

DESIGNING FOR CO-CREATION TO ENGAGE MULTIPLE PERSPECTIVES ON ETHICS IN TECHNOLOGY PRACTICE

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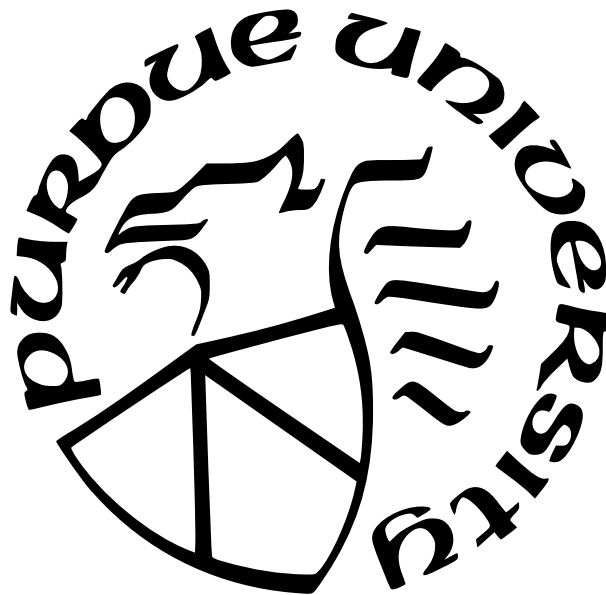
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Dedicated to

Nolin, Elizabeth, Nani, and younger self

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This is a page in this dissertation document I have always wanted to write, from the bottom of my heart. It was my first dream I had when I started knowing the world during my undergraduate studies that I want to do a Ph.D. I did not know what it actually meant back then, but I started to get a grasp of it finally. PhD is not an individual journey, it is not just a degree. I had great pillars of support, encouragement, wisdom, fun, silliness, and life-lessons. I would first like to thank every human being who have been a part of this process from August 2017, teaching me how to be and not-to-be.

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ABSTRACT

As part of an increasing interest in a “Turn to Practice,” HCI scholars have investigated the felt design complexities and ethical concerns in everyday technology practice, calling for practice-led research approaches. Given the ethical nature of technology design work, practitioners have to often negotiate and mediate their personal values, disciplinary notions of ethics, organizational policies and values, and societal impact of their design work. To tease apart and describe practitioner accounts of ethical aspects of their design work, I used three different approaches to investigate what practitioners from different professional roles communicate about and participate in (potentially) strengthening their ethical engagement in their everyday design work within and across role boundaries: survey, design of co-creation activities, and deployment/pilot of these co-creation activities.

In the survey study, I identify and describe the differences in disciplinary values, responsibilities, commitments, and alignment in relation to ethics and social responsibility through captured data from 256 technology and design practitioners from a range of professional roles.

As a part of the design phase of co-creation activities, I design, iterate, and prototype three co-creation activities (A: Tracing the Complexity; B: Dilemma Postcards; and C: Method Heuristics) and sequences of these activities to engage a range of different professional roles to communicate about their ethical action and (potentially) strengthen their ethical engagement in everyday design work. I define design vocabulary/Schemas: 1) *A.E.I.O.U model* to investigate the landscape of ethics in practice and 2) *Classifiers* to codify the activities and potential variants.

As a part of the deployment phase of these designed co-creation activities, I piloted four sequences of these activities with twelve practitioners with three different professional roles per sequence, engaging in approx. 23 hours of facilitation, artifact creation, and conversation. I present the results of deployment of the co-creation sessions where practitioners articulated that the co-creation activities helped *expand* their ethical horizons through self-awareness, *learn* new approaches to ethics vocabulary, *become (re-)aware* of their current practice, and *imagine* trajectories of change in their practice. Practitioners also identified a preliminary

set of ethics-related practices that could be better supported such as tools for performance, leadership support, ethics education, and resources for ethical decision making.

Based on the results from these three approaches, I propose contributions to HCI and design audiences. For HCI researchers, practitioners, and educators, the survey results describe differences in professional notions and valence of ethics, framing the need for translation and transdisciplinary approach to ethics in a practice context. For design researchers, the designing of the co-creation activities is a methodological contribution where I propose and illustrate opportunities for creating novel ways to engage practitioners in co-creation work as a means of communicating their felt ethical concerns and practices. For co-creation researchers and professional ethicists, the engagement of practitioners in the co-creation reveal: 1) complexities to facilitate different disciplinary roles and design a space for “representing” a range of practitioners; and 2) gaps and potential synergies in supporting practitioners through practice-resonant ethics-focused methods.

1. INTRODUCTION

Current headlines report the use of manipulative techniques in our daily design and technological interactions, and even talk about how our world has been “ruined by design” (Monteiro, 2019). Many everyday users and technology researchers have become aware of the famous Facebook–Cambridge Analytica data scandal (Graham-Harrison & Cadwalladr, 2018), articles like “Tech companies use ‘persuasive design’ to get us hooked” (Lieber, 2018) and concepts like dark patterns or dark design (Brignull, 2011; Reuters Staff, 2019). Through these examples of unethical behavior, we can observe that some designers are in fact being manipulative, and many others are disempowered to do the “right” thing due to the realities of industry work (cf., as discovered through my previous engagement with industry practitioners (Chivukula, Hasib, et al., 2021; Gray & Chivukula, 2019)). Given the nature of technology and design practice, ethically-centered outcomes result from the everyday actions of a range of practitioners from different professional roles working in particular contexts. These actors involved in the process of designing technologies can conduct themselves in more or less ethical ways as they constantly negotiate disciplinary notions of their work, organizational culture, fellow-practitioners, and stakeholders (Gray & Chivukula, 2019). Because each practitioner’s mediation is projected or inscribed into the designed product that is eventually released into the society, I use practitioners as my unit of analysis in this dissertation. Therefore, it is important to understand practitioners’ “felt” experiences in professional settings as it relates to their ethical awareness and action. Broadly, I frame my work by asking: What kind of circumstances lead practitioners to take such decisions? Is it practitioners’ lack of awareness about the ethical impacts of their decisions on society, lack of support for them to act ethically, or they are intentionally being evil? How aware are practitioners about their ethical responsibilities, roles, and commitments? In focusing on different professional roles in technology and design practice, I ask further questions such as: What kind of professional role-based discussions or attitudes do practitioners leverage to act or work in an ethically-aware and socially responsible manner? What are the roles and responsibilities of various technology practitioners in designing? These questions frame

my interests in ethical dimensions of technology and design practice with a focus on the professional roles of practitioners.

1.1 Research Focus

In my dissertation work, I approach ethical dimensions of sociotechnical work through a practice-led framing by engaging practitioners from various professional roles in communicating about their felt ethical concerns within their role boundaries, identifying practices that could be better supported. From this professionalization relating to the discipline perspective, I focus on practitioners’ reflections on their work in order to describe the ethical engagement of individual practitioners in *their identified* professional roles and as *they interact* with practitioners from other technology and design professional roles. I define and describe how these professional roles relate to professionalization patterns of academic disciplines in Section 2.2. As a side note, I have started the research framing study around “discipline.” But in the later stages of the research framing and analysis process, I changed the use of “discipline” towards professionalization of an academic discipline to focus on the “professional roles” as identified in technology and design industry. I have discussed in the research design how this shift effected the protocols vs. the reporting process. Coming back to the research focus discussion... The range of technology practitioners’ professional roles I focus on include designers, software engineers, product managers, data scientists, and researchers. I draw from practitioner accounts in my prior research to further describe ethical engagement, awareness, and action in these practitioners’ everyday design work. I build on two prior strands of research in HCI to frame my dissertation study. First, I build upon *practice-led research* approaches as a way to conduct my research, desiring to better theorize practice to bridge the disconnect between research and practice and uncover the complexities “on the ground” in practice; studying how practitioners can be better supported to communicate and reflect upon their ethical engagement and action in their work, in their professional role and their interactions with other roles. I particularly focus this practice-led inquiry on the ethical dimensions of different professional roles in technology practice. Second, I build on existing work claiming the need for practice-resonant methods (Chivukula, Li, et al.,

2021; Gray & Chivukula, 2019; Shilton, 2018; Stolterman et al., 2008) to identify practices that they seek to be better supported in their ethical action, engagement, and responsibility in their everyday work through practice-resonant ethics-focused methods. I further this engagement by proposing specifications or forms of practice-resonant ethics-focused methods as expressed appropriately by the practitioners based on their primary professional role rhetoric and their mediation with practitioners from other roles. I elaborate and position my contribution through my dissertation in the literature as explained in the sections below.

1.1.1 “Turn to Practice” → Ethical Dimensions

HCI researchers have previously critiqued the disconnect between discourses in academic research and practice (Gray et al., 2014; Rogers, 2004; Stolterman, 2008). Some researchers have proposed translational models to bridge this theory/practice gap (Colusso et al., 2019) and described the process of enabling “trickle-down” and “bubble-up” flows for knowledge between research and practice communities (Gray et al., 2014). Resonant with the third wave HCI research and practice, a research agenda to “turn to practice” (J. Bardzell et al., 2015; E. Goodman et al., 2011; Harrison et al., 2011; Kuutti & Bannon, 2014; Rogers, 2004) was proposed, with the goal of revealing the design complexity that practitioners are embedded in rather than shaping theories only around individual’s responsibility and processes (Stolterman, 2008). In my research, I take a practice-led approach by designing for and directly engaging with practitioners from different professional roles; grounding my research in practitioners’ accounts as they share, articulate, co-create, and reflect on their felt ethical aspects of design and technology work, and also proposing how my contributions can build on the translational aspects of research into technology practice in Chapter 7.

1.1.2 Ethical Dimensions → Professional Role-based Aspects of Technology Practice

HCI researchers have previously studied the complex nature of practice (Stolterman & Pierce, 2012; Zhang & Wakkary, 2014). Some researchers have provided evidence to support the importance of engaging with ethical practices through a practitioner lens (Gray &

Chivukula, 2019; Shilton, 2013, 2018; Shilton & Greene, 2017; van Wynsberghe & Robbins, 2014). Other researchers have proposed ways to better support designers' responsibility to create value-centered or human-centered designs (Friedman et al., 2002; Gray & Boling, 2016; Stolterman et al., 2008). Taking a practice-led framing, scholars in HCI as well as Science, Technology, and Society (STS) have engaged in: describing the impact and role of ecological factors in ethical decision making (Gray & Chivukula, 2019; Greene & Shilton, 2018; Shilton, 2013); proposing pragmatic theories for improving ethical decision making in teams in practice (Shilton, 2013; van Wynsberghe & Robbins, 2014); identifying individual practitioners' beliefs, practices, concerns, and role in ethical aspects of practice (Chivukula, Hasib, et al., 2021; Chivukula et al., 2020; Lindberg et al., 2021; Shilton & Greene, 2017; Weller, 2020; Wong & Mulligan, 2019); proposing methods for pragmatic ethical action (Chivukula, Gray, et al., 2019; Flanagan & Nissenbaum, 2014; Friedman & Hendry, 2019; Friedman et al., 2013; Shilton, 2010); and informing the social responsibility of designers through exemplars from everyday ethical concerns (Chivukula, Watkins, et al., 2019; Fansher et al., 2018; Gray et al., 2021; Gray et al., 2020; Gray et al., 2018). Building on prior research relating to ethical aspects of technology and design practice, I assessed that most of the prior work has targeted a particular professional role such as UX designers and software engineers, or focused on a particular value lens such as privacy or security. In my research trajectory prior to this dissertation work, I began by exploring dimensions of ethical awareness and practices of UX designers and extended the practitioner pool to a range of practitioners across the sociotechnical spectrum. I found an opportunity space to explore the resonance of ethics across different professional roles. Building on my past industry experience as a designer, researcher, and strategist, I have interacted with practitioners from different professional roles and negotiated various role-focused attitudes and ethical perspectives to create a digital product. There are various personal approaches to ethics, which often intersect with their primary professional role-focused notions of practitioner's work, organizational culture, fellow-practitioners, and stakeholders. In this study, **I build upon the professionalization of technology and design practice**, seeking to design ways to better describe how practitioners build, navigate, leverage, critique, and disagree with their primary professional

role-based knowledge of ethics; and engage, align, and interact with practitioners from other professional roles during ethical action.

