Designing Participatory AI: Creative Professionals' Worries and Expectations about Generative AI

Nanna Inie
nans@itu.dk
Center for Computing Education
Research (CCER), IT University of
Copenhagen
Copenhagen, Denmark

Jeanette Falk
jeanette.falk-olesen@plus.ac.at
Dep. of Artificial Intelligence and
Human Interfaces, University of
Salzburg
Salzburg, Austria

Steven Tanimoto
tanimoto@uw.edu
Paul G. Allen School of Computer
Science & Engineering, University of
Washington
Seattle, USA

ABSTRACT

Generative AI, i.e., the group of technologies that automatically generate visual or written content based on text prompts, has undergone a leap in complexity and become widely available within just a few years. Such technologies potentially introduce a massive disruption to creative fields. This paper presents the results of a qualitative survey ($N = 23$) investigating how creative professionals think about generative AI. The results show that the advancement of these AI models prompts important reflections on what defines creativity and how creatives imagine using AI to support their workflows. Based on these reflections, we discuss how we might design *participatory AI* in the domain of creative expertise with the goal of empowering creative professionals in their present and future coexistence with AI.

CCS CONCEPTS

• **Computing methodologies** → *Philosophical/theoretical foundations of artificial intelligence*; • **Human-centered computing** → **Empirical studies in HCI**; *HCI design and evaluation methods*.

KEYWORDS

participatory AI, participatory design, generative AI, creative professionals, creativity support

1 INTRODUCTION AND BACKGROUND

Recent developments in *generative AI*, i.e., AI technologies that automatically generate visual or written content based on text prompts, have led to much speculation and concern about what these developments may mean for different professions in the future, particularly for professionals where creativity accounts for a

sizable part of their everyday work [19]. Potential "threats" that generative AI models may pose for creative professionals ("creatives") include the ability to automate generation of high(er) quality content (text, code, images, and video), increased content variety, and personalized content based on preferences of individual users and consumers. Some current discourse about generative AI models frame them as threatening the ownership and agency of creatives. See, e.g., [2, 13, 17] for interviews with artists whose work was — unbeknownst to them — used to train AI models that generated images in the style of the artists' work. Rogers critically discusses this scenario in terms of 'the attribution problem with generative AI' [20].

Conversely, other creatives express curiosity and excitement about the potential this technology may offer, e.g., [27]. Regardless of whether generative AI is seen as a blessing or curse, it is both timely and of research value to answer questions about how it and creatives can most fruitfully coexist.

One response to perceived threats posed by AI is the notion of *participatory AI*, where the goal is to include 'wider publics' in the development and deployment of AI systems [4]. Historically, the emergence of *participatory design* (PD) in the 1970s was motivated by efforts to rebalance *"power and agency in the professional realm"* [3] in order to empower workers to *"codetermine the development of the information system and of their workplace"* [8]. In light of this historical backdrop, participatory AI is expected to empower those affected by the development of novel technologies by enforcing values of inclusion, plurality, collective safety, and ownership [4].

One step in the direction of participatory AI is to understand the needs of people and communities affected. Related research in this direction includes Singh et al., who explored which assumptions and expectations creative writers have for a supporting AI tool [24]; Guzdial et al., who explored designers' expectations for AI-driven game-level editors [12]; and Zhu et al., who argued for a better understanding of game designers' needs when co-creating with AI [29].

Our paper contributes to this objective by surfacing and categorizing concerns and expectations that creatives of different types currently have about the effect of generative AI on their work. It represents the authors' first empirical research into the question of **How might we design and perform *participatory AI*?** This question is particularly relevant to those who design and develop AIs for creatives and those who design and develop creativity support tools that use AI technology.

Our findings, albeit preliminary, identify important topics that may inform participatory design of generative AI so creatives can *"influence digital technologies that will change their work practices*

or everyday life" [6], the goal of participatory design in its essence. Our contributions include the following. (1) We introduce new conceptions about what constitutes creativity in relation to generative AI. (2) We categorize some reasons why creatives are and are *not* concerned about novel generative AI. (3) We categorize reasons why some creatives are curious and excited about AI and how it might augment their creative processes. (4) We discuss possible foci for the design of participatory AI aimed at helping creative professionals *Understand* AI, *Cope* with AI, *Adapt* to AI, and *Exploit* AI.

2 METHODS

We conducted a qualitative survey with open-ended questions designed to encourage longer answers and reflection. The survey format let respondents participate asynchronously, while allowing us to discover themes and directions for further in-depth research. The survey was circulated to the authors' networks of creative professionals as well as on social media. The call was posted as an open question of 'Are you a creative professional/professional creative, and do you have opinions about generative AI that you would like to share with us?' The term 'creative' was left to self-definition, and we asked the respondents to explain the role of creativity in their profession. We collected responses over a period of approximately two months in late 2022. We offered a draw of five $25 gift cards to Amazon as symbolic compensation for participation. The study and survey were approved by the ethical committees of the authors' universities.

