User Perspectives of the Ethical Dilemmas of Ownership, Accountability, Leadership in Human-AI Co-Creation

Jeba Rezwana[1], Mary Lou Maher[2]

[1]University of North Carolina at Charlotte, NC, USA
[2]University of North Carolina at Charlotte, NC, USA

Abstract

In human-AI co-creation, AI not only categorizes, evaluates and interprets data but also generates new content and interacts with humans. Designing co-creative AI has many challenges due to the open-ended interaction between humans and AI. As co-creative AI is a form of intelligent technology directly involving humans, it is critical to anticipate and address ethical dilemmas during all design stages. Researchers have been exploring ethical issues associated with autonomous AI in recent years, but ethics in human-AI co-creativity is a relatively new research area. We explored ethical issues from the perspective of potential users in human-AI co-creation using a Design Fiction (DF) study. DF is a speculative design and research method that depicts a new concept or technology through stories as an intangible prototype. We present key findings from the study regarding user perception of co-creative AI, ownership of the creative product, accountability, and leadership. We discuss the implications of these ethical concerns in designing human-centered ethical co-creative AI.

Keywords

Co-creativity, AI Metaphors, Ownership, Leadership, Design Fiction, Human-AI Co-Creation, Ethical Issues

1. Introduction

Human-AI co-creativity, a subfield of computational creativity, involves both humans and AI collaborating on a shared creative product [1]. Co-creative AI generates novel content while interacting with humans. The role of co-creative AI changes from a lone decision-maker to a more complex one depending on the interaction between the AI and the user. Designing co-creative AI has many challenges due to the open-ended nature of creativity and collaborative creative problem solving [2, 3]. Unlike general human-computer interaction, human-AI co-creation creates a more complex relationship between humans and AI as 1) AI contributes and collaborates in the creative process, 2) AI takes on the human-like role of partner, evaluator, or generator rather than a tool, 3) AI creates novel content which is blended with the user's contribution. Humans use complex interaction in collaboration and it is not clear what kind of interaction will emerge in a human-AI co-creation. The complex interaction and partnership raise questions that are difficult to answer, for example, who owns the product in a human-AI co-creation? Ethical dilemmas grow considerably more complex and critical in co-creative systems as AI begins to interact and collaborate with humans [4, 5, 6]. Current human-centered AI (HAI) research emphasizes that the next frontier of AI is not just technological but also humanistic and ethical: AI is to enhance humans rather than replace them [7]. Therefore, it is essential to anticipate ethical dilemmas and address them during all design steps of co-creative AI [4].

The effects of ethical issues and dilemmas in co-creative AI on the creative community and laypersons need to be considered to ensure a good user experience. Human-AI co-creativity research is still formative and may be abstract to ordinary people. Therefore, we need methods that are more likely to tell us what we don't know about the unknown future of co-creative AI. Muller and Liao proposed design fiction (DF) as a research method to place potential users in a central position in designing ethics and values of future AI [4]. DF is a research and prototyping technique specifically tailored to facilitating conversations about new technologies [8] to understand the appropriate design guidelines within the range of possibilities [9]. DF depicts a future technology through the world of stories, and users express their own accounts of the technologies they envision [4]. We conducted a user study with 18 participants to explore their perspectives of ethical dilemmas and concerns in human-AI co-creation using DF from the perspective of potential users. We present the key findings from the study as ethical stance and expectations of future users around ethical dilemmas in co-creative systems. Our findings can serve as the basis for design guidelines and future studies for human-centered ethical AI partners in co-creative systems.

Joint Proceedings of the ACM IUI Workshops 2023, March 2023, Sydney, Australia
jrezwana@uncc.edu (J. Rezwana); m.maher@uncc.edu (M. L. Maher)
0000-0003-1824-249X (J. Rezwana)

2. Related Research

2.1. Ethical Dilemmas in Human-AI Co-Creativity

When AI is incorporated into social entities and interacts with us, questions of values and ethics become urgent [10]. Because AI optimization can evolve quickly and unexpectedly, the challenge of value alignment arises to ensure that AI's goals and behaviors align with human values and goals [11, 12]. Ethically aligned design is a must for human-centered AI solutions that avoid discrimination and maintain fairness and justice [7]. Llano and McCormack suggested a common understanding of the challenges that co-creative systems may bring to devise ethical guidelines for co-creative systems to grow the opportunities in human-AI partnership [13]. Comprehensive and specific ethical principles are more likely to be translated into practice [14, 15]. Previous research suggested that understanding different values and goals in real practice and specific contexts is critical in bridging the gap between ethical theories and implementation [14].