1.1.3 Support for Expressing and Facilitating Ethical Engagement

Building on this focus of studying ethical aspects of technology and design practice with a professionalization focus, I seek to mitigate existing disconnects between methodological interventions in academic research and actual applications in practice (Colusso et al., 2019; Gray et al., 2014), starting by investigating technology and design practitioners' commitments towards their notions of ethics, and engaging these practitioners to communicate about their ethical engagement, action, responsibility, and need for support in their everyday design work. I intend to focus on the lens of ethics-focused methods and support for ethical engagement, including practitioners' level of awareness, resonance, and application of these methods in their everyday work. Stolterman, Gray, and colleagues (2016; 2014; 2008; 2008) have shown how the research-practice disconnect has resulted in the lack of resonance of practical support for interaction design practice, and I have found similar results about the ethical support of practitioners in recent studies (Chivukula, Li, et al., 2021; Chivukula et al., 2020). In HCI and STS literature, research focusing on socially and ethically responsible impacts of designed technology has largely focused on various methodological improvements to the design process, taking into account a designer's responsibility and related organizational structures. Several frameworks and methodologies have addressed how values, critical reflection, and ethics could be incorporated into designers' everyday work, including approaches such as value-sensitive design (Friedman & Hendry, 2019; Friedman et al., 2002; Friedman et al., 2013; Hendry et al., 2021), critical design (J. Bardzell & Bardzell, 2013; J. Bardzell et al., 2018), professional code of conducts (Wolf et al., 2019), values at play (Flanagan & Nissenbaum, 2014), value levers (Shilton, 2013), steps to become an *ethicist* (van Wynsberghe & Robbins, 2014), and many more. Methods proposed by academic researchers often focus on end-to-end processes as viewed from an academic perspective (Roedl & Stolterman, 2013), without specific identification of the mediating roles of multiple actors from different disciplines (e.g., designers, technologists, developers, users, data scientists) (Shilton, 2018)

and the complexity of design practice (Gray & Chivukula, 2019; Kuutti & Bannon, 2014; Manders-Huits & Zimmer, 2009). While not all methods lack a connection with practice, practitioners' awareness and the resonance of these methods with everyday practice is still understudied (Shilton, 2018). Alongside providing ways for practitioners to better communicate, engage, and reflect on their everyday ethical engagement, in my research, **I focus on identifying the practices that practitioners desire to be better supported to enable better ethical engagement in their everyday work.**

1.2 Study Overview

I take a practice-led approach to conduct and achieve the goals of my research, which involves exploring and recording “felt” concerns and practices as they occur (E. Goodman et al., 2011; Gray et al., 2014; Zhang & Wakkary, 2014). In the **first part of my dissertation work**, I identify and describe practitioners' different professional orientation, roles, responsibilities, and values concerning ethics and social responsibility through a *survey* study, capturing data from a range of technology and design practitioners. The analysis of these survey results provides a descriptive account of how different professional roles reveal: 1) how a practitioner's professional role defines their notion of ethics using the language of human values; 2) a practitioner's ethical orientation towards various aspects of decision making, i.e., users, discipline, stakeholder, and society; and 3) alignment/ misalignment of values with other professional roles during practitioner interactions in everyday work. In the **second part of my dissertation work**, I design, deploy, and analyze *co-creation sessions* held with practitioners to identify felt ethical concerns in the boundaries of their professional role and interactions with other roles. These co-creation sessions aid me in: 1) contributing a methodology that supports design efforts to engage practitioners in communicating about ethics and supporting them to participate in articulating, reflecting, and extending their ethical engagement in their everyday work and 2) describing a preliminary set of ethics-focused practices that could be supported through future work.

1.2.1 Research Questions

To address this purpose, I seek to answer the following research questions:

1. **Research Question 1: How do practitioners from a range of professional roles describe their ethical orientations, commitments, and alignment with other practitioners?**
 - (a) How do practitioners describe their ethical engagement as a member of their profession through the language of human values?
 - (b) How do practitioners describe their ethical commitments as an individual and anticipate ethical commitments of practitioners from other professional roles?
 - (c) How do practitioners describe their degree of ethical alignment of their professional role with other professional roles?
2. **Research Question 2: How can I engage practitioners from a range of professional roles to communicate about and participate in potentially strengthening their ethical engagement?**
 - (a) What supports are needed to facilitate practitioners' engagement in discussions or generative activity regarding ethical dimensions of their work?
 - (b) What did practitioners articulate, reflect, and express about their professional experiences, their ethical responsibility, and kinds of ethical practices they seek to be better supported in their everyday work through the provided supports?

1.2.2 Research Design

To answer the above research questions, I conducted two related studies, each answering one research question. My research design required me to take on and shift across the roles of qualitative researcher, designer, and design researcher, which is further elaborated in Chapter 3.

To answer **Research Question #1**, I build upon preliminary work from an interview study that I collaboratively conducted, collecting data from fifteen practitioners from a range

of technology and design roles. I extend an initial analysis of these interviews to inform the design of the primary instrument of Study 1, a **survey**, to distribute and capture data from a range of practitioners across geographical locations and industry types. The survey recorded practitioners' personal values and commitments; their disciplinary and organizational values; their awareness of existing ethics-focused methods and knowledge about their everyday ethical aspects (not the focus of this study); and ethical commitments and alignment with practitioners from other professional roles they interact daily in their professional work.

To answer **Research Question #2**, I built upon the results from Study 1, my design expertise, and industry experience to design and deploy **co-creation activities** as a part of Study 2. I primarily drew from Research through Design (RtD) approaches (Koskinen et al., 2011; Zimmerman & Forlizzi, 2014) and co-creation methodologies (E. Sanders & Stappers, 2008) with the main goal of engaging a range of practitioners from different professional roles in communicating about and participating in reflecting, articulating, and (potentially) strengthening their ethical engagement (Study 2.1). I conducted 90-120 minute pilot **workshops** with twelve practitioners using the designed co-creation activities (Study 2.2).

1.3 Expected Contributions

In this set of research studies, I take a practice-led approach to: 1) identify and describe how a range of technology and design practitioners engage with their responsibilities and primary knowledge of ethics as framed by their professional roles as individuals; and 2) identify how these practitioners interact with practitioners from other professional roles during their everyday work. I anticipate the results of my study will directly contribute to strands of work relating to technology ethics by HCI and STS researchers, design and technology practitioners, design researchers, and ethics researchers or professional ethicists.

For **HCI researchers and practitioners**, the survey results provide a descriptive account of the human values that are considered by the practitioners' professional role; commitments towards various aspects such as user, stakeholder, discipline, or society during decision making; and a comparative account of any alignment or dissonance in these value considerations across different professional roles. These findings will allow the HCI community to

identify and describe resonance in everyday practice among professional roles and highlight opportunities to identify, build, and disseminate practice-resonant supports. These findings are also expected to further encourage taking on a transdisciplinary approach towards ethics and values in practice and research contexts.

For **design researchers**, the design and implementation of various co-creation activities provide a methodology that will provide an illustrative collection of new ways to conduct practice-led research work with an ethics-focused framing. The design outcomes I created are intended to engage and support a range of technology and design practitioners in communicating and expressing their felt ethical concerns and practices. This methodological contribution through the design vocabulary I propose provides a framework for design researchers designing such co-creation activities or spaces. This framework may guide further development of the proposed co-creation activities to provide practitioners with an opportunity to participate in translating or producing supports to be ethically engaged in their professional role and during their interaction with practitioners from other roles.

For **ethics researchers or professional ethicists**, the results from the engagement with practitioners will provide descriptive accounts that are expected to reveal opportunities to: 1) support practitioners' ethical engagement, both individually and during interactions with practitioners from other professional roles; 2) design vocabulary or language around designing to engage a range of professional roles about ethics in everyday practice and practice-resonant ethics-focused methods; and 3) specify or provide examples of kinds of support practitioners identified to (potentially) strengthen their ethical engagement. These results are anticipated to allow researchers to further compare, contrast, and evaluate existing ethics-focused methods.

1.4 Dissertation Structure

The structure of this dissertation document is as follows: In **Chapter 2**, I present a literature review to provide definitions and inform the methodology for my research study

and showcase the landscape of work related to my research on topics such Practice-focused research in Ethics; Professionalization of Discipline; Ethics in Philosophy, Industrial Organization, Behavioral Economics, and Technology Design literature; ethics-focused methods for design work; and knowledge production practices in HCI such as Research through Design, Co-creation, and Co-design. In **Chapter 3**, I describe the study design, data collection, and data analysis procedures for Study 1, Study 2.1, and Study 2.2, and detail aspects of my research approach and positionality that inform its validity, reliability, trustworthiness, and transparency. The next three chapters relate to the results and findings of this research study; providing the professional role’s, designer’s, and practitioner’s stories respectively. In **Chapter 4**, I answer research question #1 with survey results that describe how 256 practitioners from different professional roles recorded their identified role’s ethical orientation using the language of human values (RQ #1a), practitioners’ own and anticipated ethical commitments towards users, discipline, stakeholders, and society (RQ #1b), and practitioners’ ethical alignment of their professional role with other roles they interact in their everyday work (RQ #1c). In **Chapter 5**, I answer research question #2a by providing my designer account of designing and facilitating three co-creation activities along with its variants and sequences, setting the stage to engage twelve practitioners through one-one workshops. In **Chapter 6**, I answer research question #2b by conducting *thematic analysis* to present what practitioners articulated, reflected, and expressed about their engagement in co-creation activities, and use *artifact analysis* to identify what kinds of ethical practices practitioners desired to be better supported. In **Chapter 7**, I extend the findings from Study 1 and Study 2 to discuss how the designed co-creation activities can be treated and expanded as a space of self-activism for practitioners and as methods for building practitioner’s ethics-focused design identity and responsibility. In **Chapter 8**, I provide a summary of findings that relate to my research questions, and identify implications and future work based on my research findings. The chapters are followed by references and appendices.