2.1 Participants

We received 23 responses to the survey from creatives residing in Denmark (10), Germany (4), the United Kingdom (4), USA (3), Turkey (1), and Morocco (1). Respondents were between 21 and 55 years old, distributed as 21-25 (4), 26-30 (1), 31-35 (8), 36-40 (3), 41-45 (6), and 51-55 (1). 10 respondents identified as female, 12 as male, and 1 as non-binary. The respondents worked in a variety of fields, from computer science research to design of UX/UI and games to teaching. Most respondents came from software-oriented creative domains, and our findings should be read with this limitation in mind (see Section 5 for a discussion of this limitation). We were more interested in people self-qualifying as a "creative professional" where creativity plays a significant role in their work, than we were in specific job titles. The responses, as well as a detailed overview of respondents, are presented in the supplementary material.

2.2 Survey and analysis

The survey consisted of both demographic questions and six questions related to our research interest (which we list below). We designed the questions to elicit respondents' general understanding of and attitudes towards AI and creativity. We sought to prompt a deeper level of reflection and tried to avoid overloading respondents with questions.

(1) In your own words, how would you define what AI (Artificial Intelligence) is?
(2) Do you believe computers can be creative? Why/why not?
(3) A standard definition of a creative idea is that it is: 1. original (new, either to the creator or to human history in general), 2. useful (in some context), and 3. surprising (it seems unlikely but possible). Given this definition, do you believe

a computer/an AI algorithm can generate creative ideas? Why/why not?[1]
(4) Are you excited about AI contributing to creative work in your profession? Why/why not?
(5) Do you worry about AI replacing creative work in your profession? Why/why not?
(6) Which role do you think AI will play in your profession in the near and far future?

Questions (4) and (5) were swapped for approximately half the respondents (in two different instances of the survey) to avoid priming respondents in any specific direction.

We performed a thematic analysis as described by Braun and Clarke [7] on the responses. We tagged responses individually with different codes and then clustered them into sub-themes, which we highlight in bold throughout Section 3.

3 SURVEY RESPONSES

3.1 How intelligent or creative is generative AI?

In order to inform the design of participatory AI, it is relevant to understand how creatives currently conceive of AI and its limits. These factors can inform decisions about how to design participation processes to, for instance, include more or less information and discussion about the state of AI.

3.1.1 What is AI?. Answers to the question "In your own words, how would you define AI?" varied, especially on two scales: **technical depth** (from superficial to deep understanding) and **agency of AI** (from no agency to high agency). In terms of **technical depth**, some respondents, naturally, had a deeper understanding of AI algorithms than others, e.g., from *"... digital solutions that are trained to be helpful in specific ways"* (P21) (technically superficial) to *"A system capable of making dynamic choices based on input, dynamic as in non-binary evaluation of input referencing data model, a model which would ideally evolve through feedback of external verification of multiple processes'* (P2) (technically advanced).

We also saw interesting variation in the level of **agency** ascribed to the AI system, from no agency at all: *"AI is a set of rules, defined by humans, which a computer can follow."* (P3) to a high degree of agency: *"it's a computer that over time improves itself in the tasks it has to solve by collecting information and inputs from humans"* (P7). These understandings may influence creatives' judgments of the degree to which AI can support them and contribute to/replace tasks in their creative processes.

We tagged 7 responses as portraying a relatively deep technical understanding with no agency to the computer. Six responses were tagged with a more superficial technical understanding and no agency ascribed to the computer. 10 responses were tagged as superficial technical understanding with a high degree of computational agency, and no responses were tagged as deep technical understanding and high agency of the computer. An overview is shown in the supplementary material, Figure 1.

3.1.2 New definitions of creativity. The presence of generative AI encourages us to reevaluate and question our understanding of

---

[1]This definition is a compilation of three-criterion definitions by, e.g., Boden [5] and Simonton [23].

creativity and creative ideas. Most respondents who denied that AIs can be considered creative disputed the computer's capacity to generate *original* output since it is trained only on already existing (human) input. However, one respondent wrote in answer to "Do you believe computers can be creative?": *"I kind of resent it - but yeah. If creativity is defined as something useful and new, then yeah I think so. Even though AI's [sic] rely on training data and existing man-made patterns (which some might use to criticize AI's as being derivative or as simply reproducing what already exists) the process of combining stuff into a new "something" isn't really THAT different from what humans do… it's just bigger in scale and I guess you might argue that humans are also just "trained on" a bunch of data… we also carry around a repertoire of input we can draw on to come up with ideas […] ideas are always rooted in some pre-existing thing(s)"* (P5). Another participant noted that *"What is my brain if not a computer that takes in all this provided data and produces its own result from a mix of the inputs? If that result is 'creative', then why is an AI not?"* (P20).

