

Anticipatory Technology Ethics Reflection By Eliciting Creative AI Imaginaries Through Fictional Research Abstracts

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ABSTRACT

From issues of intellectual property rights, environmental impact, and the question of creativity in itself, Creative AI (AI applied to arts and design) presents many pressing ethical challenges. At the same time, AI ethics guidelines have been criticised for their rationalist inactionability, highlighting the need for finding ground-up approaches for exploring situated ethics and anticipatory – rather than reactive – ethics in AI technology design. In this paper, we present the results of organising two workshops with Creative AI practitioners in writing *fictional research abstracts (FRAs)*. The participants wrote future-oriented research scenarios for Creative AI and engaged in discussion about them, with the aim to critically reflect on Creative AI ethics and futures in an anticipatory manner. In this paper, we provide an analysis of the *imaginaries* within the abstracts (e.g. stakeholders, technology framing, and scientific study framing in the abstract), as well as a thematic analysis of topics evoked in and by the abstracts. We observe that the FRAs facilitated five different kinds of thematic discussions, of which *nature of creativity* and *role on AI in the society* were particularly prevalent. We also witnessed *socio-technical continuity* that brought current and past conditions as constraints into the future scenarios. We subsequently reflect on how the FRAs engaged with ethical questions using the Anticipatory Technology Ethics perspectives of *technology*, *artefact*, and *application*. Our work contributes to the empirical understanding of the ethical concerns of future Creative AI technologies and their role in society, while extending the empirical insights of applying the FRA method into a situated case of anticipatory ethics reflection.

CCS CONCEPTS

• **Applied computing** → **Media arts**; • **Computing methodologies** → **Philosophical/theoretical foundations of artificial intelligence**.

KEYWORDS

Imaginaries, AI Ethics, Creative AI, Anticipatory Technology Ethics

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1 INTRODUCTION

Addressing ethical issues has often been approached through establishing ethics guidelines (e.g. [21]). Such a modernist approach seeks absolute knowledge principles and laws of order and is a continuation of the tradition of continental philosophy and ethics [51]. It promotes the aim to construct knowledge that could say something absolute about "what is ethical action?". In contrast, post-modernist theories have argued against approaches that aim to explain the structure of the world through all-encompassing theories [35], and many contemporary scholars have instead advocated for a stance that emphasizes situated, partial knowledge that addresses phenomena ground up [35, 48]. Echoing this critique, contemporary AI ethics guidelines have also been criticized for often being centred around values and perspectives of the Global North [40], as well as for their inactionability [58]. One of the prominent critics, Munn, suggests that AI ethics guidelines "*are meaningless principles which are contested or incoherent, making them difficult to apply; they are isolated principles situated in an industry and education system which largely ignores ethics; and they are toothless principles which lack consequences and adhere to corporate agendas*" [58, p.1]. Following this notion, questions arise as to *how* the ethics of AI should be approached from the ground up in situated real-world contexts. Furthermore, a relevant question remains: how can we anticipate technology ethics, rather than react after the technology has already been applied to use? In the case of AI, an additional aggravating problem emerges from how large corporations advocate and push AI development forward, and ethical issues are addressed reactively as they emerge. In this study, we suggest that an anticipatory perspective to ethics – exploring future ethical concerns to guide present ethical reflection and technology design [17] – is crucial in the context of AI technologies, which are progressing at a fast pace, are technology-driven, and surrounded by a multitude of critical and ethical concerns, ranging from issues of copyright [68] to environmental impact [42, 43] and replacing human creative practitioners [44].

There is a long tradition of critical design practices, where ethical questions are examined in an anticipatory manner through speculative futuring [25, 31]. Speculation has been used by feminist science and technology scholars to expand harmful normative social imaginaries [35], as well as to raise specific issues related to technology [76]. While speculation and design fiction have their methodological limitations, such as their limited ability to contribute to

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long-term change [47], they prove useful in the exploration of socio-technical future(s) and the engagement with anticipatory ethics through critically examining stakeholders' social imaginaries of the future. The method of Fictional Research Abstracts (FRAs) draws from this prior research on speculation and design fiction as critical and ethically engaged practices to technology design. The Anticipatory Technology Ethics (ATE) [17] perspective allows to identify and critically discuss ethical concerns of future(s), which are not fully palpable or acknowledged today. It is particularly valuable in providing three analytical perspectives ("technology", "artefact", and "application") for examining ethics in situated future contexts at the research and development phase. Thus, ATE allows looking at ethical issues from three different perspectives.

In this paper, we focus on Creative AI – AI technology applied to arts and design – as a situated case of AI use in society. This context is of particular interest because the use of AI in the production of images, videos, and music has raised many ethical concerns in recent years (copyright, environmental impact, automation of creative labour, etc.). As for the stakeholder community of this study, we engaged Creative AI practitioners (N=22) – engineers and artists – in an academic context to partake in writing Fictional Research Abstracts (FRAs) [12] to reflect on ethical issues in the future of Creative AI. The aim of using the FRA method was to elicit Creative AI imaginaries that highlight stakeholders' anticipatory ethical concerns of not-yet-invented AI systems and not-yet-realized socio-technical futures. We examine two research questions: 1) *Which ethical concerns do FRAs reveal from the Creative AI practitioners' imaginaries?* and 2) *To which extent do the FRAs engage with the three ATE perspectives?* We pursue this aim, first, through a qualitative analysis of the FRAs, and, secondly, by reflecting on which of the three ATE perspectives the FRAs focused on and what qualitative features were present among these perspectives.