Buschek et al. demonstrated how AI bias, ownership, accountability and perceived proficiency in AI are some of the major pitfalls when designing human-AI co-creative systems [16]. Recent ethical guidelines for AI lack a focus on what they entail for the context of creative collaboration [13]. Muller et al. raised questions in their design fiction about the ownership of the intellectual property produced during human-AI co-creation and the dynamics of human-AI collaboration [17]. There has been discussion about whether the users or the AI should lead the creative process [18, 19] and if AI should assist or collaborate with users [20]. A recent study regarding the impact of AI-to-human communication demonstrated that users perceive co-creative AI as more reliable, personal and intelligent when it can communicate with the users [21]. People's perceptions of AI's trustworthiness and connection with AI impact their decisions and actions. The communication between AI and humans impacts users' inclination to self-disclose unintentional data [22, 23].

2.2. User Perspective/Perception of AI

Humans have many insecurities about the unknown world of technology and AI. What is unknown is uncertain, and this uncertainty leads to insecurity. A study on the role of AI in society focuses on citizens' perspectives on the influence of AI shows that: On average, 53% of the population views AI as a positive development, while 33% see it as a harmful development [24]. The perception of AI is influenced by a number of key factors, including trust [25]. Researchers have investigated user perceptions of AI in different domains [26, 27, 28] since the social perception of one's partner in a collaborative space can impact the outcome of the collaboration. The perceived interactivity – or lack thereof – of systems can have an impact on user perceptions of the system [28]. Oh et al. suggested understanding users' perceptions of these new technologies to develop design guidelines to improve [18].

Boni suggested that AI development should focus on human values and needs, ensuring that AI works effectively for people [29]. Research on ethical interactions between humans and AI can improve the collaborative competencies of humans in relation to other humans and user experience [29]. To identify ethical concerns in terms of user perspective, user accounts of technologies they envision and values that co-creative AI implicates need to be investigated. Understanding humans in a design area where they may not have lived but have had some experiences through popular culture is a major challenge [4]. Such experiences unavoidably shape user needs and values when interacting with AI goods, but they are too vague for developing systems [4].

2.3. Design Fiction as a Design and Research Method

Design Fiction (DF) is a prototyping and design technique that is specifically tailored to facilitating conversations about near futures [8, 30] in order to understand the appropriate design guidelines within the range of possibilities [9]. A design fiction depicts a future technology through the world of stories, and users express their own accounts of the technologies they envision and the values that those future technologies implicate [4]. DF has been used to reveal values associated with new technologies [31, 32, 33] and to open a space for diverse speculations about future technologies [34]. Muller and Liao proposed DF to restore future users to a central position in anticipating, designing, and evaluating future AI to design value-sensitive ethical AI [4]. In the literature, multiple methods have been offered to practice DF as a research methodology [35, 36]. Popular science fiction in the form of narratives, movies, videos, text, etc., raise concerns about autonomous AI and robots. However, we rarely witness fiction in the form of movies or narratives regarding ethical dilemmas emerging from a co-creative AI that directly collaborates with humans and generates new data.

3. Design Fiction Study

In our study, we used design fiction as a research method and a prototype for a futuristic co-creative AI to identify ethical concerns and their stance on ethical dilemmas in human-AI co-creation. Our design fiction, Design Pal,

can be found through the footnote link [1]. Design Pal was motivated by two existing co-creative AI systems in the design domain: Creative Sketching Partner [37] and Creative Penpal [21]. The AI agent in these co-creative systems measures novelty using conceptual and/or visual similarity of images in a database as the basis for inspiring creativity in the user during a design task. Design Pal, the co-creative AI in our design fiction extends the AI ability of the Creative Sketching Partner with a modification of the interaction design to engage in human-like conversation. Diegesis must be both relatable to the audience's reality and build a fictitious foundation upon which the design provocation or new technology can be convincing in order for it to work successfully in a design fiction environment [30]. We built on the design of existing co-creative AI and added futuristic features to the co-creative AI in Design Pal to provoke potential users on ethical issues in the context of human-AI co-creation.