This understanding is consistent with a traditional definition of creative ideas as being **'novel', 'useful', and 'surprising'**, e.g., [5, 23]. However, one respondent noted that *"Computers aren't creative by themselves as they only follow the orders that someone gives them"* (P6). In P6's understanding, creativity entails **agency** or **initiative**, which is not historically a property of the three-criterion definition of creativity.

Intention and **sentience** were described as criteria for creativity by some respondents: *"There is not intention"* (P1), *"Creativity stems from personal experiences/knowledge/emotions and the need to express/communicate/use this […] Creativity lies not in the creation, but in why we create. Programs can emulate this, but without true sentience, it will always be [an] emulation"* (P10), and *"The computer still isn't creative, it's still just doing what it's told […] Maybe I think it needs feelings to be truly creative?"* (P23).

Other conditions for creativity were also evoked in the answers, such as **(self-)awareness**: *"I think that true creativity requires a sense of self and self-awareness"* (P8). *"They are not creative in themselves; they are producing content unaware of the value they just created"* (P21). Even **experiences** and **inspiration** were evoked: *"Computers can solve problems and create art and everything, but it will all be logic and calculated and not because it got a sudden burst of inspiration or remembered something that happened in the second grade"* (P23).

Even if we do not assume that these definitions should be unanimously integrated into a scholarly or theoretical definition of creativity, it is interesting that reflecting on creativity in relation to the role of generative AI raises different conceptions of what creativity entails.

3.2 I Am Not Worried (Yet)

Only three of our 23 respondents unambiguously answered yes to being worried about AI replacing their work: *"Yes, the market needs to adjust heavily and I don't think the revolution will be entirely peaceful"* (P2); *"the idea of AI is mostly uncanny right now."* (P4), and *"Yes I [worry]. (…) a lot of tasks such as writing micro copy for websites etc which UX writers currently do would be automated"* (P14). Three more noted that they worry to some degree, or that they worry but

are optimistic, e.g.: *"I worry about it, but I hope the reality will be that AI becomes another tool"* (P5).

Nine respondents noted that they did not worry at all, while six reported that they do not worry *yet*, e.g. *"for now only the boring parts would be replaced. But this take-my-job-away argument was made countless times in history, there will always be something new. We can't be held back by this fear"* (P12). We group **reasons for concern** (aside from losing work) into the following themes.

1. Worse quality output. P8 observed: *"It concerns me already that video games are becoming something of an echo chamber, and the sheer volume of games being released are diluting the market and making it harder for indie games to get the recognition they need to do well."* The concern expressed here is not only that humans may become obsolete in the development process, but that the volume of output (in this case, of games) that AI (co-)creation makes possible will increase quantity but reduce quality of video games.

P9 wrote *"I certainly don't intend to replace all my hires with AI but some people will. They may achieve early success and they may also bring the genre into disrepute if they pump out a lot of lazy AI-written content."* This indicates worries that extend beyond individuals and their job security to concerns about an entire genre of creative content. This perspective assumes that AI produces creative output of worse quality than humans produce, which we could consider a reason *not* to worry about AI-generated content. However, in this case, the potential of such content to 'dilute' or 'bring into disrepute' a whole genre or field presents a threat or concern to some creatives.

2. Weakening the creative process. Most respondents pointed out that humans will still be required in AI-facilitated creative processes or that the computer will simply help automate the 'boring tasks.' However, a few also reflected on what that might mean to the creative processes, e.g., *"I also don't like the way AI image generators get you results instantly. They skip the creative process and just take you straight to the result… […] that just overlooks a super important part of a creative process, which is exploration. And emergence, where stuff just kind of comes out of the process but you never imagined it would. Or happy accidents! In that sense I think AIs could actually lead to a stagnation in the history of creativity, if AI turns out to weaken the "creative muscle"'* (P5).

P11 further noted that *"the meaning of 'creative' seems to be increasingly twisted to mean merely 'original/surprising,' and partly because there is a tendency for many to be unaware of the amount of creativity that my work involves. […] A lot is being lost."* This observation raises seminal questions similar to those raised in other fields where complex human thought processes have historically been replaced or at least disrupted, such as the introduction of calculators in algebra: How does it affect human cognition if computational processes take over (part of) our thinking? Will we lose our ability to use those parts of our brain, or will it simply free up cognitive reserve to consider new and more significant issues?

3. Copyright issues. Generative AI works only because a dataset exists that it can be trained on, and this raises new copyright issues, as P16 notes, *"the ethical implications of AI stealing other people's work without credit […] make me a bit wary."* Many established artists have raised concerns about this issue since those whose art is currently visible on the internet lack means to opt out of

image training databases or otherwise control how their art is used [2, 13, 17, 25]. Interestingly, this concern was mentioned directly by only one respondent, suggesting that either it is not a matter that appears to be a threat to creatives we surveyed *or* that they expect that a technological solution will emerge to address it; indeed, measures to protect intellectual properties of images, such as *watermarks*, are currently being developed [28].