In the qualitative analysis, we examine the FRAs in two different ways: by presenting a descriptive and content-based account of the abstracts themselves, and by analysing the themes in the abstracts and reflective discussions about these abstracts. We observe that in this study the FRAs facilitated five different kinds of discussion (themes T1-T5). Three strong themes that were most clearly present were discussions on the nature of creativity (T1), the role of AI and the AI-human relationship in the socio-technical futures (T2), and how AI potentially alters society in the future (T3). Furthermore, the abstracts had strong socio-technical continuity, e.g., they projected current developments into the future rather than radically re-imagining certain conditions (T4). Lastly, certain normative aspirations (T5) emerged in the abstracts, but they often emerged implicitly rather than explicitly in the imagined scenarios. Subsequently, we used the three perspectives of ATE as an analytical lens to examine the level of ethical engagement in the FRAs. Through the ATE analysis we uncovered that there was an emphasis on the ethical concerns of "autonomy", which was most clearly identifiable at the *artefact* and *application* levels. The focus on only two ATE perspectives indicates the need to pursue a more holistic approach to anticipatory ethics perspectives where issues at the three perspectives are considered to encompass long-term ethical consequences of systemic degree as well on the everyday degree. Furthermore, the ATE analysis highlighted that the FRAs primarily emphasized reactionary ethical concerns (for

example seen through socio-technical continuity), rather than anticipatory ethical concerns. This underscores the need for long-term engagement with the Creative AI community to build capacities for anticipatory ethical reflection.

This study contributes to the understanding of future ethical concerns in Creative AI by providing qualitative insights on the socio-technical future imaginaries of the Creative AI stakeholders as well as on how the FRA methodology enabled ATE reflection. In addition, the analysis of FRAs through the three dimensions of the ATE demonstrates a practical pathway for how anticipatory ethics can be developed within the field of Creative AI. To account for ethical questions in emerging futures in a well-rounded manner, we note the need for future research to ensure that all three ATE perspectives are present in the ethical reflection. Furthermore, there is a need to find ways to assess the diversity of the ethical reflections brought forth in the qualitative analysis of the FRAs, both in a qualitative sense but also in terms of values – by bringing in further perspectives (decolonial, feminist, more-than-human). Lastly, long-term work in the Creative AI community is required to build the capacity for participatory ATE reflection.

2 BACKGROUND

2.1 Reflecting on Creative AI Ethics Through Eliciting Imaginaries

Imaginaries are often elicited through speculation in the form of producing artefacts. According to Taylor, imaginaries are imaginations of social existence and reflect our internal conceptions about how things ought to be [72]. Similarly, Akrih has described how technological artefacts come into being by establishing a "script", an imaginary about the intended place and the intended use of the imagined artefact [1]. New technologies are thus not *tabula rasa*, but are instead born with normative and aesthetic predispositions and values, as well as ideas about the future they will create and inhabit [6]. This provides a leverage point for investigating imaginaries: the unpacking of hidden normative, aesthetic, and value-oriented dimensions of socio-material arrangements, following the post-modernist commitments of surfacing situated perspectives. Eliciting imaginaries through speculation [25] has been used in technology design to widen perspectives and possibilities [8, 9, 16, 34, 49, 53, 54, 61, 69, 71, 74] and to examine and question the prevailing normative and aesthetic qualities of socio-technicality [10, 22].

In the case of AI technology, studying imaginaries of future through speculation has been shown to methodologically useful for examining the ethics and values of AI systems. Various studies that have grounded imaginaries of AI in everyday scenarios [26, 46, 64] have found eliciting future scenarios as an accessible approach for the participants to reflect on emerging AI technologies and their implications and concerns. At the same time, it has been argued that research on artificial creativity systems, such as Creative AI technology, could benefit from exploring speculative methods, which have been overlooked in the past [28, 39, 50].

Despite the effectiveness of speculative approaches to explore possible futures and to uncover values, research has also highlighted limitations in terms of failing to encourage active engagement in political change [2], limited capacity to reach wider audiences [27],

and of how speculative artefacts often paradoxically perpetuate ideals of privileged communities and cultures [15]. Another challenge for speculation concerns self-assessment of the speculation process. This includes the capability to self-assess the motivations, processes and consequences of speculation, as well as how ideas that come out of such a process can be embraced or adapted by others [47]. Works such as [15, 60, 69] exemplify attempts to introduce diverse perspectives in HCI through speculation. However, if the focus of speculation remains only within the realm of socio-technical imaginaries without incorporating insights from other perspectives – legal, economical, environmental, decolonial, more-than-human, feminist, etc. – researchers may inadvertently bolster dominant power structures and injustices perpetuated by technology [36, 38, 70]. To overcome these challenges, researchers must focus on the *reflection that arises from the speculative process*, rather than solely on the outcome of said processes [47, 76]. This suggestion grounds our approach to engage the Creative AI stakeholder community in writing FRAs to elicit imaginaries with subsequent ATE reflection that puts the focus on reflecting the process and the method that were used.

2.2 Eliciting Imaginaries Through Fictional Research Abstracts

In our study, we used FRAs to materialise imaginaries on Creative AI futures, and to elicit the discussion on the ethical questions and values presented in the FRAs. FRAs *describe prototypes and studies that did not take place* [12, p. 5]. They were first introduced by Blythe, who explored the idea of presenting design fictions as imaginary research abstracts to explore the design space without the need to construct and test actual physical prototypes [12]. One benefit of fictional abstracts is the low resource commitment, as the structure of an abstract allows for just enough space to identify a problem, underline its socio-technical context, and suggest possible implications – while at the same time leaving space for interpretation. This makes fictional research abstracts a useful tool for exploring and discussing possible futures [63]. Furthermore, we focus on FRAs as the format to elicit imaginaries because we wanted to provide our participants with a format they felt familiar with and would allow them to present a possible future without limiting concerns of feasibility of implementation.

Although fictional abstracts as a method have been used by different HCI scholars [4, 5, 19, 32, 67, 73], our project primarily builds on the work by Pargman et al. [63] to extend the fictional abstracts method to the critical analysis of *Creative AI future imaginaries*. Pargman et al. illustrated the value of the process of writing and discussing FRAs as an anticipatory tool by uncovering insights regarding the implications, power dynamics, assumptions, and expectations related to the future work of technology designers and engineers [63].