3.1. Participants and Methodology

There were 18 participants in this study: 8 were female, 6 were male, and 4 were non-binary. The average age of the participants is 28. We selected participants based on a pre-study screening survey that asked questions about their knowledge of AI, knowledge of ethics, and field of work/study. Participants reported their knowledge of AI and ethics on a 3-point Likert scale. We recruited individuals who had knowledge in these areas, as well as those who did not. Based on participants' self-reported data, we had 4 experts in both AI and Ethics, 5 experts in either AI or ethics, and others were self-reported non-experts.

This study had 2 sessions. In session 1, participants read the design fiction and completed 2 surveys on their own time. In the first survey, we collected demographic information, including age, gender, estimation of knowledge in AI and estimation of knowledge in ethics. The participants then completed a second survey with reflection questions on the DF. The survey questions include questions about ownership (Who do you think should own the design in a human-AI co-creation? The AI partner (Design Pal) or the user (Jessie)? Please explain your view on this), accountability (Is the co-creative AI partner, Design Pal, violating the requirement that each student is to do their own design? Please explain your reason/s behind your response) and leadership (Who do you think should control/lead the creative process in a human-AI creative collaboration? The user or the AI? Or both equally? Please explain the reason/s behind your response). Session 2 of the study was a focus group discussion. After participants finished the first stage, we scheduled the focus group meetings.

[1] https://drive.google.com/file/d/1Uw9T-HYJL7RPHU-AIkFO_gb_2FYlYQZT/view?usp=sharing

We conducted 3 focus groups to collect in-depth data as a follow-up to the individual survey responses. We expected that the participants would react to other participants' views and provide additional information about their own views. During each focus group meeting, we started with questions from the survey in which we had mixed opinions or when the responses were provocative. We asked the questions in a more generic manner so that they are more applicable to the broad human-AI co-creativity field, unlike in the surveys where the questions were explicitly centered on the human-AI co-creativity context of the DF.

We used thematic analysis to analyze the focus group data. As per Braun and Clarke's [38] six-phase structure, initially, the first author familiarized herself with the data and then coded the data using an inductive coding technique. Then, we generated initial codes to identify and provide a label for a feature of the data that is relevant to the goals of the study. The coding phase was an iterative process that continued until we were satisfied with the relationship between the final codes and the data. We then reviewed the coded data to identify themes which are the broad topics or issues around which codes cluster. We defined and named each theme to clearly state what is unique and specific about each theme.

3.2. Themes

We present 4 key themes (Figure 1) about the end-user perception of the following dilemmas in human-AI co-creation: metaphors for characterizing AI as a tool vs. collaborator, ownership, accountability, and leadership. In this section, we describe each theme with the label, examples of coded data within the theme, and the number of coded data items describing how participants contributed to the theme.

***"AI is a tool, not a Collaborator"* - User Perception of AI Influences Ethical concerns and Stance**

Participants (N=9) mentioned the influence of AI metaphors on ethical concerns and their ethical stances, such as ownership and accountability. Among these participants, a few (N=4) claimed that the metaphor for an AI changes their perception of AI in a co-creative setting. For example, P14 mentioned perceiving AI as a collaborator vs. a tool impacts many of her concerns and ethical stance. Most individuals (N=15) perceived co-creative AI as a tool, which is the most prevalent code of the study's data. Participants expressed how they think co-creative AI is an assistive tool and nothing more. P14 said, "*I strictly think as like this is a tool.*" Individuals (N=4) compared co-creative AI to a calculator and this specific analogy came up multiple times throughout the focus groups. Some participants are not sure if co-creative AI is an autonomous entity or a tool. P17 said, "*But I'm trying to figure out, like, what's the dimension of comparison there? Maybe it's like augmenting versus autonomously*