Reasons for *not* worrying about generative AI having a deleterious effect on their professions were described in three themes:

1. AI cannot produce output without human input. As described in Section 3.1.2, several respondents questioned a computer's ability to produce truly original output. This was also described as a reason not to worry about AI replacing creative production or problem solving since human input is needed for datasets to be trained on and verified: *"Being able to generate a Rothko at the click of a button is only possible because Rothko himself had original thoughts - that isn't creativity"* (P8), and *"human input is still needed to verify and maintain AI's work"* (P22).

***2. AI output is not* convincing**. Several respondents also noted that they do not find AI-generated output completely 'convincing' or original: *"I don't see any authentic or convincing AI in artistic fields at all"* (P8); *"I know it can create pretty, but I don't think it can create "Wow! I have never seen anything like it!""* (P23); and *"at the moment it's a tool that when used skillfully can create awesome images, but there still needs to be someone with creative taste and an eye for imagery at the helm. AIs also tend to generate 'samey' images to me"* (P20). Although this theme resembles the preceding one (AI needs human input to produce output), which pertains more to requiring a human in the *process* of creating and maintaining generative AIs, whereas the current theme critiques generative AIs' *output*.

3. My work/creative process is too complex for AI to imitate. Finally, several respondents observed that their work process is too complex for AI to replace it: *"No, the complexity and dependencies is [sic] too high in my work"* (P21); *"[I do not worry] for user interface design, there's so much to consider and think through that I can't see an AI making something fluid yet"* (P16). Particularly in processes of original problem solving and client communication, human cognition was described as indispensable: *"Even the new code that they write is still going to be unoriginal in terms of problem solving"* (P15); *"We work very closely with clients and our work requires a lot of thought process behind it. Our main product is communication ideas and solving problems visually. Often we can do that better with a scribble than a fancy looking piece of art. You can never ask the AI about the intention/thoughts/feelings behind the product"* (P10).

3.3 Exciting Times Ahead!
Thirteen respondents noted that they are more or less unequivocally excited about AI contributing to creative work in their profession (such as *"Yes!"* or *"Absolutely, exciting times ahead!"* (P12)). Four volunteered some version of "yes *and* no," e.g., *"To some extent. I think some people will be able to use it in a nice way"* (P7). We grouped specific reasons for being excited about the advent and adoption of generative AI technology in creative professions into three themes:

1. AI can raise productivity for the individual or for larger processes. Several respondents imagined AI being used to raise productivity, either in terms of individual efficiency (e.g., eliminating repetitive tasks and thus allowing creatives to focus on 'more important' work): *"there are things that are more efficient to leave to machines which should pair with things that humans will be better at for the foreseeable future."* (P19)) or in terms of cultivating higher output rates by streamlining processes: *"it would streamline many of the standard questions in the field"* (P1).

2. AI can offer inspiration. In fields that require creativity, it is perhaps not surprising that respondents highlighted using quickly generated output as a source of *inspiration* in their creative process. Creative professionals often rely on readily available examples of design for inspiration [14], and the availability of AI to generate innumerable novel examples was seen as a powerful opportunity for 'opening up new solution spaces,' e.g.: *"It will allow me to iterate through a much bigger possibility space"* (P12); and *"it will make some work a lot easier/more efficient as you can try out different ideas in a very short amount of time"* (P6). In this role, AI is imagined to augment what we call the **divergent** parts of the creative process by offering examples and opening up novel and larger solution spaces [9].

3. AI can lead to higher quality output. Finally, some respondents highlighted the opportunity for AI to yield higher quality output, partially for the two reasons above (offering novel inspiration and freeing up time to work on tasks more central to the creative core), and partially due to qualities inherent in the AI itself: *"Any creative work is better as a team effort and differences are a driving force. AI is very different and I want to work with them"* (P2); *"it's a powerful tool that can enhance my work. [...] I can see it slotting into a step between browsing Pinterest for reference art and sketching my own stuff"* (P20). Two respondents also mentioned using AI for **convergent** parts of the creative process, for instance, decision making and evaluation: *"It can augment decision making"* (P14); and *"it opens up to possibilities to create new solutions and evaluate in new ways"* (P21), although specific ways for evaluation to occur were not described further.

4 DISCUSSION: OPPORTUNITIES FOR PARTICIPATION
Although complex, it seems prudent and timely to tackle the issue of how to encourage populations to participate in the development of AI more broadly [4]. We consolidate our preliminary analysis into four categories of potential focus for the design of participatory AI for creatives: (1) **Understanding AI**, **(2) Coping with AI**, **(3) Adapting to AI**, and (4) **Exploiting AI**. These categories align with the participatory design approach presented by Sanders [21] by considering what end-users *know* (= understand AI), *feel* (= coping with AI), *do* (= adapt to AI), and *dream* (= exploit AI). The categories offer a framework for engaging professional creatives in participatory AI design in a meaningful way. One could ask questions that align with the framework, e.g., "How might we help future users *understand* this technology" or "How might we help future users *adapt* to new work flows?"