2. LITERATURE REVIEW

I aim to investigate the ethical aspects of technology and design practice from a disciplinary perspective by leveraging practice-led approaches to better describe ethics-focused practices and methods. Through my work, I aim to engage with practitioners through co-creation sessions to: 1) learn about their felt ethical concerns within and across their disciplinary boundaries; and 2) translate or produce specifications or forms of practice-resonant ethically-focused methods as technology practitioners rely on their disciplinary notions of ethics and align their interactions with practitioners from other disciplines. To support this investigation and build on prior work, I present the following sections of my literature review:

1. Turn to Practice: Literature about the academic research-practice disconnect in HCI and practice-led research approaches. Additionally, I review practice-led ways of conducting research in technology practice regarding ethics.
2. Ethical theories and perspectives: Literature about perspectives of ethics as defined by researchers in fields such as philosophy, organizational psychology, behavioral economics, and technology and design ethics.
3. Methods to support ethical practice: Literature about existing ethics-focused methods, frameworks, practices, and resources to support practice.
4. Knowledge production and research approaches in HCI: Literature about potential approaches to conduct my practice-led work, including Research through Design (RtD), co-creation, and co-design approaches.

In this literature review, I outline and acknowledge existing work done related to my research topic and gather definitions or frameworks for different theoretical constructs used in this research study.

2.1 Turn to Practice

In this section, I seek to describe the academic research and practice disconnect and how this disconnect led to HCI and STS researchers' call for a "turn to practice." I illus-

trate practice-led work conducted by HCI researchers, including work conducted specifically to investigate ethical aspects of technology practice. This review helps me to build upon practice-led approaches to research with technology practitioners. It also helps me position my work in relation to already conducted work in describing ethical aspects of technology and design practice.

HCI researchers have reported the academic research-practice or theory/practice disconnect, with impacts on HCI research and practice (Colusso et al., 2019; E. Goodman et al., 2011; Gray et al., 2014; Kuutti & Bannon, 2014; Rogers, 2004; Stolterman et al., 2008). Studies done to uncover this disconnect discovered a lack of practical tools for designers (Stolterman et al., 2008), a need for a “solid understanding of existing practice [that] must ground research aimed at supporting interaction design practice” (E. Goodman et al., 2011), and a lack of practitioner awareness of academic theories and methods, including their resonance with practitioners’ everyday work (Roedl & Stolterman, 2013; Rogers, 2004). Stolterman (2008) has emphasized the adoption of more practice-oriented research to bridge this theory/practice gap and build a rationality resonance, which argues that “any attempt to introduce a new ‘rationality’ into practice has to resonate with the already existing rationality.”

Adopting the “practice turn” from other social science disciplines Kuutti and Bannon (2014) proposed a “turn to practice” to better “understand [the] ‘context’ of interaction” by “conducting research ‘in the wild.’” This approach has been proposed to have benefits for HCI, CSCW, and Information Science communities in bringing academic research and practice closer together. Gray et al. (2014) proposed the need for a dynamic flow of knowledge, trickling down from research to practice to build resources for practitioners and bubbling up from practice to research to study how those designed resources are used, not used, or evolved. Colusso et al. (2019) proposed a more detailed model to bridge translational gaps among three communities: basic research, applied research, and practice. Goodman et al. (2011) provided ways for “researching practice” to make “theories grounded and recognizable from the perspective within practice” such as extending the methodology toolkit to include “first-person” research approaches and theorizing practice whenever possible.

Taking a practice-led approach to HCI research, Stolterman and colleagues have studied the design complexity—defined as “the complexity a designer experiences when faced with a design situation”—that exists in practice (Stolterman et al., 2008). Gray, Zhang, Stolterman, and their colleagues have studied the adoption of theory in practice for design competence in UX design practice (Gray et al., 2015), design practitioners’ awareness and use of designed tools (Gray, 2016; Stolterman & Pierce, 2012), accounts of characterizing disciplinary knowledge (Kou & Gray, 2019), and experiences of how designers inscribe personal experiences into design work from an organizational perspective as a form of knowledge of design practice (Zhang & Wakkary, 2014).

2.1.1 Investigating Ethics in Practice

Gray, Shilton, Friedman, Lindberg, Wong, and colleagues have conducted research to investigate ethical dimensions of technology and design practice. Shilton and colleagues have conducted studies informing and targeting STS venues to identify value considerations in interdisciplinary teams (Shilton, 2010), levers to encourage value implementation in a design process (Shilton, 2013), educational tools to engage designers in privacy work (Shilton et al., 2020), practitioner conversations about mobile application privacy (Shilton & Greene, 2017), and surfacing ethical challenges and norms in online social research (Shilton & Sayles, 2016; Vitak et al., 2016). From her ethnographic work with engineers taking part in a design process of software systems (Shilton, 2010), Shilton defined “value levers” (Shilton, 2013) as a way to characterize the manifestation of values. Through value levers, values “were seen as a boon to creativity and new innovation” treating them as a lever to manifest values as a design criteria. The listed value levers, although derived from a particular context, can be widely applicable to promote social values in interdisciplinary teams and with business stakeholders, considering ecological factors in a design process supporting resonance with technology practice. Friedman and colleagues have proposed theoretical and methodological improvements to value-oriented computing work by proposing “Value Sensitive Design” as a methodology to conceptually, empirically and technically investigate values in technology (Friedman & Hendry, 2019; Friedman et al., 2002; Hendry et al., 2021). I detail Friedman and colleagues’

work in the “Methods for Ethical Practice” section for its relevance. Lindberg and colleagues co-created “actionable ethics” with design practitioners to define how designers can self-cultivate ethical practices for “the designer role,” “the design studio,” and “the practice” (Lindberg et al., 2020); and “noticing, reflecting and reacting” are three ways how design practitioners approach ethics in their practice (Lindberg et al., 2021). Wong and Mulligan (2019) explored the role of UX practitioners in privacy related decisions in the industry and suggest extending design efforts for privacy concerns. Gray and colleagues have conducted a variety of studies targeting the HCI audience. Gray and Chivukula (2019) defined a model of ethical design complexity, positing that individual practitioners are a part of a “complex and choreographed arrangement of ethical considerations that are continuously mediated by the designer through the lens of their organization, individual practices, and ethical frameworks.” This model gives me a basic framing of various factors involved in ethical decision making, where I am focusing mainly on discipline. Chivukula et al. (2020) reported five dimensions of ethical awareness of UX practitioners “on their own terms” including positionality of UX discipline in the enterprise, self and stakeholder education, conflicts and balance in decision making, identifying design activities for ethical engagement, and futuring. This work describes how practitioners characterize and contextualize their ethical awareness, where I gain knowledge of a broader set of factors that enable or disable their ethical engagement. Gray et al. (2018) theorized practitioners’ conversations about unethical practices focusing on the concept of “dark patterns.” This work clarifies a practitioner-defined term called “dark patterns,” where I have gained grounded examples of manipulation and deception as inscribed by technology practitioners. Chivukula et al., (2021) identified eight “identity claims” of a range of technology and design practitioners that describe their ethical awareness and action in everyday practice. These identity claims are “I am learner,” “I am an educator,” “I am a policy-follower,” “I am a translator,” “I am a member of my profession,” “I have a sense of responsibility,” “I am an activist,” and “I am deliberative.”

To summarize, building and adding to the above cited work, I plan to explore the ethical aspects of technology and design practice, with a focus on discipline. My focus for this research is to describe practitioners’ disciplinary knowledge of ethics as they engage in

ethically-nuanced situations, both individually and as they interact with practitioners from other disciplines. Secondly, I aim to engage practitioners directly in communicating about their felt ethical concerns with the goal of producing or translating practice-resonant ethics-focused methods that support them in ethical engagement within and across disciplinary boundaries.

2.2 Professionalization of Discipline, a.k.a. Professional Roles in Tech Industry

Discipline in academia signifies “a method of training or instruction in a body of knowledge” (Turner, 2006). Discipline is defined in Webster’s dictionary as “a branch of instruction or learning” or “to train by instruction and exercise; drill” (“Discipline”, 2008) and in Oxford English Dictionary as “a branch of knowledge, typically one studied in higher education” (“Discipline”, 2005). Discipline when contextualized as an ecology relates a body of knowledge into procedures that are applied to build new knowledge, drawing conceptual and administrative linkages between discipline, profession, and a job role (Dyck, 1994). Given the range of disciplines and various ways they can be operationalized in an industry context, I focus on the professionalization outcomes of a discipline. Disciplinary profession or job role is defined when people “make their living with academic work and as a rule are ‘employed’ with a contract that guarantees money in exchange for regular work under specified work and employment conditions” (Teichler et al., 2013, p. 9). Alligood (2018) defines professions as “a specialized field of practice, founded upon the theoretical structure of the science or knowledge of that discipline and accompanying practice abilities.” Professionalization of any discipline is indicated as the means by which a “specific occupational group is able to establish a ‘market monopoly,’ or exercise control over certain services that excludes other occupations” (Kou & Gray, 2018). This means that discipline is generally the foundation of a profession, despite its volatile foundations with different potential roles branching out from a particular academic discipline. In this section, I establish the definition of professionalization as used in the context of my research study.

In this study, I focus on *professionalization* that relates to, but is not completely determined by, academic disciplines that shape the job functions of various practitioners involved

in producing digital products and services employed in a tech industry. When I say that I am studying ethics in practice from a “professionalization of discipline” lens to engage technology and design practitioners, I refer to various “professional roles” and specific job functions in the technology industry that include the direct involvement of practitioners that create a technological product. These practitioners are typically bundled into groups of computing professionals or information technology professionals. I primarily focus on five professional roles which include: UX/ Product designers, Software Engineer/ Developers, Product Managers, Data Scientists, UX Researchers, and Hardware Engineers. In Table 2.1, I define these professional roles, job functions, and responsibilities as described in the literature. This list of roles is based on the most commonly known and recognized professional roles in the current technology industry. These roles have varying levels of volatility as it relates to academic disciplines. For example, the role of a *product manager* does not have a direct connection to an academic discipline called product management, but rather potential disciplines of business administration or sometimes, these roles result through years of experience in the industry. The role of a UX designer and researcher is related to a much nascent discipline (Kou & Gray, 2018) whereas the role of a software engineer has stronger links to the computer science academic discipline. In my study, I have focused on these professional roles as identified by the participants themselves, with an assumption that they primarily represent themselves through their selected role. I do not seek to fully understand or interpret their trajectory in relation to their academic discipline(s) and/or other roles they might have taken in their professional journey.

2.3 Ethical theories and perspectives

In this section, I provide a review of various ethical theories and perspectives drawn from the following disciplinary perspectives:

- Ethics in *Philosophy* defines broader ethical theories that encompass the functioning of ethical norms and moral philosophy in the world which forms the base of their decision making and conduct oneself as an individual or a practitioner. For my research, this review provided me with vocabulary for potential ethical theories on which individual

Table 2.1.

Definitions of technology and design professional roles and responsibilities.