2.3 The Value of Exploring Anticipatory Technology Ethics

To anticipate means exploring future possibilities with the aim to guide action in the present [65, p. 1]. In the process of anticipation, people’s assumptions about the future influence their imaginaries,

ultimately affecting the future they enact [56]. As everyone contributes to making the future, for example through researching, designing, or adopting technology in the everyday, it is pertinent to examine the values embedded in emerging technologies and in the imaginaries of designers and practitioners involved in the development of such technologies.

In this study, we applied Anticipatory Technology Ethics [17] as an analytical lens to examine the depth of ethical considerations that emerged from the FRAs. First, the “technology” perspective looks at the concept of the whole technology. Second, the “artefact” perspective focuses on specific instances of that technology. Finally, the “application” perspective situates these instances in a specific sociocultural context. Such a holistic approach aims at avoiding pitfalls from overly deterministic and narrow views of technology research and development by highlighting how ethical challenges vary between technology, its materialisation, and context of use [17]. ATE builds on previous research on ethical analysis of technology [37, 62] and scholarship from futures studies [7] to study ethical issues in the design stages of technology, and to determine potential future scenarios and social consequences of technology. While HCI methods such as Value Sensitive Design [30], envisioning criteria [59], and modes of reflecting design futuring [47] provide valuable insights into the implicit ethics of interactive technologies, they focus on the design process itself. In contrast, ATE provides an approach to examining ethical questions on different socio-technical layers of technology at the research and development phases. The main characteristic of the ATE is the definition of analytical perspectives, “technology”, “artefact”, and “application” [17]. The technological perspective examines ethical issues that apply to all technologies that belong to a group, in our case Creative AI. The artefact perspective examines ethical issues concerning artefacts of a particular technology, for example the environmental footprint of specific text-to-image model(s) [52]. Finally, the application perspective concerns ethical issues of uses or practices of the technology and the artefact, once embedded in our everyday lives, as shown with cases of misinformation and impersonation through the use of deepfakes [57].

3 METHODOLOGY

We conducted two workshops with Creative AI practitioners who produced Fictional Research Abstracts (FRAs) and reflective worksheets where participants provided critical reflection about the abstracts. The participants of both workshops were informed about the ongoing research work and that they, by participating in the workshop activities, consented to the use of their FRAs in this research study.

3.1 Fictional Research Abstracts Workshop Design

The first workshop (WS1) was organized as a part of the ICC¹ conference in Canada. The conference focused on the *engineering and development* of Creative AI systems. The workshop had 14 participants (of which two attended remotely) who were divided into four groups. We asked the participants to write the FRAs before the workshop and to submit them with their applications for

¹International Conference of Computational Creativity

Table 1: List of Fictional Abstracts from the workshops WS1-WS2

Abstract nr.	Abstract title
A1	Human Created: Exploring the Effects of Strict Government Policy for Training Generative Machine Learning Systems
A2	SpeakCode: Bridging the Gap Between Natural Language and Code Generation
A3	Humans Will Lose Proper Imagination Unconsciously
A4	Exploring the Use of Non-Fungible Tokens to Protect Copyright in AI-Generated Content: Benefits, Concerns, and Guidelines
A5	ArtCAPTCHA: A Turing Test for Human Visual Artists
A6	AI paradigm shift and the consequences of replacing the human agent with an AI decision making agent
B7	“Yeah, but let’s see an AI shit on stage”: An ethnographic study of the emerging music laborers in the age of AI supremacy
B8	AI-Driven Multimodal Brain-Computer Interfaces for Mental Health Treatment and Coma Recovery: Integrating Personalized Art Therapy for Neural Resilience and Consciousness Restoration
B9	Auratic/microbiomic inter-machine communication
B10	Sonic Self: Exploring the Neuro-AI-Acoustic Future of Solitary and Collective Consciousness

participation in the workshop, to allow more time to analyze and discuss the abstracts during the workshops. The workshop itself focused on critical reflections based on the six submitted FRAs. The majority of participants were early-career researchers, while a few senior researchers were present as well. The participants were organized into the groups so that each group had at least one FRA author in them. Seniority and FRA authorship might have been influencing factors in regard to how the critical reflection of the FRAs unfolded.

The second workshop (WS2) was held at a research institute in Vienna as a part of an academic course for *artistic* Creative AI practitioners. There were eight participants in the workshop and they were divided into four groups. The participants did not submit FRAs before the workshop but instead wrote four fictional abstracts during the workshop as there was more time reserved for the workshop, enabling both writing and discussion. In this workshop, majority of the participants were deeply experienced in artistic research, while few of the participants were more oriented towards engineering and humanities research. The power dynamics between these research orientations might have influenced factors in regard to how the writing of the FRAs unfolded.

Both workshops were approximately half-a-day long. In Table 1, we summarize the abstracts produced by the workshop participants. For the purposes of analysis, we named the abstracts A1-A6 for the first workshop, and B7-B10 for the second workshop. Throughout the paper we also refer to the workshop participants as Creative AI practitioners, encompassing both the engineers and the artists.

The content and structure of the workshops were informed by prior studies described in Section 2.2. We provided the participants with slightly modified guidelines based on the guidelines in a prior fictional abstracts study [63] to guide their writing of fictional abstracts. To not influence in the imaginaries of the participants, they were explicitly informed that they had the freedom to either adhere to or deviate from the guidelines provided. The format of the FRAs was typical of the length of a research article abstract (max 500 words). In the first workshop, the FRAs were formatted in the official conference paper format to follow the conference conventions

and make the abstracts more “realistic”. In the second workshop the participants were provided with a writing template, because there was no official format they were familiar with. The FRAs that participants wrote constitute the primary empirical data for our paper. We also asked each group in both workshops to fill out reflective worksheets when they discussed the FRAs. Participants were provided with guiding questions as input to help them structure their critique. Guiding questions to these reflections focused on ethics, sustainability, participation, and power relations of concern for Creative AI futures:

- What cultural perspectives and/or values are present in the article?
- What sustainability-related consequences could be inferred from the futures depicted?
- How is power distributed in this scenarios? Who benefits, who is disadvantaged, and who is left out in these scenarios?
- What are the motivations for the stakeholders and technologies depicted in the article?