4.1 Understanding AI

Some survey responses identify a superficial understanding of the technical side of AI. This is acceptable, just as it is not a requirement of driving a car that one understands how the engine works. However, creatives will be better prepared to use AI as creativity support tools and design materials if they have a working understanding of the tools and their limitations [10, 11, 16], particularly the level of *agency* that computers can be ascribed (as we saw, no responses that demonstrated a deep level of technical understanding also portrayed the computer as having a high degree of agency).

We suggest that facilitating a truthful *understanding* of AI is the first step in empowering these users to co-create with AI technology. It is easy to brush this responsibility off as a creatives-only undertaking. However, we believe that AI developers share an ethical responsibility to make their systems accessible and explainable to a broader public, in line with the HCI research agenda for explainable, accountable and intelligible systems [1].

4.2 Coping with AI

In the longer term, it is inevitable that AI-generated content of many kinds will be ubiquitous in most of our lives. How should we cope? We posit that creatives should hone their skills in creating and in evaluating creativity. The responses to our survey suggest that they can recognize and celebrate indispensable human properties of creativity and art, e.g.: *"human[-like] creativity is due to a combination of experiences and impressions that are connected in ways that are largely defined by human culture, and also feelings/sensations [...] that are mostly haphazard, and which AI don't have"* (P11). Sharing worries, excitement, and coping strategies — including avoiding AI, see, e.g, [15, 18, 28] — as well as celebrating what is uniquely creative about human approaches seems an important and achievable goal of designing participatory AI. We imagine a future where generative AI openly celebrates the sources from which its data are harvested, and where creators of generative AI include input from end-users in their design processes.

4.3 Adapting to AI

When photography was invented, artists adjusted their activities to focus less on realism and more on interpretation, whether through impressionism, abstraction, or surrealism (see, e.g., [22] for a more elaborate discussion of this). As writing, translation, paraphrasing and poetry become increasingly automated, professional writers and editors may become "bosses to bots," instructing them on what to write, how to tailor material, and what to re-write when results do not meet professional or personal standards.

Where by *coping* we mean respectfully considering the new reality that these technologies bring about, by *adapting* we suggest more comprehensive inclusion of creatives in the development of specific generative AI models. Several respondents shared excitement about the possibilities of using AI to help automate bureaucracy, repetitive tasks, and boring work. The responsibility of facilitating adaptation, however, does not fall only on creatives. By understanding creative needs and processes, generative AI developers may tailor AI systems to help specific professions and crafts in a way that is not only meaningful for creatives, but that may enhance the development of AI itself, similar to how PD was originally meant not only to improve information systems but also to empower workers [8].

4.4 Exploiting AI

Photography changed what painters did, but it also opened up a field and a new profession: photographer. Technologies such as ChatGPT will change what writers do. Journalists are likely to spend more of their efforts on investigation and acquiring stories and less time on wordsmithing the reports on those stories. A mystery writer may give increased attention to plot features and less to the word-by-word narrative. Completely new tools and media may come out of the new AI technologies, including new types of creative jobs; as P3 notes, *"the far future might include both 2D and 3D assets, generated in real time, as the player interacts with the experience [...] Experiences still need to be controlled, to ensure a good user experience. Therefore it would probably increase the number of creative/technical positions within game companies."* (P3).

We hypothesize that such technology can reach its full potential only if creative professionals truly participate in its development. AI has sometimes been described as "a new shiny hammer in search of nails" [26], i.e., the technology or tool is being developed ahead of its specific purpose. We posit that if generative AI is developed with participation from creatives, there is a chance not only of better integration of AI in specific creative work practices, but also of leveraging creative competencies to imagine completely new avenues for these technologies.

5 CONCLUSION AND FUTURE WORK

The insights presented in this abstract illustrate some of the ways in which creative professionals speculate about and anticipate how AI may impact their creative work practices. Based on the insights, we encourage engaging creatives in the development of generative AI, both in developing concrete technology and in managing larger project issues as representatives of their peers, in line with the ideals of participatory design [6, 21]. Pathways for developing more participatory AI should consider how creatives may better *understand*, *cope with*, *adapt to* as well as *exploit AI*.

While the scope of our study is limited, we believe that both technology development and opinions towards AI are changing so quickly that it is relevant to share these preliminary results. We hope they will spark discussions and inform future research into how to develop and use AI in a way that encourages and requires participation of the people who will be affected most by these technologies in the future. Since most creative fields represented in our study are software-oriented, it is possible that the expressed views are more open and welcoming towards AI. Future research should include a more evenly distributed representation from different creative fields as well as obtain richer data by conducting interview studies.