Role	Definition (Source)
UX/Product Designer	<p>“A User Experience (UX) designer is involved with all facets of product development regarding its purchasing, branding, usability and functionality. They collect and review user feedback to determine what a product needs to be efficient, functional and successful. They apply this feedback to the design, organization and usability. These professionals then monitor the process of testing and revising products until they meet their consumers’ high-quality standards” (Indeed Editorial Team, 2021). Muller states: “Designers are typically concerned with the visual and dynamic design of products – and sometimes, as well, with the usability of products.” (M. J. Muller & Carey, 2002).</p> <p>“Software developers are the creative minds behind software programs, and they have the technical skills to build those programs or to oversee their creation by a team. They create software that enables users to perform specific tasks on computer devices” (Doyle, 2020); “software engineers apply their knowledge of mathematics and computer science to create and improve new software. They may work on enterprise applications, operating systems and network control systems, which are all examples of software that can be used to help businesses scale their IT infrastructure” (Indeed Editorial Team, 2021). One developer states “I code and test the functionality of databases and/or other web based systems” (Putnam & Kolko, 2012)</p>
Software Developer/Computer Scientist/Engineer	<p>Product Managers “Manage[s] the entire product lifecycle and product roadmap” (“A complete guide to product management roles”, 2021). One PM says: “I create deliverables (specifications and requirements) that guide and manage design” (Putnam & Kolko, 2012)</p>
Product Manager/Project Manager (PM)	<p>“A data scientist analyzes and organizes data to determine trends that can influence business decisions. Their methods and IT tools use statistics and machine learning to help collect and process a company’s data such as financial records, sales, prospects and lead generation” (Indeed Editorial Team, 2021)</p>
Data Scientist	

practitioners base their decision making and how different disciplines define ethics or values as drawn from these ethical theories.

- Ethics in *Industrial/Organizational Management* defines ethics as treated by organizations and various components that practitioners are a part of their larger professional settings. For my research, this review allowed me to describe the landscape

of organizational ethical responsibilities and ecological forces that influence individual practitioner’s decision making.

- Ethics in *Behavioral Economics* defines the ethics of decision making as embedded and leveraged through cognitive, economic, and social factors of technology work. For my research, this review provided vocabulary and knowledge to define the capitalist nature of technology work that practitioners are expected to design for end-users or consumers.
- Ethics in *Technology and Design* describes the inscription of values of designers mediated across an individual, disciplinary roles, organizational structures, societal impact, and applied ethics. For my research, this review provided definition for my focus in tech ethics while building a product and background work to my contributions directly to the literature in the space.

2.3.1 Ethics in Philosophy

In philosophy, ethics is talked about in terms of “relevance”, meaning “ethical terms are instruments used in the complicated interplay and readjustment of human interests” (Stevenson, [1937](#)). There are two common views to categorize how philosophers approach ethics: 1) approaches to ethical standards, and 2) ethical theories based on moral philosophies. Five ethical standards that suggest how to approach ethical action: the utilitarian approach, the rights approach, the fairness, and justice approach, the common good approach, and the virtue approach. These are different approaches that a person can take to evaluate or approach an ethical situation. These are analogous to mindsets of people, but there are also evident ethical theories that were defined by philosophers to define various styles and categories of ethical decision making.

There are three broad categories of ethical theories: metaethics, normative ethics, and applied ethics. Metaethics is the stream of ethical theories that “investigate where our moral values, language, and principles come from and what they mean” (Kurdylo, [2014](#)). One can engage with this stream of ethics without taking a stance, but questions such as

where those standards came from and how it deals with moral epistemologies still exist (Sayre-McCord, 2014). I treat meta-ethics primarily as a research goal of philosophers to understand the basic foundations of how ethics plays a role and what can a word mean in a certain context to call it ethical. Different from meta-ethics, which deals with moral epistemology, normative ethics looks into what is right or wrong based on “consequences, harm, and consent” (Kagan, 2018). These ethical theories are epistemological contributions of this field to mention the forms in which ethical decision making and ethical situation evaluation happens. Normative ethics deals with questions such as what features make a situation, when evaluated, good/bad or right/wrong (Hursthouse & Crisp, 2013). The three broad perspectives, presented as ethical theories are deontological ethics (aligning with Kantian ethics), consequentialist ethics (built on utilitarianism), and virtue ethics (a new turn in ethical theories). The deontological approach derives from *deon* meaning duty and *logos* meaning science or study. According to deontological ethics, ethical decision-making happens through a certain set of norms already prescribed for a context that is “required, forbidden, or permitted” (Alexander & Moore, 2016). Being prescriptive in nature restricts the deontological lens from addressing the broader implications of ethical decision making. Consequentialism, taken as a contemporary philosophical stance for act-utilitarianism, refers to “moral views or theories which base their evaluations of acts solely on consequences” (L. C. Becker & Becker, 2001). Taking a consequentialist ethical lens has dual nature; this approach can be used as an evaluative tool to grade the standard of “good” action or as a useful action-guiding rule in decision making for utilitarian outcomes (Chappell, 2001; Mill, 1895). Consequentialist ethics leverages ends-based thinking in focusing on the impacts of a certain decision and evaluates the ethical situation based on its ends or consequences. A turn from a deontological and consequentialist lens in ethical theories with more “interest in the character of a moral agent and how it relates to overall well being” is called virtue ethics (Bowin, 2020). Virtue ethical theory defines that ethical decision-making lies in the hands of the decision-maker and aligns with their moral valence. To summarize, deontologically, an authority of some sort tries to prescribe duties that have to be used in ethical decision making. Consequentialism argues that the receiving ends of the utility decides the ethical valence or even the decision-maker can act accordingly to think through the consequences

of an action. Virtue ethics focuses on the moral and ethical valence of the agent who takes the decision.

A newer form of ethical theory focuses on pragmatic ethics. As LaFollette (1997) describes: “Theorizing is valuable, for sure, but its value arises from practice, is informed by practice, and its proper aim is to clarify, coordinate, and inform practice.” Pragmatic ethics falls under a third broad category of ethical theories called applied ethics. In a practical sense, it focuses on which theoretical approach a moral agent takes during decision making. As a new field in moral philosophy, applied ethics is taken to be the application of ethical theories to practical moral problems (Gert, 1984). This definition does not mention either the content or the methods used through applied ethical theories. In philosophy, researchers provide the language of moral philosophies, which are later in real contexts through theories of applied ethics. For example, (Walsham, 1996) presents an evaluation of codes of ethics in information systems (IS) practice. This work talks about applied ethics in the form of a “code of ethics” and falls at the intersection of organizational psychology and philosophy. As applied ethics is more embedded in the context, this strand of ethical theories can be further investigated, through a description of how the fields of Industrial/Organizational Psychology (IO Psychology) and Behavioral Economics (BE) treat or implement ethics through their policies, practices, and production.

2.3.2 Ethics in Industrial/ Organizational Management

In Organizational Psychology, “we cannot avoid the economic, sociopolitical and human developmental antecedents of individual and organizational ethical behavior any more than we could hope to understand the functioning of an organization as if it were a closed system, ignoring its cultural history and the social, political and economic environments that influence and set constraints on its internal policies and external actions” (Katz & Kahn, 1978). To give an overview of my synthesis, Figure 2.1 shows the various internal and external influencers in ethical decision making in an organization. I have identified three main actors: the corporate organization, society, and an organization external to the organization of your

interest (ex: the Government). I summarize my analysis through three different forces of ethics playing out among these actors:

1. *Internal* to the corporate organization;
2. *External* to the corporate organization which deals with the impact of this corporate organization on the society; and
3. *External* to the corporate organization from the Government, as an organization.

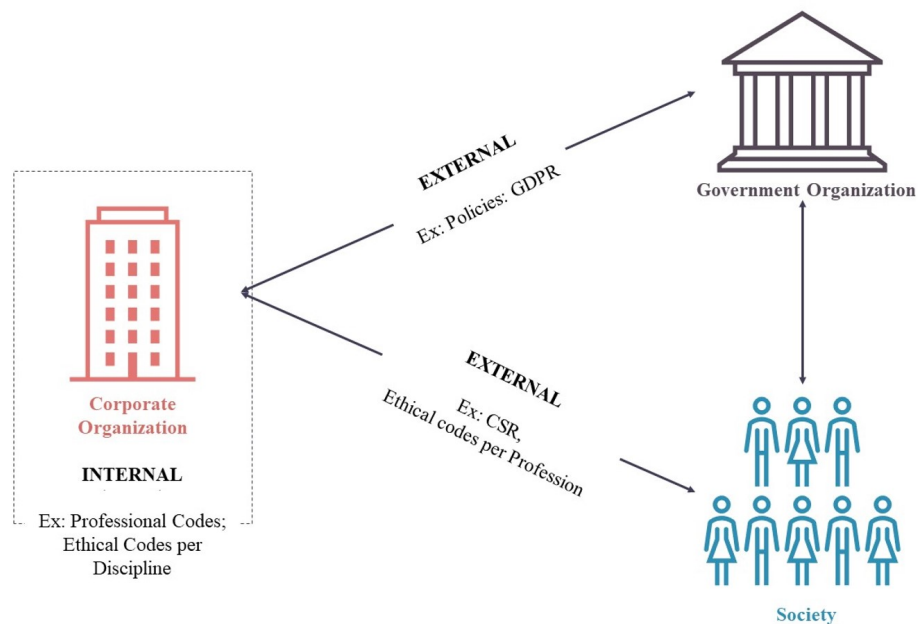


Figure 2.1. Overview of the role of ethics as talked about in Industrial and Organizational Psychology.

Due to the scale of organizations and their impact on ethics in these various forms, IO psychologists usually take a deontological view on defining ethics in these spaces. (Lefkowitz, 2017) lists various domains of moral action that are considered in IO psychology such as Respect for people, Fairness and Justice, Care: Beneficence, and Moral Virtue or Character. These various domains are given a form as Codes of Conduct, Code of Ethics, and legal

policies that are in place. An individual practitioner, as a professional, is expected to do their duty by following these codes.

Internal to the organization, an important assumption taken by IO psychologists is as follows: “As professionals, we cannot do that work very well, at least not for very long, if we do not treat all of those persons ethically— that is, honestly, fairly and with respect and dignity” (Lefkowitz, 2017). This is a basic notion of the ethical conduct of an organization towards its professionals (employees). These consist of codes of aspirational ideals designed by organizational entities such as “governments, professional and trade associations, individual organizations (including business corporations).” These range from Responsible Conduct of Research (RCR) related to research ethics (Macrina, 2014), Organizational Citizenship Behaviors (OCBs) as an appreciation for a person’s voluntary commitment with the company that is off (or beyond) the contractual tasks assigned to the person (Podsakoff et al., 2009), Codes of Conduct and Behavior (Raiborn & Payne, 1990; White & Montgomery, 1980) in defining behaviors of professionals in organizational settings towards colleagues, organization’s internal human resources (Gilliland et al., 2001; Greenberg, 2009) and workers rights (Sukdeo, 2019). These aspects were intentionally separated from the aspects that are internal to an organization but have a more external influence on the society through ethical decision making, detailed in the next section.