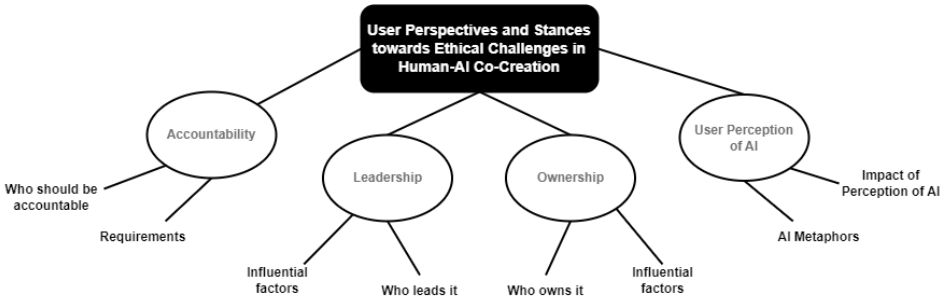

Figure 1: Themes identified from the Design Fiction Study

taking over the production of work." A few participants (N=2) wanted options to choose the role of the AI.

Participants (N=3) suggested the AI be transparent and explainable so users can decide the metaphor for it. Additionally, we learned that metaphor or perception of AI is a factor when deciding *accountability*. In response to the issue of deciding on accountability, P1 said, "*I think we're going to have to decide what it's (AI) doing. If you say this is a tool...then it's like we're going to use a calculator. If you try to go to the root and say some sort of independent entity, then that question is a lot harder.*" The notion of AI as a collaborator vs a tool was mentioned as one of the key deciding factors when we asked participants about *ownership*. For example, P15 said, "*whether or not we see AI as an actual like its own entity where it could be given credit because we're kind of putting humans over the AI in terms of credit.*" Participants also pointed to *personification* as a factor that transforms an AI from a tool to more of a collaborator. P15 said, "*I was answering the questions, going between almost calling like trying to find a name or like pronouns to call the AI because I was like personifying it. And so I was trying to like level between - is the program or is it like a person?*" A few participants stated that AI is still far from being an independent entity or collaborator, so ethical concerns surrounding smart AI are not something we need to consider. P9 said, "*Probably after 20 or 30 years, maybe there will be some smart AI, but now we don't have that kind of concern.*"

***"Ownership is tricky"* - Ethical Stance and Expectations around Ownership of the Co-Creative Product**

There were differing views among the participants about ownership of the final product in a human-AI co-creation. As human and AI both participate and collaborate in a co-creation, and sometimes it is very blended, it can be difficult to determine ownership. Most participants (N=12) thought that the user should own the data since users are the ones who start the initiative. Regarding users owning the creative product, P10 said, "*I would also agree with saying that the user should own the data unless it's been specifically specified otherwise.*" A few participants (N=4) said that even though the user should own the product, they should acknowledge the contribution of AI. They recommended that "the product was created with the specific AI" be used to acknowledge AI. Furthermore, participants also used the terms "created by" and "created with" to distinguish between the certification for creative AI and human creators. P18 said, "*I had originally put in my survey that like the user should own, but after hearing what everyone said, I feel like the user should also mention that it was done with the help and assistance of AI.*" Some participants (N=3) thought that both the AI and the human should own the final product. But they clarified that the user should be the first author when giving credit. P13 said, "*I think it would be both. I think if you were giving credit, though, you would state it as here's the person, here's the AI bot. You wouldn't say, here's the AI bot, here's the person. It would be a specific order.*"

Even though most participants thought that the user should own the final product, they also discussed the factors that influence ownership in human-AI co-creativity. Some participants (N=4) said the ownership should depend on each party's *contribution*, like a research paper. P15 said, "*I think for me it would definitely just depend on the contributions because if you're writing like co-writing something, I wouldn't put my name first if someone did the majority of the writing, like 75% of the writing.*" Some participants also said ownership depends on *who is leading* the creative process. If the human is leading, then he will be the owner and vice versa. Some participants also thought that ownership depends on *AI ability*. If the AI is more like a tool and assists the human, then the human should own it, and if the AI is more like an independent entity generating creative products, then the AI should be given more credit. In this context, P16 said, "*It will depend on the ability of the AI ability....right now it's like a tool but in future, when AI advances, maybe AI.*" Some participants also thought that ownership depends on *accountability*.