Furthermore, the respondents came from different creative industries, and their everyday work lives may therefore not necessarily be impacted in the same ways by generative AI. We have also not characterized how each individual's understanding of AI relates to, for instance, their level of worry or expectations since we believe this would require a larger participant group and deeper investigation.

Future work could categorize different creative industries and identify *which* and *how* specific work tasks within these industries

may be impacted by generative AI, as well as investigate different ways to support these creative practices with AI.

ACKNOWLEDGMENTS

REFERENCES

[1] Ashraf Abdul, Jo Vermeulen, Danding Wang, Brian Y Lim, and Mohan Kankanhalli. 2018. Trends and trajectories for explainable, accountable and intelligible systems: An hci research agenda. In *Proceedings of the 2018 CHI conference on human factors in computing systems*. ACM New York, NY, New York, NY, 1–18.

[2] Andy Baio. 2022. Invasive Diffusion: How one unwilling illustrator found herself turned into an AI model - Waxy.org — waxy.org. https://waxy.org/2022/11/invasive-diffusion-how-one-unwilling-illustrator-found-herself-turned-into-an-ai-model/. [Accessed 18-Jan-2023].

[3] Liam Bannon, Jeffrey Bardzell, and Susanne Bødker. 2018. Reimagining participatory design. *Interactions* 26, 1 (2018), 26–32.

[4] Abeba Birhane, William Isaac, Vinodkumar Prabhakaran, Mark Diaz, Madeleine Clare Elish, Iason Gabriel, and Shakir Mohamed. 2022. Power to the People? Opportunities and Challenges for Participatory AI. In *Equity and Access in Algorithms, Mechanisms, and Optimization* (Arlington, VA, USA) *(EAAMO '22)*. Association for Computing Machinery, New York, NY, USA, Article 6, 8 pages. https://doi.org/10.1145/3551624.3555290

[5] Margaret A Boden. 2004. *The creative mind: Myths and mechanisms*. Routledge, 11 New Fetter Lane, London EC4P 4EE.

[6] Susanne Bødker, Christian Dindler, Ole S Iversen, and Rachel C Smith. 2022. What Is Participatory Design? In *Participatory Design*. Springer, 5–13.

[7] Virginia Braun and Victoria Clarke. 2012. *Thematic analysis*. American Psychological Association.

[8] Andrew Clement and Peter Van den Besselaar. 1993. A retrospective look at PD projects. *Commun. ACM* 36, 6 (1993), 29–37.

[9] Kees Dorst and Nigel Cross. 2001. Creativity in the design process: co-evolution of problem–solution. *Design studies* 22, 5 (2001), 425–437.

[10] Graham Dove, Kim Halskov, Jodi Forlizzi, and John Zimmerman. 2017. UX design innovation: Challenges for working with machine learning as a design material. In *Proceedings of the 2017 chi conference on human factors in computing systems*. ACM New York, NY, USA, 278–288.

[11] Jeanette Falk and Nanna Inie. 2022. Materializing the abstract: Understanding AI by game jamming. *Frontiers in Computer Science* 4 (2022). https://doi.org/10.3389/fcomp.2022.959351

[12] Matthew Guzdial, Nicholas Liao, Jonathan Chen, Shao-Yu Chen, Shukan Shah, Vishwa Shah, Joshua Reno, Gillian Smith, and Mark O Riedl. 2019. Friend, collaborator, student, manager: How design of an ai-driven game level editor affects creators. In *Proceedings of the 2019 CHI conference on human factors in computing systems*. ACM New York, NY, USA, 1–13.

[13] Melissa Heikkilä. 2022. This artist is dominating AI-generated art. And he's not happy about it. Retrieved January 14, 2023 from https://www.technologyreview.com/2022/09/16/1059598/this-artist-is-dominating-ai-generated-art-and-hes-not-happy-about-it/

[14] Scarlett R Herring, Chia-Chen Chang, Jesse Krantzler, and Brian P Bailey. 2009. Getting inspired! Understanding how and why examples are used in creative design practice. In *Proceedings of the SIGCHI conference on human factors in computing systems*. ACM New York, NY, USA, 87–96.

[15] Joseph Saveri Law Firm & Matthew Butterick. 2023. Stable Diffusion litigation. https://stablediffusionlitigation.com/. [Accessed 17-Jan-2023].

[16] Duri Long and Brian Magerko. 2020. What is AI literacy? Competencies and design considerations. In *Proceedings of the 2020 CHI conference on human factors in computing systems*. ACM New York, NY, USA, 1–16.

[17] Rachel Metz. 2022. These artists found out their work was used to train AI. Now they're furious | CNN Business — edition.cnn.com. https://edition.cnn.com/2022/10/21/tech/artists-ai-images/index.html. [Accessed 16-Jan-2023].

[18] Luke Plunkett. 2022. Artists Protest After ArtStation Features AI-Generated Images [Update] — kotaku.com. https://kotaku.com/artstation-ai-art-generated-images-epic-games-protest-1849891085. [Accessed 01-Mar-2023].