3.2 Data analysis

The outcomes of both workshops were analysed by first noting down a summarizing description of each abstract (title, core themes) and then by analyzing various dimensions of the imaginaries present in the abstracts along with the reflections participants recorded about these imaginaries in the worksheets. In this process, we constructed an analytical framework for the fictional abstracts that consisted of the research domain, the focus of the study, how the technology was framed, what stakeholders were involved, what research methods were used, and what research questions/problems were formulated. This framework helped us to make sense of the future research scenarios and imaginaries. After that, we analyzed the abstracts and worksheets using a ground-up thematic analysis approach [14, 20] where distinct topical instances were consolidated into 5 themes by the two first authors and reviewed and discussed with the third author. We intended to identify sub-themes, but it became apparent that the limited amount of data was challenging and that it was most suitable to consolidate individual instances into thematic groups. These results became a ground for further

Table 2: Content analysis of the FRAs - Part 1

Nr.	Research Domain	Technology framing	Research methods
A1	Social science	Generative AI	Case study, Literature review, Interviews
A2	Technology design	Conversational AI	Engineering study
A3	Human evolution	Generative AI	Case study, Workshops, Interviews
A4	Technology design	NFT	Interviews, Engineering study
A5	Technology design	Creative AI	Engineering study
A6	Social science	AI Agent	Data-based prediction, Literature review
B7	Ethnographic study	AI Music System	Ethnography
B8	Technology design, Music psychology	BCI	Clinical study
B9	Communication studies, engineering	AI System	Engineering study
B10	Technology design, neuro-acoustics	Auto-Poetic AI	Literature review

Table 3: Content analysis of the FRAs - Part 2

Nr.	Stakeholders mentioned	Problem framing
A1	Researchers, Politicians, Government, AI Experts	Does enforcing a “human created” restriction on training data foster human creativity? Why shouldn’t generative models be allowed to train on their own output?
A2	Users, Programming community	How to overcome ambiguity in natural language understanding for code generation?
A3	Humans, Professional text reviewers	What happens, if humans will become addicted to AI and lose the ability of imagine?
A4	Artists, GenAI developers, NFT engineers	NFTs can help to protect artists’ artworks. However, what problems do they involve?
A5	Humans, Artists	How can humans prove their capability for autonomous creativity?
A6	Decision-makers, Military-industrial complex	What are the dangers of introducing AI in autonomous decision-making?
B7	Music economy, Streaming companies, Artists, Music communities	How does musical practices continue to evolve so extreme they are outside the purview of AI?
B8	Patients	How can AI-driven art therapy help patients and what ethical considerations arise?
B9	Humans	What are implicit forms of communication among machines? What is the “social life” of AI systems?
B10	Humans	What are the benefits and drawbacks of self-referential, AI-enabled sound environments?

reflections through the three ATE perspectives – “technology”, “artefact”, and “application” – [17] – e.g. what kind of ethical insights surface, and what are the depth of engagement of the FRAs in the three ATE perspectives. In the process of applying the ATE to the FRAs, we analysed their content looking for indications of the ATE perspectives. In this process, we coded different sentences in the FRAs that expressed ethical issues which aligned with a particular ATE perspective. If a single abstract engaged in the same perspective through two different sentences, these manifestations were counted as engaging with one perspective only. On the contrary, if two different perspectives were found under the same abstract, a manifestation of each perspective was counted for that abstract. Furthermore, we considered a computational textual analysis of the most commonly used phrases and words in the abstracts. However, this did not provide much value considering the limited textual material and thus was omitted from the final results.

4 RESULTS & ANALYSIS

4.1 Description and Content Analysis of FRAs

We begin by briefly describing the abstracts, a list of which is provided in Table 1. Participants highlighted different concerns and ideas regarding Creative AI, from copyright and societal impacts to future solutions and governmental policy. It was also evident that various workshop participants approached the writing style of these abstracts differently: some closely resembled current-day research abstracts, while others brought forward themes of concern to the authors. Notably, some of the core workshop themes were absent from the discussion, e.g. “environmental sustainability” was a core workshop theme, yet none of the FRAs explicitly focused on this topic. We did, on the other hand, observe a large number of technological solutions in the form of new problem-solving innovations, particularly regarding authorship and coding workflows (e.g., A2, A4, B8, B9). Four of the ten abstracts (A3, A6, B7, B10) were concerned with societal impacts and impacts on human agents, which thus made such impacts a prevalent topic. In the abstracts from the second workshop with Creative AI practitioners, we noticed that participants approached the task of writing abstracts very

diversely: while some imagined laboratory studies, others imagined ethnographic observations. At the same time, there was a focus on imagining futures that AI could enable, e.g. collective consciousness, neurological art therapy, and inter-machine communications. Furthermore, many of the FRA titles did not explicitly focus on questions of ethics or sustainability but rather on technological solutions that might exist in the future. The FRAs that were written by senior researchers (in both workshops, with engineering and artistic participants) were most likely to address questions of ethics more explicitly or in a more critical manner.