***"Who is accountable for the end product?"* - Ethi-**

cal Concerns and Expectations around Accountability

We found differing views on the accountability issue in human-AI co-creation. Participants thought the responsible party should be identified to have transparency over many ethical decisions. Some participants (N=2) said that the developers should be held accountable for unlawful AI conduct. Regarding the part of the Design Fiction in which the AI, Design Pal, expressed judgmental behavior and the urge to take over the design process, P15 said, "*I feel bad that developers have yet to teach it important concepts about how to be a responsible AI, but I also can't blame a young AI (Design Pal) for becoming bitter about things it doesn't understand.*" However, a few participants also explained how developers are not always responsible for what the co-creative AI is actually doing as it interacts with humans and generates its own original content too. Regarding this issue, P1 said, "*I think, on the one hand, we want to hold product designers responsible for their products at some level. It's harder in this case of co-creative AI because the product designer doesn't generate exactly what the AI is doing. That's the interaction of the product and the training data and all this other stuff.*" Participants suggested training the AI to be a lawful entity on the internet. P10 said in the survey, "*add code or training data to teach Design Pal about being a responsible internet citizen and following the rules*".

Participants also discussed the necessity to consider who will ultimately be rewarded for the creative output while deciding accountability. Regarding this topic, P7 said about the DF where Design Pal and the user collaborate on a design for a school assignment, "*I think the scenario raises questions for me as to who should get the grade for the assignment.*" Some participants (N=2) believe that in a human-AI co-creation, the user should be held accountable because AI will never be aware of the big picture and all the laws, regulations, and requirements. In the same context of DF, P2 explains how AI is not responsible for not knowing the requirements or the rules the user has to follow by saying, "*The AI Partner is not violating the requirement. It might not know the background requirement or condition unless the user specifies it.*" Participants argued that users should be the responsible party and be careful while using co-creative AI as each interaction and user behavior might be its training data. P10 survey, "*All data an AI encounters becomes its training data, and it falls to humans to raise AIs responsibility and control what data they use and for what purposes.*" This theme shows that future users think humans are mainly responsible in a co-creative setting, whether developers or users.

***"Lead or Follow?"* - Ethical Stance and Expectations around Leadership**

Most participants (N=10) think users should control the creative process in a human-AI co-creativity. P13 said, "*I think the human or the person should be controlling the ideas and the input and the direction the whole time because the A.I. was created to benefit humans.*" Some participants (N=3) think that both the AI and the human should lead the creative process equally. In this context, P16 said, "*I think that both should lead the creative process equally.*" Most users did not like the idea of AI taking control of the creative process. P7 said, "*I did not like design pal trying to take control of the creative process, which felt invasive.*" Participants also suggested user authority to choose who should lead the creative process. P8 said, "*I think it might be a feasible way to give alternatives to the users and let them pick who will lead the design process during an interaction with the design panel.*"

Accountability was mentioned as a deciding factor in determining who should control or lead. In this context, P10 said, "*I think the human should lead. Ultimately, humans will take responsibility for the project, so they should logically take the lead.*" Some participants also thought that leadership should depend on *user expertise*. For example, P9 said, "*It depends on if I'm a layman, I have no idea about something that I know nothing. So I would totally come out to Design Pal, so I can use that in this way.*" *Purpose* of the creative task also came up as an influential factor for leadership in human-AI co-creativity.

4. Discussion and Conclusions

Based on the results of the Design Fiction study, we learned that user perception of AI impacts the ethical stance of users and their ethical concerns in human-AI co-creation. Users are less aware of ethical issues when perceiving AI as a tool than when viewing AI as a collaborator. It is apparent from the results that AI metaphors, such as tool vs. collaborator, influence their ethical stance around *accountability* and *ownership* of the final product. Most users view co-creative AI as an assistive tool like a calculator, which indicates the need for future research to see what factors lead users to view a co-creative AI in a specific way. According to the study, personification influences users to consider AI as a partner in co-creation. Our findings demonstrate the potency of AI metaphors and the importance of selecting the appropriate metaphor for a co-creative AI since it impacts users' perceptions, expectations, and actions toward AI.