[19] Gil Press. 2023. Generative AI And The Future Of Creative Jobs. Retrieved March 6, 2023 from https://www.forbes.com/sites/gilpress/2023/03/06/generative-ai-and-the-future-of-creative-jobs/?sh=463a30506617

[20] Anna Rogers. 2022. The attribution problem with generative AI. https://hackingsemantics.xyz/2022/attribution/

[21] Elizabeth B-N Sanders. 2002. From user-centered to participatory design approaches. In *Design and the social sciences*. CRC Press, 18–25.

[22] Eva Silva. 2022. How Photography Pioneered a New Understanding of Art — thecollector.com. https://www.thecollector.com/how-photography-transformed-art/. [Accessed 18-Jan-2023].

[23] Dean Keith Simonton. 2012. Taking the US Patent Office criteria seriously: A quantitative three-criterion creativity definition and its implications. *Creativity research journal* 24, 2-3 (2012), 97–106.

[24] Nikhil Singh, Guillermo Bernal, Daria Savchenko, and Elena L Glassman. 2022. Where to hide a stolen elephant: Leaps in creative writing with multimodal machine intelligence. *ACM Transactions on Computer-Human Interaction* (2022).

[25] Matthew Sparkes. 2022. AI copyright.

[26] Moshe Y Vardi. 2021. Will AI destroy education? *Commun. ACM* 65, 1 (2021), 7–7.

[27] Peter Yang. 2022. Will AI Art Help or Hurt Artists? — creatoreconomy.so. https://creatoreconomy.so/p/will-ai-art-help-or-hurt-artists. [Accessed 18-Jan-2023].

[28] Jialong Zhang, Zhongshu Gu, Jiyong Jang, Hui Wu, Marc Ph Stoecklin, Heqing Huang, and Ian Molloy. 2018. Protecting intellectual property of deep neural networks with watermarking. In *Proceedings of the 2018 on Asia Conference on Computer and Communications Security*. ACM New York, NY, USA, 159–172.

[29] Jichen Zhu, Antonios Liapis, Sebastian Risi, Rafael Bidarra, and G Michael Youngblood. 2018. Explainable AI for designers: A human-centered perspective on mixed-initiative co-creation. In *2018 IEEE conference on computational intelligence and games (CIG)*. IEEE, 1–8.

A RESPONDENTS OVERVIEW

P#	Age	Country	Gender	"Please describe your profession and how creativity plays a role in your profession/work" (slightly shortened for overview)
1	41-45	USA	Female	**Librarian**, My work involves a lot of creative problem solving to address user needs.
2	36-40	Denmark	Male	**Digital designer, game designer**, creative use of concepts and interfaces to tailor experiences and evoke emotions.
3	31-35	Denmark	Male	**Designing, programming and testing games**. Creativity is important in designing a game, since it helps the rest of the team to understand where the goal of the game is.
4	36-40	Turkey	Female	I am a **researcher** in academia and creativity plays a key role in terms of connecting dots on different topics, organize and elaborate my ideas clearly, be fluent on different subjects and flexible in terms of changing my perspectives when needed.
5	41-45	Denmark	Male	**3d artist / illustrator**. I work in a team tasked with coming up with new game concept prototypes. My day job involves a lot of hands-on art creation, where different types of creativity is a big part - in concepting new stuff, or in problem solving, or simply in painting something
6	21-25	Germany	Female	**Media Designer**, I need to come up with creative ideas for campaigns and minigames on websites.
7	31-35	Denmark	Male	I'm a **game designer** / developer. I do everything from coding, drawing, animation and ui/ux design. Creativity plays a large role in everything I do
8	26-30	UK	Female	I work in **games production**, so am responsible for the scheduling and scope of PC and console videogame projects. There's a significant element of creative problem-solving in my job in terms of administration and organisation, as well as need for creativity in helping to create the games themselves
9	41-45	UK	Female	**video game writer / developer**
10	31-35	Denmark	Female	**Creative Producer**. I work with concept art and manage concept artists
11	51-55	Denmark	Female	I work as a **fixer, coordinator, and assistant**. Because my job is to make people shine, regardless of their intrinsic potential, I have to be extremely creative (and imaginitive and persuasive) in finding ways to accomplish this, both in terms of finding solutions and in convincing clients to adopt my suggestions.
12	36-40	Germany	Male	**Software Engineer**, sometimes coding needs to be creative
13	41-45	Germany	Female	**Research Assistent**
14	31-35	UK	Male	I am a **computer scientist**. As any other researcher, much of my work involves using creative methods - designing experiments, writing papers, analysing data etc
15	21-25	USA	Female	**student** with an interest in art and design
16	21-25	USA	Non-binary	**Student in HCI and Design**, with the goal of becoming a user interface designer or similar. Creativity is necessary to solve design problems and create visuals to explain solutions.
17	31-35	Germany	Male	I **research computational creativity**, I am also an educator.
18	41-45	UK	Male	**Creative**
19	31-35	Denmark	Male	**Experience Design** for websites
20	31-35	Denmark	Male	By day I'm a **UI/UX artist**. In past I've worked as a concept artist.
21	41-45	Denmark	Male	**Project management and design**, finding new solutions on a daily basis...
22	21-25	Morocco	Male	I'm a **PhD student** working on extracting entities and relations from morphological descriptions. Creativity is crucial for my work especially in coming up with solutions, presenting the explainability behind the provided solution as well as for presenting it to non technical meeting.
23	31-35	Denmark	Female	**I teach simple programming and computer game development** to 11-13 year olds. They work through the design process, ideation, sketching, creating original pixel art and coding their own games.