Next, we performed an analysis of the contents of the fictional abstracts as described in Section 3. See Tables 2 and 3 for a summary of this analysis. The content of these tables provides a general understanding of the abstracts, as well as a higher-level summary of the scenarios in the technological imaginaries. For instance, when it comes to the domain of the study, roughly half of the abstracts focused on addressing societal and human issues, and the other half focused on technology design and engineering solutions to solve problems. The specific foci within these broad domains were very diverse, spanning user-centred design, copyright, government policy, evaluating artists' authenticity etc. Interestingly, no abstracts were imagining methods radically deviating from stereotypical modes of science-making in both workshops. In the domain of the FRA's imagined research, we could again see a split between social science- and technology-focused studies. Even in the second workshop with artists, no artistic research was envisioned, while there were ethnographic studies of artists' labour and art therapy. This was despite the artists being explicitly informed that the framing could involve all kinds of research, including artistic research. On the other hand, human wellbeing and health seemed to be highlighted in the second workshop with artists. Furthermore, the focus on technology in the first workshop could be explained by the fact that (as explained in Section 3) the participants were primarily engineers, and imagining new technology is highly present in such work. However, we saw similar tendencies in the second workshop with artists, which could indicate that the Creative AI topic itself urges participants to imagine certain types of futures that centre around technological solutions (or "technological solutionism"). While the topic of both workshops was "Creative AI", we saw broad interpretations of creative systems (e.g. generative AI, conversational AI, neuro-AI, bio-AI etc.) and of how Creative AI technologies could be applied in society. An interesting difference was that some engineers seemed to be concerned about "losing creativity" or "losing authorship", a topic artists did not seem very concerned about - likely informed by their experience and insights as creative practitioners. It was also notable that various stakeholders were more explicitly written into the abstracts from the first workshop, e.g. policy-makers, users, engineers, the programming community, text reviewers, etc. Many of the abstracts of the second workshop, instead, formulated the stakeholders in a more vague manner, such as "human" or "people".

When we examined the problem formulations posed in the abstracts, it was clear that there were concerns about AI technology and its impacts (A3, A6, B7, B10), as well as imaginaries of how AI could help solve problems (A2, A4, B8). Some of the abstracts provided a rich account in which technological developments and critical implications were addressed at the same time (e.g. A1, A4,

B10). The first of these three abstracts concerned the potential impacts of Creative AI adoption for society, and what legal measures could result. A4, in turn, imagined NFTs as a solution to a problem many artists are currently experiencing when their work is being appropriated and used to train AIs, but the FRA adopted a more nuanced perspective in examining what the ethical implications of applying NFT technology to such cases might be. The third abstract, B10, imagined a future in which AI enables the creation of auto-poetic, self-referential sound landscapes that evolved based on the personalized user data, resulting in both positive and negative effects for humans who experience and live in those soundscapes. These three abstracts managed to combine the critique and opportunities of AI into nuanced scenarios.

4.2 Thematic Analysis of the FRAs and Discussions Evoked by Them

Next, we will describe themes constructed through thematic analysis of the FRAs and the critical discussion around them represented in the worksheets. Table 4 provides an overview of all six themes and the instances that contributed to constructing these themes.

4.2.1 T1 - Impact on Creativity. Firstly, it was observed that several aspects of the imaginaries touched upon creativity: creativity loss, creativity augmentation, creativity definition, and opportunities for and commercialization of creative practice. It was not surprising that these core issues, which are also fundamental in driving the development of Creative AI and automatization of creative work, were expressed through the abstracts. For example, creativity loss, creativity augmentation, and creativity definition are deeply coupled to the way in which artistic workflows change when AI enters the picture. As AI enters the workflows, some creative tasks will not be solely the responsibility of the creatives, which raises fears of creativity loss. But, interestingly, this fear was expressed primarily in the FRAs of the engineer-focused workshop, rather than the artist-focused workshop. As an example, one the abstract imagined dystopian scenario in which humans have completely lost the ability to imagine as a result of Creative AI use:

"There is no doubt that this machine-in-the-loop creative process would become the primary choice for novices and professionals when developing creative artefacts. However, will humans become addicted to this creative mode and lose the ability of sole creation, and eventually get limited by machines' imagination?" - A3

The same FRA (A3) also featured the idea of creativity augmentation, in which the artistic work is enhanced by AI. On the other hand, another abstract (B10) was concerned with the impact AI has on creative practices on a wider scale, such as how the artistic genres keep evolving and how the creative communities respond to AI:

"A counter movement has arisen where artists race to stay ahead of what the state of the art commercial AI music systems can produce - a kind of 'genre race'." - B7

B7 also touched upon commercial aspects of Creative AI, highlighting the boundaries and limitations of how and what kind of

creative labour companies can exploit for profit through automatization. The same theme came forth in other abstracts (e.g. A4, A5), which sometimes framed these concerns under appropriating creative work, rather than explicitly calling out the companies involved or the capitalist power structures. Thus, we could see that several of the FRAs were concerned with the role and definition of creativity, as well as the impact on creative practice.

4.2.2 T2 - Role of AI and AI-Human Relationship. Participants' imaginaries explored the role of AI in the society, as well as the relationship between humans and AI. When it came to the role of AI, we identified imaginaries in which AI permeated society and took over production. These discussions centred around the ubiquity of AI, overproduction and overuse of AI, and generally AI-driven society that relied on technological determinism, taking AI as an inevitable development. These seem to be prevalent ethical concerns in the FRAs of both workshops. Furthermore, the socio-technical imaginaries involved thoughts of future human-AI relationships. These were seen in instances that concerned the human-AI divide, human stewardship (human-in-the-loop), human-centredness, humans understanding of AI, and trust between human and AI. As an example, A5 discussed how humans and AI would be located in creative spaces:

"Attempts at reserving certain creative spaces for humans only has resulted in an 'arms race', in which increasingly sophisticated AI-detection techniques compete against increasingly sophisticated attempts, by artists using AI, to circumvent these techniques." - A5

Thus, many of the imaginaries touched upon questions of how humans and AI should be positioned in relation to each other when it comes to work tasks, power, and agency. While they incorporated different views of this relationship (such as emphasising the AI or the human more, for example within the discussion on human-centred AI development), they essentially focused on the same questions about the roles and relationship between human and AI.