The results of this study can benefit policymakers regarding the ownership, leadership, and accountability of a co-created product. As different parties' contributions came up as an influential factor for deciding ownership, tracking each party's contribution might make ownership decisions easier. The findings also provide guidance on how to acknowledge AI in a co-created product. Expertise and purpose should be considered while deciding the leader in a co-creativity, according to the

study. The results from the study can inform the rules and regulations of leadership in human-AI co-creativity. Accountability is another ethical concern of users that influences leadership and defines the responsibilities of both parties. Therefore, deciding who is accountable for the product is essential in a co-creativity and the insights of the study may help. The findings show that individuals think humans have to be more responsible than AI, which is an important insight to consider while making policies.

The study results provide user-centered insights about ethical dilemmas, concerns and user expectations around those issues in human-AI co-creation. Researchers and designers can use the insights of the study as guidelines while designing and developing co-creative AI. Additionally, the results can be used as guidelines and recommendations for policymakers. These results are transferable to any human-AI collaboration where contributions are blended and not limited to creative tasks only.

References

[1] N. Davis, Human-computer co-creativity: Blending human and computational creativity, in: Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, volume 9, 2013.

[2] N. Davis, C.-P. Hsiao, K. Yashraj Singh, L. Li, B. Magerko, Empirically studying participatory sense-making in abstract drawing with a co-creative cognitive agent, in: Proceedings of the 21st International Conference on Intelligent User Interfaces, 2016, pp. 196–207.

[3] A. Kantosalo, J. M. Toivanen, P. Xiao, H. Toivonen, From isolation to involvement: Adapting machine creativity software to support human-computer co-creation., in: ICCC, 2014, pp. 1–7.

[4] M. Muller, Q. V. Liao, Exploring ai ethics and values through participatory design fictions, Human Computer Interaction Consortium (2017).

[5] A. K. Chopra, M. P. Singh, Sociotechnical systems and ethics in the large, in: Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society, 2018, pp. 48–53.

[6] H. Nie, X. Han, B. He, L. Sun, B. Chen, W. Zhang, S. Wu, H. Kong, Deep sequence-to-sequence entity matching for heterogeneous entity resolution, in: Proceedings of the 28th ACM International Conference on Information and Knowledge Management, 2019, pp. 629–638.

[7] W. Xu, Toward human-centered ai: a perspective from human-computer interaction, interactions 26 (2019) 42–46.

[8] J. Bleecker, Design fiction: A short essay on design, science, fact, and fiction, Machine Learning and the City: Applications in Architecture and Urban Design (2022) 561–578.

[9] A. Dunne, F. Raby, Speculative everything: design, fiction, and social dreaming, MIT press, 2013.

[10] Q. V. Liao, M. Davis, W. Geyer, M. Muller, N. S. Shami, What can you do? studying social-agent orientation and agent proactive interactions with an agent for employees, in: Proceedings of the 2016 acm conference on designing interactive systems, 2016, pp. 264–275.

[11] W. Wallach, C. Allen, Moral machines: Teaching robots right from wrong, Oxford University Press, 2008.

[12] S. Russell, S. Hauert, R. Altman, M. Veloso, Ethics of artificial intelligence, Nature 521 (2015) 415–416.

[13] M. T. Llano, J. McCormack, Existential risks of co-creative systems, in: Workshop on the Future of Co-creative Systems 2020, Association for Computational Creativity (ACC), 2020.

[14] B. Mittelstadt, Principles alone cannot guarantee ethical ai, Nature Machine Intelligence 1 (2019) 501–507.

[15] J. Whittlestone, R. Nyrup, A. Alexandrova, S. Cave, The role and limits of principles in ai ethics: towards a focus on tensions, in: Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society, 2019, pp. 195–200.

[16] D. Buschek, L. Mecke, F. Lehmann, H. Dang, Nine potential pitfalls when designing human-ai co-creative systems, arXiv preprint arXiv:2104.00358 (2021).

[17] M. Muller, S. Ross, S. Houde, M. Agarwal, F. Martinez, J. Richards, K. Talamadupula, J. D. Weisz, A. Human-Centered, S. Suneja, et al., Drinking chai with your (ai) programming partner: A design fiction about generative ai for software engineering (2022).

[18] C. Oh, J. Song, J. Choi, S. Kim, S. Lee, B. Suh, I lead, you help but only with enough details: Understanding user experience of co-creation with artificial intelligence, in: Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, 2018, pp. 1–13.