External to the corporate organization which deals with its impact on society. This type assumes that professionals carry out good work, “work that is both excellent in quality and socially responsible” (Gardner et al., 2001). These types of ethical decision making mostly work on understanding the societal impacts of the organizational decisions or outcomes and dealing with practical, applied ethics as well as social criticism (Singer, 2011). This happens through two forms: Codes of Ethics and concept of Corporate Social Responsibility (CSR). Due to its relevance, I explain Codes of ethics in detail in the “Methods for Ethical Practice” section. Codes are defined for individual professionals, beyond which the aspect of collective exposure of the organization as the ethical entity is expressed by CSR. From the corporate organization’s perspective, these codes of ethics are expected to work because of the social responsibility of these professionals through their designed outcomes but as a corporate organization, as a unit. CSR defines a “companies’ responsibilities to society”

which provides “ways of assessing corporate social performance” (Moir, 2001). Moving from an individual’s duty to the corporate organizations, CSR “permit[s] a systematic critique of business’s impact upon human consciousness, human community and human continuity.” IO psychology does not talk much about tools that are used for ethical decision making, which might be expected to be discipline-specific and the only way it handles is through these prescriptive forms of rules to follow which do not have much impact on the professionals as they lack details about the application and for all consequences.

External to the corporate organization from the Government, as an organization. This type of decision making is policy-based external influence and is expected to influence corporate organizations internally. Policies, in contrast to codes, focus on one human right at a time. A very recent example of this type is the General Data Protection Regulation (GDPR). It is important to note the expectation through such a move is “Organisational measures must be more effective and embedded throughout the organization, but GDPR builds on transparency and trust enshrined in national and international codes with best practices that put the interests of research participants rightfully at the centre” (Goddard, 2017). Reflecting on the way rights are targeted, one at a time, this might be a good idea over the set of Codes that have to be revised all at a time or remembered, sometimes not accessible either. The question is: How are these policies issued by an external agency (actually, powerful ones) incorporated in daily ethical decision making? Through a recent study to understand the impact of GDPR policy, it is observed that only 11.8% of the content management platforms met the minimal requirements that the policy states in relation to consent procedures (Nouwens et al., 2020).

2.3.3 Ethics in Behavioral Economics

In Behavioral Economics (BE), the process of ethical decision making is derived from social and cognitive psychology. The ethical decision making in behavioral economics revolves around the policies that are in place to influence moral choices or decision making of the general public (citizens) or customers when we focus on an artifact and the marketing that surrounds it, “provid[ing] public policy-makers with the ultimate tool: an ethical,

politically non-controversial approach to influencing the choices and behavior of citizens in accordance with their own interests” (Hansen & Jespersen, 2013). This approach makes BE ethics “grounded in an individual-level cognitive perspective” (Treviño et al., 2006). BE ethics research demonstrates that ethical decision making is influenced, often subconsciously, by situational and social factors and most importantly, taking advantage of cognitive biases (Buss, 2015) through design. Actors involved include economists (Irlenbusch & Villeval, 2015), public policy-makers, choice architects (Thaler & Sunstein, 2009), and customers. (Bommer et al., 1987) maps the “categories [that] include a decision-maker’s social environment, government and legal environment, professional environment, work environment, personal environment, and individual attributes” as referenced in Figure 2.2.

A policy is defined as “a plan, course of action, or set of regulations adopted by government, businesses, or other institutions designed to influence and determine decisions or procedures” (“Policy makers”, n.d.). The meaning of policy in BE is different from that in IO Psychology, where the latter looks into policies that are to be followed by organizations as a part of their CSR. Whereas in BE, the focus is on the policies that are created to offer services to the customers. Developed drawing from theories in from BE, nudge interventions “aim at changing individuals’ behaviors without limiting their freedom of choice, exerting coercion or significantly changing economic incentives” (Lembcke et al., 2019). Proposed by Thaler and Sunstein (2009), the concept of a “nudge” was introduced for public policy-makers to promote behavior change during decision making “in the interest of individual citizens as well as that of society” (Hansen & Jespersen, 2013). However, this concept has received criticism, with claims that nudges promote manipulation and focus on the interests of the policy-makers over other stakeholders (Low, 2011) and that customers are usually unaware of these manipulations. Nudges come in the form of incentives (Lunze & Paasche-Orlow, 2013) or choice architectures (Thaler & Sunstein, 2009). Finding overlaps between persuasion and computing technology, B.J. Fogg, a behavioral scientist, coined the concept of captology (Atkinson, 2006), which describes the persuasive capabilities of technology. These persuasive capabilities include approaches such as persuasive design strategies (Fogg, 2009a, 2009b), black hat marketing (“Diverse Voices: A How-To Guide for Creating More Inclusive Tech Policy Documents — Tech Policy Lab”, n.d.), habit-forming techniques in the inter-

est of the stakeholders (Eyal, 2014), dark patterns (e.g.,(Brignull, 2011; Gray et al., 2018)) and business moves to control customers psychology through design (Nodder, 2013). These tactics are often used by technology practitioners to support the stakeholder’s needs.

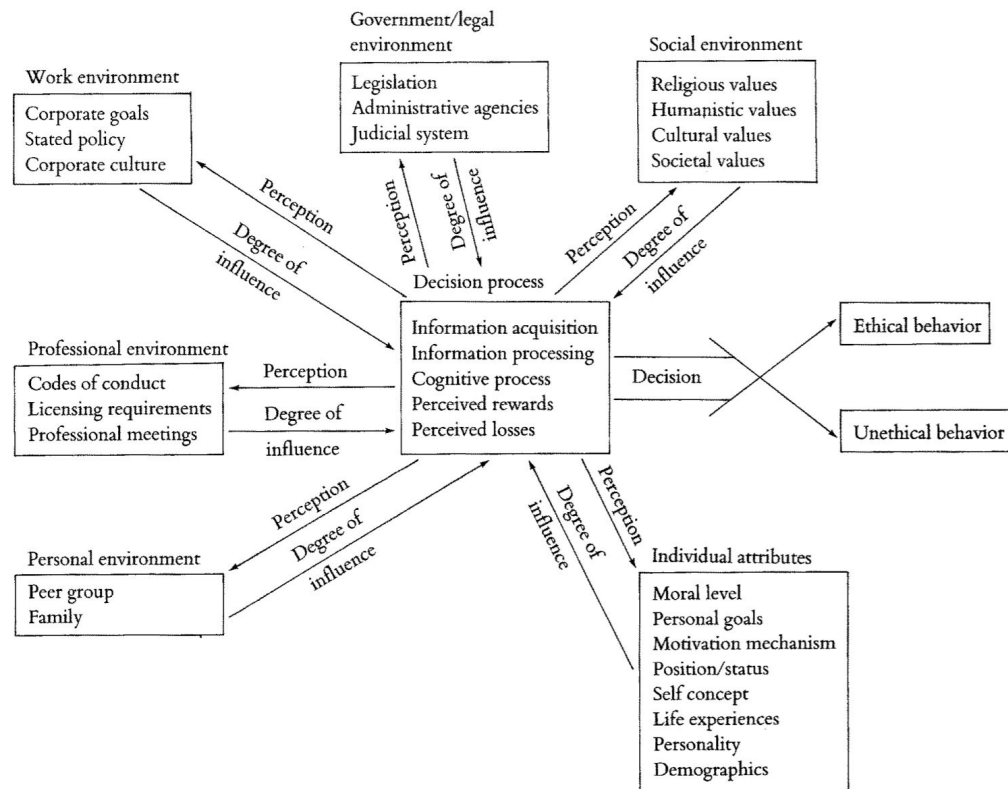


Figure 2.2. A behavioral model of ethical/ unethical decision making (reproduced from Bommer (1987)).

To summarize, ethics in philosophy is approached from an epistemological point of view. In IO Psychology, scholars focus on applied ethics by creating prescriptive forms of engaging in ethical decision making which aligns primarily with deontological ethics. In Behavioral Economics, scholars focus on doing good for society with a pragmatic lens, these approaches foreground unseen persuasion or manipulation. (Bommer et al., 1987) brings in all these perspectives together in their work in Figure 2.2.

2.3.4 Ethics in Technology and Design

In Technology and Design studies, a wide range of framings of ethics are present. For example, ethics focus on: implications of values in technological designs (Friedman & Kahn, 2003); designer's responsibility and inscription of their values into the product (Gray & Boling, 2016); “criticizing ‘technology’ as such, and its impact on society and culture” (Verbeek, 2008); commentary regarding how society has been “ruined by design” (Monteiro, 2019); mediation of practitioners across their personal, disciplinary, organizational, and applied values (Gray & Chivukula, 2019); end-user manipulation using “dark patterns” (e.g., (Brignull, 2011), (Gray et al., 2018)); and speculative design on how ethical assumptions embedded in technological artifacts can be uncovered or provoked through design (Dunne & Raby, 2013).

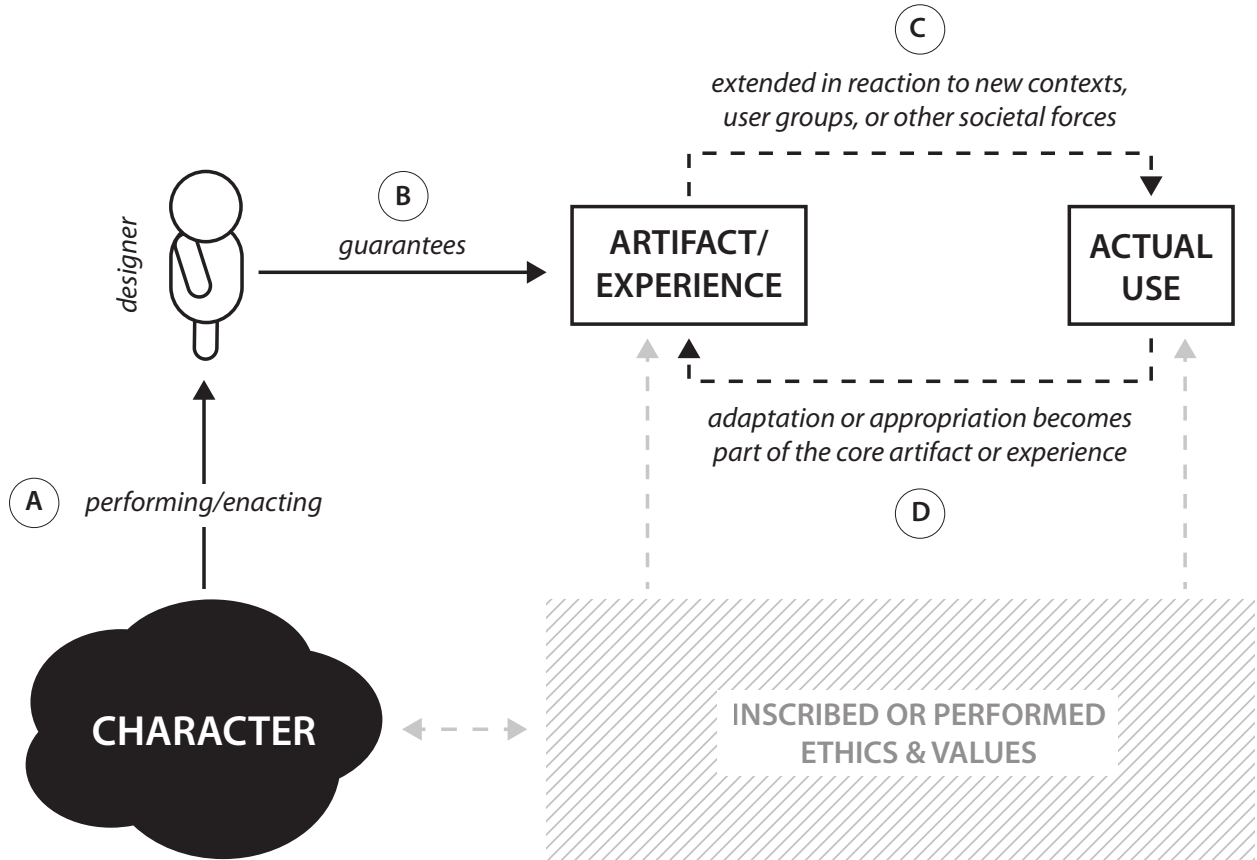


Figure 2.3. Inscription model defined by Gray and Boling (2016).