4.2.3 T3 - Projected Change. FRAs contained impacts and projected change on human society and human experiences. This involved considerations of how humans might increasingly work in teams due to increased socializing facilitated by time freed from manual labour, how human experiences might become segmented in experience bubbles due to hyper-personalization capabilities of Creative AI, and how wider societal practices might be impacted by AI. The impact on societal practices concerned those beyond the creative practices, such as changes in healthcare systems, programming practices, and legislation. For example, A1 considered the effects that Creative AI technological development would have on regulation in the future:

"This caused immense concern among both researchers and politicians as it became glaringly apparent that humans were training GML [Generative Machine Learning] systems that were ultimately rendering human creativity obsolete. In an effort to combat this, governments across the globe agreed to make it a requirement that all new GML systems be trained using data that

could be identified as "clearly human created", effectively banning the use of models being trained on data that they themselves had previously generated." - A1

Thus, this theme involved aspects of imaginaries that focused on how Creative AI was anticipated to change and alter society in the future in domains that focused particularly on healthcare, coding, and legislation, and experience bubbles and teamwork as ways in how human experience were expected to change.

4.2.4 T4 - Socio-Technical Continuity. The FRA's also emphasized socio-technical continuity to the future, both in terms of design and institutional continuity. Both characteristics and current limitations of AI technology were projected onto the future scenarios. Such design continuity, e.g., the way current and past technology design determine the design characteristics and features of the technology that was imagined in the fictional abstracts, was present both in a negative and a positive sense: the past technology determined what kind of technology characteristics were imagined, but also how the absence of certain technologies in the present motivated placing them into the future imaginaries. As to institutional continuity, several concerns surfaced about modern-day society and how it is organized (e.g. regulatory structures, political structures, economic organisation, systems of power). These reflections on societal and institutional approaches to AI clearly manifest in the imaginaries. More specifically, questions related to regulation touched upon AI transparency, intellectual property protection, and protection against AI misuse. Similarly, prevailing political and economic structures, such as the current political situation in the US and existing power structures between companies and creatives, were projected into future scenarios:

"In this paper we study how musical labor continues to move to practices so extreme they are outside the purview of AI, and the interests of the corporate players building such systems. We conduct ethnographic work in niche music communities of Vienna, Stockholm, and Trumpeoria DC." - B7

Extending this, we could also see that prevailing power systems, such as capitalism, were present in the scenarios. We did not see references to other power systems, such as gender, race, ability, etc., in the abstracts. This is noteworthy because these themes are part of the common discussions and research around AI and its impact on society [11, 18, 55], but also the probing questions that we provided in the workshop involved questions power structure, cultural perspectives, values, etc. It was, therefore, remarkable that most of the FRAs did not evoke notable discussion on other power systems in the society, except B7's notable discussion of capitalism and the role of companies and creatives in the creative industry.

4.2.5 T5 - Normative Aspirations. The last theme – normative aspirations – was perhaps the most disparate and least present in the FRAs. It considered notions in the imaginaries about what kind of benevolent normative aspirations – what is considered good – were present. These, for example, included cultural diversity, environmental awareness and impact, accountability, and human wellbeing. A good example is B8, which focused on future of healthcare, taking an implicit assumption that improving healthcare and human wellbeing using AI was a good thing to strive towards:

Table 4: WS1-WS2 themes, and instances

Theme	Instance
T1 Impact on Creativity	Creativity Loss, Creativity Augmentation, Creativity Definition, Creativity Opportunism Creativity Commercialization
T2 Role of AI and AI-Human Relationship	Ubiquity of AI, Solution-Oriented AI, Human-AI Divide, Human Stewardship (human-in-the-loop), Human-Centredness, Humans Understanding AI, Trust Between Human and AI,
T3 Projected Change	Experience Bubbles, Increased Teamwork, Change in Healthcare Systems Legislation-Enabled Change, Change in Coding Practices
T4 Socio-Technical Continuity	Design Continuity, Legislative Continuity, Political Continuity, Economic Continuity Power System Continuity
T5 Normative Aspirations	Cultural Diversity, Environmental Awareness and Impact, Accountability, Human Wellbeing

“A key element of this approach is AI-based art therapy, where generative image, music, and immersive audio-visual environments are crafted to stimulate emotional and cognitive healing, engaging patients in experiences that foster neuroplasticity and resilience.” - B8

These normative instances were present to varying extents. For example, environmental awareness was mentioned minimally as a side comment in two abstracts (A4, A6) but was not present in the core research design, while instances on human wellbeing were more concretely present in the actual study designs of multiple abstracts (B8, B10). We can gather from the presence of these instances that cultural diversity and environmental impact were considered additional side concerns, while human wellbeing and accountability were central concerns.

5 HOW DO FICTIONAL ABSTRACTS ENABLE ANTICIPATORY ETHICAL REFLECTION?

To examine how the three ATE perspectives – technology, artefact, and application – were reflected in the FRAs, we analysed each abstract to determine which perspectives it addressed and what ethical issues were raised concerning those perspectives. As a result, we encountered that 8 out of 10 abstracts engaged with the *application* perspective; 7 out of 10 engaged with the *artefact* perspective; and only 1 out of 10 abstracts engaged with the *technological* perspective. Hence, in response to our second research question, the FRAs reached specificity in primarily focusing on ethical issues on the *artefact* and *application* perspectives, while engaging less frequently with the technological perspective. Such focus highlights an area for broader exploration to ensure comprehensive ethical considerations across all ATE perspectives. While the *technological* perspective refers to general ethical concerns of a technology – in this case creative AI –, it can enable surfacing radical ethical concerns through reimagining what creative AI will be and mean in the future versus how we conceive it today. However, these radical re-imaginings were somewhat absent in the FRAs. We also noticed that while many FRAs were effective in focusing on a specific artefact (A4) or application of Creative AI (B10), there was a certain lack of diversity across all the FRA scenarios – they often focused on future scenarios in which AI-generated content had surpassed human-created content and overtaken human creative work. Furthermore, we observed that FRAs were surfacing

primarily reactionary, rather than anticipatory reflection. Such reactionary reflection represents the complexity of disengaging from prevalent ways of envisioning technology, which are often constructed around the technological feasibilities and challenges of the past and present, but rarely on those technological possibilities and challenges of the future [66]. This could potentially be influenced by the workshop design and constraints, which were left open-ended in order to not influence the participants’ output to certain direction. The result of this decision likely led in perpetuation of existing ethical concerns in the FRAs. However, it proved successful in surfacing and representing the current concerns expressed by our participants.

