in the design of interactive technologies can increase awareness of potential negative impacts and encourage discussions on ethical issues. This work calls for future interdisciplinary work to explore the value of critical approaches to uncover new insights about the role of technology in society and its ethical implications. This could facilitate how users, as well as innovators, technologists and researchers, could be challenged to critically rethink their relationship with novel technologies.

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