In my research, I depend on three models that define the technology ethics with practitioners as the subject who are the actors, drivers, and negotiators of values inscribed in a

technology product as situated in an ecological model (a sociotechnical system). First, Gray and Boling (2016) present an inscription model that describes a designer as a “guarantor” that interacts with the “notion of design responsibility.” As shown in Figure 2.3, “[A] describes the moment when an individual designer’s character—including their philosophy of designing, their approach or process, and the ways they prioritize design constraints—are called upon in design activity”; “The resulting guarantee of a designer or design team [B] that a design decision or output will meet the needs of a client or stakeholder is more contractual in nature”; and “[C] and [D] begin to describe this complex extension and appropriation of designs, leading to changes in the design over time.” Second, building on Gray and Boling’s inscription model, Gray, Chivukula, and Lee (2020) studied the subreddit ‘/r/assholeddesign’ to describe how designers “actively inscrib[e] values as an outgrowth of their own design philosophy and the socio-cultural and organizational forces that surround them.” As shown in Figure 2.4, a designer inscribes a combination of manipulative, asshole designer properties, or human values in order to create evil, asshole, or good designs.

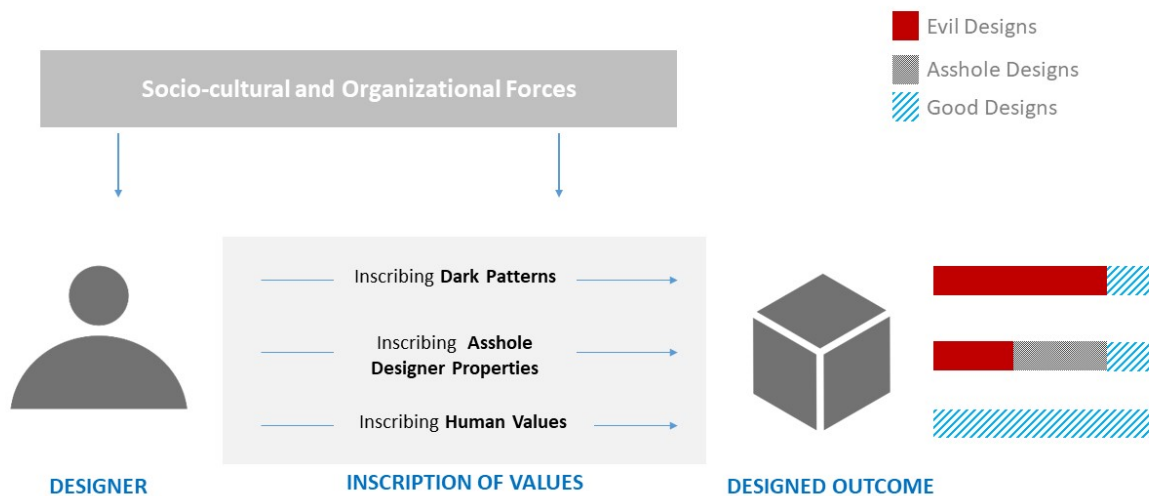


Figure 2.4. Defining value-focused, manipulative, and bad design (reproduced from (Gray et al., 2020)).

Third, Gray and Chivukula (2019) describe a “model of ethical design complexity, positing that individual practitioners are a part of a “complex and choreographed arrangement of ethical considerations that are continuously mediated by the designer through the lens of their organization, individual practices, and ethical frameworks.” As shown in Figure 2.5, the practitioner not only inscribes their own “design character” (Gray & Boling, 2016) but are also impacted by “[s]ocio-cultural forces [which are] highly constrained or extended by organizational practices.”

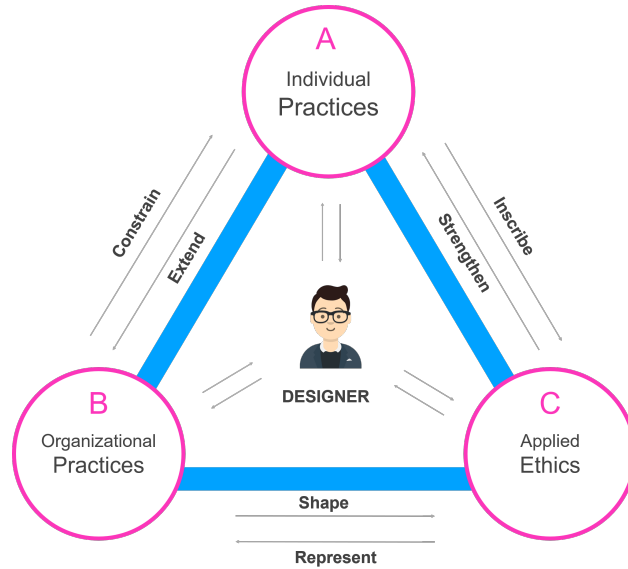


Figure 2.5. Ethical design complexity model (reproduced from (Gray & Chivukula, 2019)).

2.4 Methods for Ethical Practice

In this section, I provide a review of the existing ethics-focused methodologies, methods, frameworks, and techniques. This review helps me to describe the landscape of existing support designed for engaging with ethics in technology design processes. For my research, this review is helpful in two ways: 1) In the first part of my dissertation work, I describe technology practitioners’ awareness about existing ethics-focused methods through a survey. This review provides me with a list of deployed, disseminated, and published ethics-focused methods that will allow me to survey technology and design practitioners about use patterns in

their everyday work; and 2) In the second part of my dissertation work, I created co-creation sessions to engage directly with technology and design practitioners to learn about their ethical concerns and provide specifications for practice-resonant ethics-focused methods. This review helped me to identify and build upon existing ethics-focused methods as a part of those co-creation activities. I mostly build on this definition of a design method: “tool[s] that allow designers to support thinking, reflecting and acting upon design activities” (Gray, 2016). And this definition of an ethics-focused methods: “function of the method revealed through this *embedded knowledge* allows designers to convert ethics-focused discovery into design outcomes” ((Chivukula, Li, et al., 2021)).

HCI and STS scholars have proposed numerous frameworks, methodologies, methods, and best practices for technologists and designers to engage in ethics (Shilton & Anderson, 2017; van Wynsberghe & Robbins, 2014; Walsham, 1996), values (Flanagan & Nissenbaum, 2014; Friedman & Hendry, 2019; Manders-Huits & Zimmer, 2009; Shilton, 2013), and moral philosophy (Bietti, 2020; Mulvenna et al., 2017). Through my review of literature in this space, I found a range of proposed methodologies for value implementations and consideration during a design process (e.g, VSD (Friedman et al., 2002)); Values at Play (Flanagan & Nissenbaum, 2014); *activities* for engineers to engage in “social values” in design (Shilton, 2013); *approaches* for critical reflection and engagement in a design process (J. Bardzell & Bardzell, 2013; J. Bardzell et al., 2018; Dunne & Raby, 2013; Sengers et al., 2005); *codes of ethics* for professionals to define and prescribe ethical standards of computing and technology work (alZahir & Kombo, 2014; D. W. Gotterbarn et al., 2018; Monteiro, 2017; White & Montgomery, 1980; Wolf et al., 2019); *practices* to include specific roles to validate, evaluate and encourage value-oriented work (Shilton & Anderson, 2017; Stark & Crawford, 2019; van Wynsberghe & Robbins, 2014); *models and checklists* for improving algorithmic and AI evaluation (“AI Fairness 360”, n.d.; Keyes et al., 2019; Madaio et al., n.d.); *practical toolkits and packages* for illustrating ethical practices during decision making (“AI Fairness 360”, n.d.; “The Data Ethics Canvas”, n.d.); *manifestos* to define roles of technologists in the social impacts of their work (Mulvenna et al., 2017); *centers* to envision and solve global challenges (Santa Clara University, n.d.); *policies* defined by governmental organizations to protect citizens from the “dark side” of technology (“GDPR Policy Document”, n.d.; God-

dard, 2017); *heuristics* to define and list ways to create ethical artifacts and designs (Falbe et al., 2017; Falbe et al., n.d.); *curricula and accreditation* for promoting ethical guidance in computing education (D. Gotterbarn & Rogerson, 1997; Hess & Fore, 2018; Shilton et al., 2020; Wong et al., 2017) and *practice-led research, blogs, and books* to expose unethical practices in design for technology creating awareness about need and happenings of ethical decision making in practitioner contexts (Brignull, 2013; Eyal, 2014; Gray et al., 2020; Gray et al., 2018; Monteiro, 2019; Nodder, 2013). In the following subsections, I describe the various methodologies, pragmatic approaches, practical toolkits and frameworks, and various codes of ethics. Additionally, I list exemplar sets of values defined per discipline. I plan to use this list of values to build my primary survey instrument to investigate technology practitioner’s personal, organizational, and disciplinary value considerations.

2.4.1 Methodologies

Value Sensitive Design. Over the past two decades, Value Sensitive Design (VSD) has become the most established and used methodology for value considerations relating to dimensions of technology work (Friedman & Hendry, 2019; Friedman et al., 2002; Hendry et al., 2021). VSD is defined as “a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process” (Friedman et al., 2002). VSD encompasses a tripartite methodology through its theoretical and methodological contributions which include conceptual, empirical, and technical investigations. Over the years, Friedman and colleagues have suggested various methods as a part of this methodology as drawn from technology and computing project case studies under the three-part framework. The methodology foregrounds value consideration in computer technology work “with ethical import as a central design criterion—along with the traditional criteria of usability, reliability, and correctness—by which systems and the work of their designers may be judged” (Friedman et al., 2002; Friedman & Kahn, 2003). In the most recent book by Friedman and Hendry (2019), methods under this methodology included: Value Scenarios (Nathan et al., 2007); Value Sensitive Action-Reflection Model (Yoo et al., 2013); Value Dams and Flows (Miller et al., 2007); and Multi-lifespan timeline (Yoo et al.,

2016) to name a few. These methods build on the VSD methodology, but are primarily embedded in a case study or a particular technology project and do not have a defined and generally applicable form. Over the years, various critiques of this methodology have included the highlighting the lack of proper guidance for empirical investigation, with designers being “left with poor tools for engaging locally expressed values” that do not enable the process of “discovery and engagement” with local values (Le Dantec et al., 2009); a questioning of whose values should be considered in practice (M. Muller, 2014); and suggestions of next steps for VSD to “address issues of theory, voice, and reportage” (Borning & Muller, 2012).