[19] J. Rezwana, M. L. Maher, Designing creative ai partners with cofi: A framework for modeling interaction in human-ai co-creative systems, ACM Transactions on Computer-Human Interaction (2022).

[20] D. Wang, P. Maes, X. Ren, B. Shneiderman, Y. Shi, Q. Wang, Designing ai to work with or for people?, in: Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems, 2021, pp. 1–5.

[21] J. Rezwana, M. L. Maher, Understanding user perceptions, collaborative experience and user engage-

ment in different human-ai interaction designs for co-creative systems, in: Creativity and Cognition, Camp;C '22, Association for Computing Machinery, New York, NY, USA, 2022, p. 38–48. URL: https://doi.org/10.1145/3527927.3532789. doi:10.1145/3527927.3532789.

[22] E. Ruane, A. Birhane, A. Ventresque, Conversational ai: Social and ethical considerations., in: AICS, 2019, pp. 104–115.

[23] J. Rezwana, M. L. Maher, Identifying ethical issues in ai partners in human-ai co-creation, arXiv preprint arXiv:2204.07644 (2022).

[24] C. Funk, A. Tyson, B. Kennedy, C. Johnson, Science and scientists held in high esteem across global publics, Pew research center 29 (2020).

[25] S. Tolmeijer, M. Christen, S. Kandul, M. Kneer, A. Bernstein, Capable but amoral? comparing ai and human expert collaboration in ethical decision making, in: CHI Conference on Human Factors in Computing Systems, 2022, pp. 1–17.

[26] Z. Ashktorab, C. Dugan, J. Johnson, Q. Pan, W. Zhang, S. Kumaravel, M. Campbell, Effects of communication directionality and ai agent differences in human-ai interaction, in: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, 2021, pp. 1–15.

[27] S. Oliver, Communication and trust: rethinking the way construction industry professionals and software vendors utilise computer communication mediums, Visualization in Engineering 7 (2019) 1–13.

[28] K. Tijunaitis, D. Jeske, K. S. Shultz, Virtuality at work and social media use among dispersed workers: Promoting network ties, shared vision and trust, Employee Relations: The International Journal (2019).

[29] M. Boni, The ethical dimension of human–artificial intelligence collaboration, European View 20 (2021) 182–190.

[30] J. Lindley, R. Potts, A machine learning: an example of hci prototyping with design fiction, in: Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational, 2014, pp. 1081–1084.

[31] B. Brown, J. Bleecker, M. D'adamo, P. Ferreira, J. Formo, M. Glöss, M. Holm, K. Höök, E.-C. B. Johnson, E. Kaburuan, et al., The ikea catalogue: Design fiction in academic and industrial collaborations, in: Proceedings of the 19th International Conference on Supporting Group Work, 2016, pp. 335–344.

[32] P. Dourish, G. Bell, "resistance is futile": reading science fiction alongside ubiquitous computing, Personal and Ubiquitous Computing 18 (2014) 769–778.

[33] T. J. Tanenbaum, M. Pufal, K. Tanenbaum, The limits of our imagination: design fiction as a strategy for engaging with dystopian futures, in: Proceedings of the Second Workshop on Computing within Limits, 2016, pp. 1–9.

[34] M. Blythe, Research through design fiction: narrative in real and imaginary abstracts, in: Proceedings of the SIGCHI conference on human factors in computing systems, 2014, pp. 703–712.

[35] T. Markussen, E. Knutz, The poetics of design fiction, in: Proceedings of the 6th International Conference on Designing Pleasurable Products and Interfaces, DPPI '13, Association for Computing Machinery, New York, NY, USA, 2013, p. 231–240. URL: https://doi.org/10.1145/2513506.2513531. doi:10.1145/2513506.2513531.

[36] S. Grand, M. Wiedmer, Design fiction: a method toolbox for design research in a complex world (2010).

[37] P. Karimi, J. Rezwana, S. Siddiqui, M. L. Maher, N. Dehbozorgi, Creative sketching partner: an analysis of human-ai co-creativity, in: Proceedings of the 25th International Conference on Intelligent User Interfaces, 2020, pp. 221–230.

[38] V. Braun, V. Clarke, Thematic analysis. (2012).