Reflecting further on the ethical concerns that appeared in the analysis of the different ATE levels, we found that both strong themes T1 (Creativity), and T2 (Role of AI and AI-Human Relationship) of the thematic analysis (see Section 4.2) highlighted underlying concerns of *autonomy*. Aligning with current research on extraction, and exploitation of labour in AI art [33], our participants showed concerns about the ubiquitous presence of AI in creative production and how it affects human autonomy, and ultimately the implied loss of human creativity. While concerns about autonomy surfaced primarily in the “artefact” and “application” perspectives, this could indicate a deeper pattern. Concerns regarding autonomy are broadly shared across discussions of AI technologies [45, 75]. Thus, the FRAs served to project general ethical concerns of AI to the “artefact” and “application” perspectives. A related ethical concern that was present in both the “artefact” and “application” perspectives was the social tensions produced by Creative AI systems. This concern relates to themes T2 (Role of AI and AI-Human Relationship) and T3 (Projected Change) of the thematic analysis. In particular, the abstracts pictured societies where individuals are divided by the economical and technological access to the computational power Creative AI requires, as well as the skill-set to leverage Creative AI technologies (A4, A5), or how the use of Creative AI can segment or isolate people from those who advocate for natural human skills (A5, B7, B10). The question of access to and proficiency with Creative AI relates to ethical concerns that happen at the “artefact” perspective – how Creative AI systems are designed – but also highlight the power dynamics that designers perpetuate in the creation of Creative AI systems (T2). Here, ethical considerations arise during the design phase of Creative AI, where developers and designers can influence

a system's accessibility through its parameters or features. However, if these "artefact" challenges are overlooked, they evolve into "application" concerns that manifest as broader societal impacts (T3). These impacts include social divide or isolation, particularly as certain groups get excluded from participating in social, professional, or cultural contexts due to limited resources or skills to use Creative AI.

Additionally, aligning with T4 (Socio-Technical Continuity) of the thematic analysis, the precautionary tone in the abstracts was visible at the artefact and application perspectives about the potential implications of unregulated Creative AI. This speaks for *what kind of stories* and narratives are being told about certain technology and its future concerns within a community of practitioners. Aligning with the concept of the sociology of expectations [13], in which expectations for the future play a central role in guiding activities to enact socio-technical imaginaries, we see that there are expectations presented as stories re-iteratively produced within Creative AI. These narratives actively construct the shared imaginary landscape of ethical concerns within certain communities – and as we see in this study, can be elicited through the FRAs. In this way, the imaginaries elicited by the FRAs tell us more about the stakeholder community our participants belong to, its culture, and values, rather than the technology itself. Furthermore, using the ATE to analyse the imaginaries represented in the FRAs enables more concrete and nuanced reflection on the projected future(s) and their anticipated ethical concerns. At the envisioning stage of creative AI, the ATE works as another tool that supports FRAs by assessing whether the speculation is exploring future ethical challenges or if it is simply projecting existing concerns onto the future scenarios presented by the FRAs. Such analysis allows researchers and practitioners to re-evaluate their considerations of creative AI's future trajectories and proactively identify overlooked challenges. To engage in anticipatory ethics reflection, researchers must examine how the narrative and content of the ethical concerns are represented across the three ATE perspectives. In the presentation of the FRAs method to our participants we did not introduce the ATE theory, as this was rather a perspective we used for analysis. Therefore, we could not expect the FRAs to comprehensively cover the three perspectives of the ATE. However, after applying the ATE in the analysis of the abstracts, we saw that our participants implicitly contextualised their imaginaries of Creative AI within the "application", or "artefact" perspective. This focus on particular perspectives suggests that more emphasis is needed in the development of a holistic approach to ethics that would allow to anticipate ethics of Creative AI across all three perspectives of the ATE. The challenge of encompassing the three perspectives of the ATE is not particular to our participant group or Creative AI practitioners, but rather to the research and development of technology in general [17]. For instance, Brey mentions that reflection on the "artefact" perspective is warranted due to an artefact being a tangible expression of technology. As such, an artefact requires moral justification for its design and manufacturing processes. Furthermore, an artefact embodies the ethical challenges inherent in the technology it represents, thereby presenting unavoidable consequences in most of its uses [17, p. 8].

Anticipating also requires contesting own assumptions and aspirations for the future [56]. Therefore, in the consideration of

the ATE perspectives, it is worth questioning what ethical challenges exist in Creative AI that have not yet been identified, or have been ignored. For example, an emphasis on reflecting how Creative AI technologies unfold (application perspective) can enable a richer investigation into how prototypes and research artefacts operate within everyday life contexts. However, to contest predominant or foreseeable applications of Creative AI, these unfoldings must incorporate critical perspectives (such as de-colonial, feminist, more-than-human, etc. mentioned earlier in Section 2) to provide an effective socio-technical critique of the Creative AI technology. Such a critical disposition requires the development of "futures literacy", the capacity to become self-aware of the assumptions one makes about the future, the ability to re-imagine futures with different assumptions, and to consider and examine different futures [56]. While Brey makes a call to consider science fiction stories and value-sensitive design [17], other authors [23, 29] have shown that speculative and fictional methods lack attractiveness in engineering-focused communities, such as computer science research, because these methods are often targeted to designers – and therefore offer additional complexities in an already overloaded research practice [23]. Hence, revisiting Pargman et al.'s [63] way of working with FRA's through an extensive critical discussion with the authors of the FRAs, and Forlano and Halpern's [29] call for deep engagement and long-term commitment in speculative futuring, there is a need for facilitators – including the authors of this paper – to take part in the understanding and discussion of anticipatory technology ethics to be able to support the development of futures literacy of their participants. Such support should focus on engaging diverse stakeholders in the evaluation of technologies across three perspectives of the ATE and in other methods of reflection in futuring [47], but also to create a knowledge base that allows documenting the concerns, aspirations, assumptions, and imaginaries of possible futures [56]. By doing so, facilitators can introduce insights from this knowledge base into discussions, offering stakeholders alternative perspectives on the future, enriching the dialogue, and empowering stakeholders to critically examine and contest their own imaginaries.