Values at Play. Another defined methodology for value implementation is “Values at Play” (Flanagan & Nissenbaum, 2014) that “systematically incorporate[s] values into the design process” (Flanagan et al., 2005). The methodology defines a process of steps: 1) Values Discovery; 2) Identifying Values-Based conflicts; 3) Implementation and prototyping; and 4) Values verification. These steps are formulated for an iterative value evaluation in a design process and to find a “balance between their own values, those of users and other stakeholders, and those of the surrounding culture” (Flanagan et al., 2005, p.751).

2.4.2 Pragmatic Approaches

“Ethicist as Designer” (van Wynsberghe & Robbins, 2014), suggests a pragmatic approach for discovering values, ideating and translating values, and balancing value trade-offs, marking the importance of a constant role for “pragmatic value analysis.” (Shilton & Anderson, 2017) talks about a similar approach to identify value advocates (a.k.a. “values-oriented team members”) and provides models defining roles and responsibilities of existing team members in role playing or working as value-oriented decision makers. Aligning with technical design communities, Manders-Huits & Zimmer (2009) suggest strategies to make any defined Value-Conscious Design framework implementable in practice by highlighting the following key challenges: “ (1) confronting competing values; (2) identifying the role of the values advocate; and (3) the justification of a value framework.” Other design approaches to foreground the value-ladenness of a design activity include: critical design (J. Bardzell & Bardzell, 2013; J. Bardzell et al., 2018), design fiction (Blythe, 2014), reflective design

(Sengers et al., 2005), and speculative design (Dunne & Raby, 2013). Shilton (Shilton, 2018, p. 6-19) has provided “Mapping the Literature: Interdisciplinary Approaches to Values and Ethics in Design,” listing various critique-based and generatively-based approaches proposed for technology practitioners drawing from “computer ethics, sociotechnical literatures, and marginalized perspectives, such as feminist, anti-racist, and postcolonial studies of technology.”

2.4.3 Practical Toolkits and Frameworks

HCI researchers and practitioners have also proposed practical toolkits, methods, and frameworks for designers to implement as a part of their decision process, improve the social responsibility of designers, and evaluate designs through an ethical lens. In a recent research project, my colleagues and I have conducted a content analysis of over 80 existing ethics-focused methods proposed for design work (Chivukula, Li, et al., 2021). The outcomes of this work include: 1) a characterization of these methods to describe their “core”, interactional qualities and knowledge contained in those methods; and 2) an argument about the lack of resonance and awareness of these methods in current technology practice. Some practical toolkits designed to help designers consider ethics and values in their work include workbooks to design for privacy futures (Wong et al., 2017), role-playing activities for “converting real-world ethical challenges into a playable simulation increased student’s reported interest in ethical issues in technology” (Shilton et al., 2020), implementable algorithmic fairness toolkit and models (“AI Fairness 360”, n.d.; Keyes et al., 2019), UI based packages for designing for data (“The Data Ethics Canvas”, n.d.), checklists for understanding organizational challenges in value implementation in AI (Madaio et al., n.d.), heuristics for designing without dark patterns (Falbe et al., 2017), manifestos listing the social and ethical responsibility of designers (Mulvenna et al., 2017), curriculum changes to incorporate ethics in computing education (D. Gotterbarn & Rogerson, 1997; Hess & Fore, 2018), and certificates for research ethics (Howard & Irani, 2019; Munteanu et al., 2015; Vitak et al., 2017; Vitak et al., 2016). Maner (Maner, 2002) collected, analyzed and critiqued various models and methods of “procedural ethics” in the field of applied ethics in algorithmic computing. The author examines

existing methods and proposes “a stage-by-stage decision-making model could be adapted for general use.” Alongside these practical toolkits, policies have been proposed, a prominent contemporary example being GDPR (General Data Protection Regulation), enacted by the EU government to protect its citizens’ data from technological advancement (“GDPR Policy Document”, [n.d.](#); Goddard, [2017](#)).

2.4.4 Code of Ethics

Codes of ethics are treated as a means to define the “professions’ moral role in society” and as a “society-profession nexus” (Frankel, [1989](#)). The main function of a code of ethics is to communicate and maintain relationships between the “profession as a group, its individual members, and those who receive professional services” (Frankel, [1989](#)) and “as Signals for Ethical Behavior” (Adams et al., [2001](#)). Code of ethics are usually designed with three dimensions: aspirational, educational, and regulatory (Frankel, [1989](#)). These dimensions are defined by (Frankel, [1989](#)) as follows: an aspirational code is “a statement of ideals to which practitioners should strive”; an educational code is “one which seeks to buttress understanding of its provisions with extensive commentary and interpretation. A conscious effort is made to demonstrate how the code can be helpful in dealing with ethical problems associated with professional practices”; and a regulatory code is one which “includes a set of detailed rules to govern professional conduct and to serve as a basis for adjudicating grievances.” To list a few, there are defined discipline-specific codes of ethics for engineers (alZahir & Kombo, [2014](#); Wolf et al., [2019](#)), for computing professionals (D. W. Gotterbarn et al., [2018](#)), for designers (Buwert, [2018](#); Monteiro, [2017](#)), and many more embedded disciplinary notions of roles and responsibilities of technology and design practitioners. Even with different disciplinary codes of ethics, the very nature of these codes is deontological and does not consider the consequential aspects of ethical decision making. This limitation offered by codes of ethics has resulted in critiques about their application in real practice contexts (Walsham, [1996](#)). Helin and Sandstorm ([2007](#)) observed that there is not much information about “how they are communicated and how they are transformed inside organizations” and McNamara et.al ([2018](#)) work provided results of no significant change in

ethical behaviors of professionals despite their existence. Researchers studying these codes called them as “passive documents” without any impact in ethical reasoning (Buwert, 2018), “their ethical pronouncements are like blunt instruments” (Frankel, 1989), and “highly specific and idiosyncratic” (Lefkowitz, 2017). Brinkman et al. (2017) and Lefkowitz (2017) critiqued the codes for lacking accessible methods and elaborate descriptions on how they may be applied.

2.4.5 Values

Most of the methods listed above are triggered or formulated around a particular value or set of values. In this subsection, I will define values and list values that are supported, credited, or used by different disciplines. Values are evaluative and they can be evaluated based on the ethical theories (which can be treated as evaluative or theoretical frameworks). Values can be understood as “objective factors in the dynamic behavior of systems” (Laszlo, 1973). Shilton et al. (2013) has documented how definitions of values differ in different disciplines to list the “source of values (agency, unit, and assemblage)” and “attributes of values (salience, intention, and enactment).” Values are operationalizable, which can be implemented using various ethical theoretical frameworks (deontological, consequentialist, and virtue) for a particular context. For example, privacy is a value. This value, when evaluated in terms of deontological ethics, points towards a developer’s duty to ensure the user’s privacy; whereas, from a consequentialist view, this value guides the ethical action of the developer to implement solutions to ensure user’s privacy rather breach their privacy, which can be evaluated as a bad consequence. In comparison to the broader nature of various ethical theories, values are more local to the agent who is involved in ethical decision making. Research presents different forms of values and examples of the form values take. Schwartz and Bilsky (1987) describe values in three different facets: 1) Terminal values (decided by the end goal) or Instrumental values (desired by the conduct of behavior); 2) Individualistic, Collective, or Mixed values (such as being obedient, polite, clean, and self-controlled (Rokeach, 1973)); and 3) Motivational values (such as being helpful, forgiving, and loving).

Disciplinary Values

There are particular discipline-specific values defined in the literature or codes of ethics that are defined for technology practitioners. Table 2.2 lists the values for various disciplinary audiences as mentioned in the source.

Table 2.2.
List of disciplinary values.

Disciplinary Audience (as mentioned in the source)	Value(s) include...
Technologists	ownership, privacy, accountability, freedom from bias, trust, autonomy, usability, informed consent, and human welfare, identity, calmness, and environmental sustainability (Friedman & Kahn, 2007).
Computing Engineers	justice, autonomy, democracy, privacy (Brey, 2000), freedom of information, or the property rights (Brey, 2010).
Software Engineers	accessibility (IEEE-CS/ACM Joint Task Force, 1999)
Computing Professionals	equality, tolerance, respect for others, justice, fairness, privacy, confidentiality, and transparency (ACM Code of Ethics and Professional Conduct, 2018)
Psychologists	enjoyment, security, achievement, self-direction, restrictive-conformity, prosocial, social power, and maturity (Schwartz & Bilsky, 1987)
HCI Researchers and Interaction Designers	pluralism, participation, advocacy, ecology, embodiment, and self-disclosure (Bardzell, 2010)
Designers and Researchers	value groups: carefulness, justice, ecology, respect for others, meaningfulness, status, pleasure, respect for oneself, and personal development (Kheirandish et al., 2020)

The values listed in Table 2.2 provide evidence of a variety of values supported by a range of technology and design practitioner contexts. This variety raises the question of alignment and how practitioners from different disciplines are involved in the entire process of creating an artifact that supports different values. In Study 1, I aim to describe this form of ethical complexity by investigating how practitioners find resonance or conflict with values that are considered personally, through their discipline, and their organization. While these values

are not intended to be an exhaustive list and are not the main aim of this review, these lists provided framing to create a list that I use to structure my survey study in Table 3.2.

To summarize, the above listed methodologies, methods, frameworks, and toolkits offer support to technologists and designers in their process of value inscription, ethical prescription, and building ethical outcomes. Researchers have provided evidence to show how these methods lack resonance with practice and the complexities that exist because of ecological factors that technology practitioners are a part of (Gray & Chivukula, 2019; Manders-Huits & Zimmer, 2009). Shilton (2018) has critiqued practitioners' awareness of various ethics-focused methods, calling for evaluation of these practices. How aware are technology practitioners about these existing methods? How were these methods designed to be used by practitioners? What are some challenges or barriers for adopting them in practice? What should be done more to make them practice-resonant? What methods are designed for practitioners from a particular discipline? How do practitioners from different disciplines use these methods? While I intend not to provide descriptive answers to all these questions through my research, I intend to focus on how these methods leverage, incorporate, enable, and restrict disciplinary framing of ethics as practitioners engage in ethical decision making within their discipline and across disciplinary borders.

2.5 Knowledge Production in HCI Research

In this section, I provide review of various forms of knowledge production in HCI research that align with my goals of directly engaging practitioners, especially for Study 2. I have reviewed the following approaches that potentially align with my aims: 1) Research through Design (RtD), and 2) Co-Design and Co-Creation. RtD is an “approach to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge” (Zimmerman & Forlizzi, 2014). From a design research perspective, I use this approach as I build or manipulate co-creation activities, relying upon other knowledge sources such as my knowledge of ethics in technology practice, existing ethics-focused methods, co-creation methodology, or participatory principles to engage practitioners. Co-creation and Co-design are participatory approaches to engage users or

customers as partners in the process of knowledge production and co-produce designs with, rather than simply for the users (Nielsen, 2011; E. Sanders & Stappers, 2008). I engaged technology practitioners in co-creation activities to allow them to communicate about their felt ethical concerns, especially in Study 2.2. These two particular approaches are defined, detailed, and illustrated in the subsections below.