Table 1: Overview of survey respondents
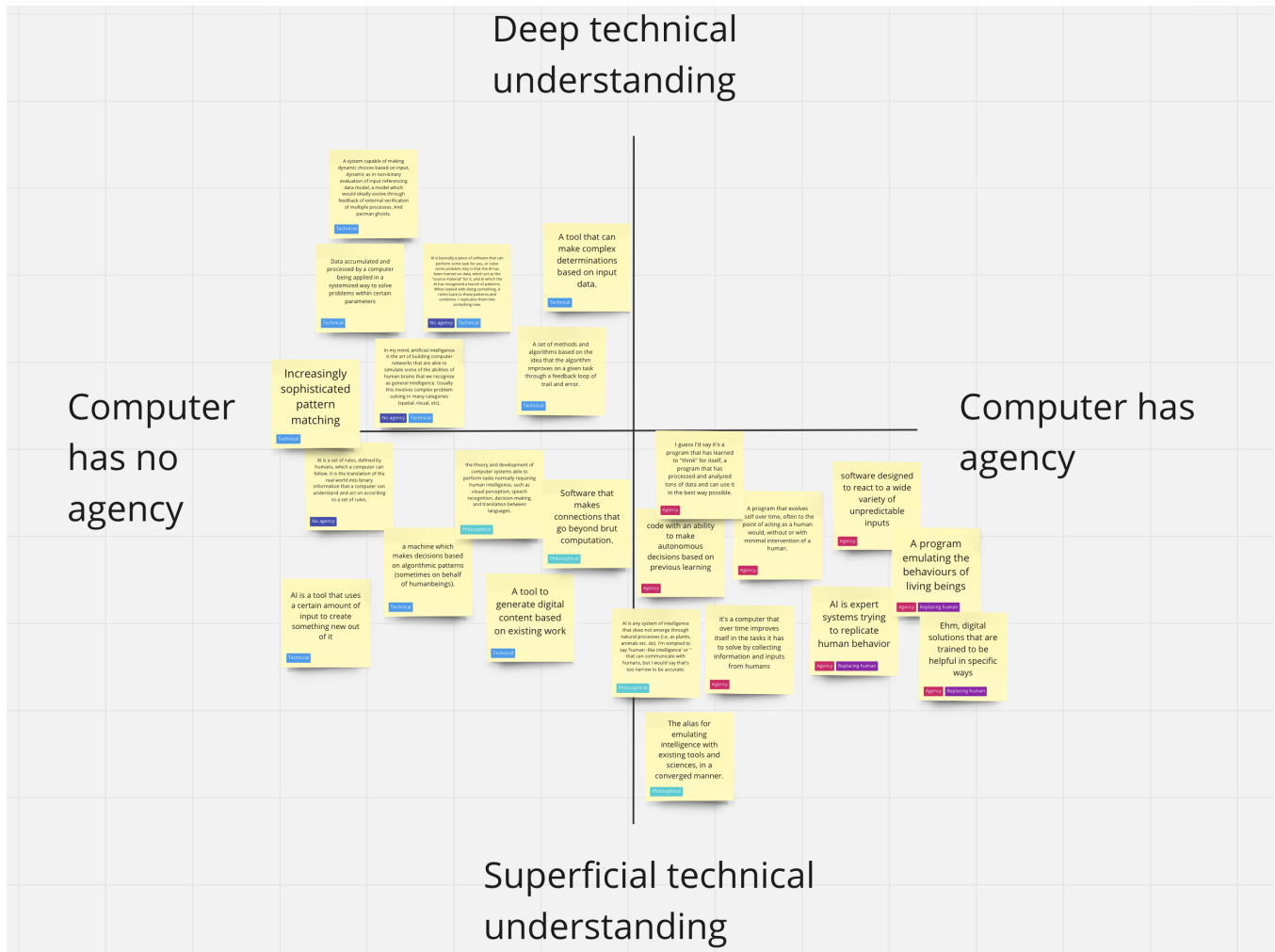
B   GRAPH OF RESPONSES TO "WHAT IS AI?"

Figure 1: Screenshot of the distribution of answers in terms of their technical depth and ascribed agency of AI.