6 DISCUSSION

In this paper (Sections 4 and 5), we have provided a content-based and thematic account of the imaginaries that surfaced through the use of FRAs with Creative AI practitioners. The content-based account showed us how the research field and its main concerns were articulated in future scenarios. This included, for example, emphasis on certain stakeholders and exclusions of others. We also provided reflections on what ethical concerns and questions are seen as relevant when it comes to Creative AI future(s). In the thematic analysis, we surfaced five qualitative themes (T1-T5), examining the topics and concerns within the FRAs. These themes tell us about the anticipatory ethical concerns that Creative AI practitioners found central (T1 and T2), they provide insight into characteristics that were projected into the future scenarios in anticipatory ethics reflection (T3, T4), and what the practitioners considered as valuable to strive towards in futuring of the field (T5).

Our results illustrate that nature of creativity and role and relationship of AI and humans were central ethical concerns in many

of the FRAs. This is noteworthy, because the workshop's brief and probing reflective questions contained notions of sustainability, cultural values, and worldviews – areas of ethical reflection that were nearly completely absent. No abstract explicitly focused on environmental sustainability or cultural value-oriented questions beyond the critique of capitalism. This aligns with the critical remarks by Bardzell, Harrington and Dillahunt, Heitlinger et al., Søndergaard et al. discussed earlier, which point to the danger of bolstering dominant power structures and injustices perpetuated by the technology when focusing on speculation without incorporating insights from critical perspectives [3, 36, 38, 70]. Similar studies conducted by Jääskeläinen et al. surfaced related insights, by highlighting the absence of certain worldviews, perspectives and values in socio-technical imaginaries of Creative AI [41, 42]. In the first one of these studies [41], Creative AI practitioners were asked to sketch future technologies, and themes of environmental care and sustainability were also minimally present. This supports our findings and highlights how homogenous imaginaries might surface through various approaches to speculation, particularly if the studies are conducted in a similar cultural and socio-technical landscape. In these prior studies, as well as our study, the locus of the studies was a Western cultural context. This further highlights that in future FRA studies we may want to adopt specific angles (decolonial, more-than-human, etc.) and actively work to re-configure the imaginaries in futuring of Creative AI with stakeholder communities. It should also be explored further how these critical perspectives relate to and can be combined with the anticipatory ethical reflection theory and its three perspectives. One reason for these limited ways of engaging with ATE could be explained by the fact that there is very little work with themes such as environmental sustainability and cultural diversity concerns within the research community that was engaged in the first workshop. This type of research is something that has emerged only very recently. Furthermore, the fast-paced development of the technology (Generative AI that is used for Creative AI systems) has largely overlooked anticipatory ethics in its early development. These trajectories might have influenced how the FRAs engaged with the ATE perspectives to some extent. This also raises a relevant notion that it likely matters when ATE is deployed: to which extent the technology already exists or is adopted into use in society.

However, surfacing the socio-technical imaginaries openly without imposing constraints – as we aimed to do in this study – can be an effective way to examine the current state of anticipatory ethical concerns. In our FRA workshops, we wanted to start by having a broad and open space without guiding the participants too much regarding their chosen issues. This arguably helped us to get a rich set of qualitative insights to understand what our participants genuinely consider core issues for the future of Creative AI. Therefore, we consider such an open approach instrumental in the beginning of participatory processes for anticipatory ethical reflection. We consider the FRAs and this study as situated, contextual evidence, which should be interpreted as a snapshot of the values and concerns of certain Creative AI stakeholders at a certain point in time. This implies a lot of space for future work to examine the nuances in the imaginaries and ethical concerns in various, differently situated Creative AI communities, as well as how these imaginaries, discourses, and concerns actively develop over time. Furthermore,

it would be crucial to bring in perspectives of *power*, as various stakeholder communities might have a diverging power in futuring Creative AI. For example, large companies' engineering teams may have more impact on the directions of technology development than small-scale Creative AI engineers or artists. Hence, it would be essential to bring perspectives of power more concretely into the analysis in order to address the societal dynamics in the futuring of Creative AI technology.

Resonating with calls from emergent Creative AI-related research to involve speculative approaches [28, 39, 42, 50] as well as critique of speculative research [3, 15, 36, 38, 70], we find it crucial to engage in long-term and committed work with stakeholder communities to bring certain values into the discussion and imaginaries around Creative AI. This aligns with the broader commitments of HCI [2, 24] in which the stakeholders – users, developers, policy-makers, etc. – are brought into the speculative discussions but also empowered to work as change agents to reconfigure the futures of technology to favour community and planetary interests rather than corporate and political agendas.

7 CONCLUSION

In this paper, we engaged Creative AI practitioners in critical speculation around future of Creative AI using the FRA method. We provided an empirical analysis of the abstracts and discussions around them that shed light on anticipated future ethical concerns surfacing in relation to Creative AI, as well as the foci and limitations of the anticipated ethical concerns. We highlight, that there is a need for methodological support in ATE, as well as committing to certain critical perspectives in ATE within Creative AI. Thus, we extend the empirical understanding of the ethical concerns in anticipatory futuring of Creative AI, and provided methodological insights on combining the FRA method and ATE perspective.

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