2.5.1 Research through Design (RtD)

As a part of a range of design-based research approaches, defined as research activated through design (Easterday et al., 2014), Research through Design (RtD) is well-known in HCI research. RtD is an “approach to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge” (Zimmerman & Forlizzi, 2014). RtD draws from Rich Interaction, Participatory Design, and Critical Design, and has been an increasingly common approach for conducting HCI design research (Zimmerman et al., 2007). RtD is a form of building “new and valuable knowledge” through design artifacts “to investigate the speculative future, probing on what the world could and should be” (Zimmerman & Forlizzi, 2014). The range of outcomes through RtD include “explor[ing] new problem spaces [and] codifying understanding through the construction of artifacts” (Zimmerman & Forlizzi, 2008); reframing the problem space (Zimmerman et al., 2007); and a collection of “artifacts that both sensitize the community and broaden the space for design action” (Zimmerman & Forlizzi, 2014). RtD makes the claim that the “design process should be considered as a driven and fundamental part of the research” (Busciantella Ricci & Scataglini, 2020) developing artifacts for the purpose of research, which are also considered as research contributions (Zimmerman et al., 2010). The series of artifacts include “models, prototypes, products, and documentation of the design process” (Zimmerman et al., 2007) and annotated portfolios (Culén et al., 2020). In summary, RtD focuses on design as inquiry, using the re-framing of existing situations and the creation of new possibilities as a means for researchers to build new knowledge. Koskinen and colleagues (2011) defined three forms of conducting RtD, including the Lab, the Field, and the Showroom. The lab form focuses on experimental values to create new ways of

interacting with things, the field form focuses on improvement and change of the current state of the world, and the showroom form focuses on provocative values to challenge and be reflective about the current state of the world.

To summarize, this review provides knowledge about RtD as a potential approach I can take as a design researcher to modify, design, and iterate design artifacts, namely existing or newly designed ethics-focused methods in Study 2.1. This review provided me with a framework of RtD, Lab, Field, and Showroom, to classify the purpose and functions of various designed artifacts. This review also helped me differentiate between RtD and co-design approaches which I detail at the end of the below section.

2.5.2 Co-creation and Co-design

The field of participatory design has evolved with a shift from a user-centered design process, with a typical focus on the designed artifacts reaching the goals or needs of the user, to a more participatory culture blurring the role of a researcher or designer as it treats user's role critical in designing (E. Sanders, 2002). Sanders & Stappers (2008) define co-creation and co-design as a part of this shift towards participatory approaches, which builds on user's making of their own needs. Co-creation is defined as "any act of collective creativity, i.e. creativity that is shared by two or more people. Co-creation is a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual, as can be seen by the output of search engines" and co-design is defined as "collective creativity as it is applied across the whole span of a design process" (E. Sanders & Stappers, 2008, p. 6). There is often confusion between the terms co-creation and co-design, but these two concepts can be differentiated based on who is involved in the act, the goals of involvement, and when they are involved in the design process (Marttila & Botero, 2013). Co-creation has its origins in the fields of business studies and marketing, whereas co-design draws more from design-focused fields following participatory design or co-operative design traditions (Durall et al., 2020). These two terms are often intertwined, but building on the definitions, I consider co-design as an instance of co-creation.

Co-creation

Roser & Samson (2009) defines “co-creation is a form of collaborative creativity, that’s initiated by firms to enable innovation with, rather than simply for their customers.” Nielsen (2011) suggests that “the innovations of co-creation might not lead to artefacts that the participants will use themselves. The user is part of knowledge gathering, idea generation, and concept development” and “finally the designer/researcher gives form to the ideas.” Lee and colleagues (2018) suggest a framework emerged from a cross-case analysis of 13 co-creation projects, which consists of ten design choices facilitators have to make, presented in four categories: participants (diversity in knowledge, differences in interest, distribution of power), project preconditions (openness of the brief, purpose of change, the scope of design), co-creation events (types of activities, setting for co-creation), and project results (outputs of the project, outcomes of the project).

Co-design

Co-design is an approach that treats “users as a partner,” giving the designers or researchers access to the tacit knowledge of the users as they participate in the design process (E. Sanders & Stappers, 2008). Co-design has many similarities or principles that align with design justice such as “center the voices of those who are directly impacted”, “everyone is an expert based on their lived experience”, and “designer as a facilitator than an expert” (Costanza-Chock, 2020, p. 6). However, co-design is not always political and does not always begin with the goal of empowering a set of users. The framing of “empowerment” focuses more on creating a space for users to experience their own knowledge and navigate through design space. Based on the spectrum of public participation as proposed by Stuart (2017), my research goals focus to “inform, consult, involve, and collaborate”, which can later lead to “empower(ing)” my participants to participate and take a lead in the change of ethical practices in their everyday work practice. In a recent book, McKercher (2020) defined four principles of co-design to be: share power, prioritize relationships, participatory means, and build capacity.

In a co-design process, there is involvement of diverse actors such as researchers, designers or developers, and users (or citizens). Users are treated as having expertise about their own experiences (E. Sanders & Stappers, 2008; Steen, 2011; Visser et al., 2005). Various authors of co-design work have approached defining this concept in different ways based on their project goals and ways of conducting co-design. Co-design is an embodied activity as defined by Kronqvist and Salmi (2011): *“co-design settings are usually embodied encounters involving both the physical and social aspects of engagement with the world. In co-design workshops participants collaboratively envision the future through interacting with each other and with physical materials creating prototypes, models, sketches, collages, posters, stories to name a few examples.”*

Co-design is “as an embodied continuum” (Akama, Prendiville, et al., 2013; Light & Akama, 2012) rather than an object-focused process. Co-design is an act of shared meaning-making, where Kleinsmann and Valkenberg (2008) define co-design as a “process in which actors from different disciplines share their knowledge about both the design process and the design content... in order to create shared understanding on both aspects... and to achieve the larger common objective: the new product to be designed.” Co-design is a reflective practice, where Evans and Terrey (2016) define co-design as “a methodology of research and professional reflection that supports inclusive problem solving and seeks solutions that will work for people.” Co-design is an act of collaborative thinking, where Steen (2013) defines co-design as a “process of joint inquiry and imagination in which diverse people jointly explore and define a problem and jointly develop and evaluate solutions.” Co-design has been termed as “Generative design research,” where Sanders and Stappers (2012) define co-design as “an approach to bring the people we serve through design directly into the design process to ensure that we can meet their needs and dreams for the future.” McKercher (2020) defined six mindsets for co-design, namely: Elevating lived experience, Practising curiosity, Offering hospitality, Being in the grey, Learning through doing, and Valuing many perspectives. Co-design need not build on real-world scenarios or have implementable solutions, where Sanders and Westerlund (2011) consider that “co-designing processes can [include] dystopian scenarios.” Recently, this notion was built into “co-design fiction by Ambe and colleagues (2019), where co-design fiction is defined as an “an approach that engages users

by foregrounding their experiences, values and convictions in co-created fiction with the aim to imagine, envision and speculate futures not just on technology but on future life.” Such definitions blur the thin line between co-creation and co-design in a practical sense, as it all becomes about “user involvement” or a collective involvement of various stakeholders in a designed system (Alam, 2002; Hoyer et al., 2010; Kujala, 2003; Roser & Samson, 2009).

Probes, Toolkits, and Co-Design Spaces. In the previous two sections, I have defined co-creation and co-design. The two approaches present user involvement through facilitation by the designer or researcher “through sharing the practical tools that can be used to enable participation, collaboration and creative thinking” (Blomkamp, 2018). In this section, I define various means of facilitation taking the forms of probes, toolkits, and co-design spaces. Probes and toolkits are both design-led, but the difference is that probes are expert-driven (made by the experts- designers or researchers), whereas toolkits are more participatory as they evolve through the co-design process (E. Sanders & Stappers, 2014). Gaver, Dunne, and Pacenti (1999) defined probes as an “approach that invites people to reflect on and express their experiences, feelings and attitudes in forms and formats that provide inspiration for designers.” On the other hand, generative toolkits describe “a participatory design language that can be used by non-designers (i.e. future users) in the front end of design so that they can imagine and express their own ideas about how they want to live, work and play in the future” and these when used in “facilitated collaborative activities, and their results (artifacts and descriptions or enactments of their use)” are used for analysis to find patterns (E. Sanders & Stappers, 2014). Examples of probes designed for co-design include Cultural Probes (B. Gaver et al., 1999), Design Probes (Mattelmäki, 2005), Design Noir (Dunne & Raby, 2001), Diegetic Prototypes (Kirby, 2010), and Artefacts from the future (Bhattacharya, 2019). Examples of generative toolkits designed for co-design include Make Tools (E. Sanders & Rim, 1999), A day-in-the-life exercise, My-ideal-future-product exercise, Make-believe role-playing with co-constructed artifacts, tools for supporting design collaboration (Brandt, 2007) and others tools (“Service Design Tools”, n.d.). Using co-design as an approach does not include the co-design specific tools or methods, but rather leverages existing design methods that are more engaging and tangible such as personas, storyboarding, storytelling, paper prototyping, user scenarios, journey maps, metaphorical

design, design futuring, card sorting, diary studies, and focus groups. Another important element of the co-designing process is co-design spaces. Sanders and Westerlund (2011) define co-design spaces in three layers: 1) experienced physical space; 2) in a more metaphorical sense, a space to encourage the participants to share their ideas and experiences; and 3) co-designed situations (ideas or future scenarios and fears). These three can be called co-design spaces that designers and researchers have to facilitate through and participants have to engage in.

It is important to understand the differences between probes, generative toolkits, and prototypes, alongside their evolution throughout the inquiry process. In summary, probes are created by designers for thought-elicitation in non-designers and can be individually worked on by participants. On the other hand, toolkits are more used as an expressive tool, designed by designers and researchers, for co-designers/users to participate and create artifacts. The making of these toolkits results in prototypes, which are used for analysis by the designers or researchers to create the next set of probes or toolkits (if the process is taken to be iterative) and used by the users/non-designers as a way to express and give form to their ideas. I can see probes being used in my work to talk about future ideas as well, similar to the work by Mattelmaki (2005) where probes are used “for inspiration, for information, for participation and for dialogue.”

To summarize, co-creation as an approach focuses on involving the customers/users as partners in the creative parts of the research or design process and empowering them as experts of their own experiences and people who are inherently creative. In the context of my project, I am relying on “co-creation” as a broad umbrella that includes the active participation of practitioners through the activities I designed with my facilitation, detailed in Chapter 5. This review provided me with the required knowledge about different ways to design my co-creation sessions and clearly define the goals of Activities A,B, and C as detailed in Chapter 5. Being reflective and reflexive about the nature of these co-creation activities, I engaged twelve practitioners through sequences of the three activities in Study 2.2 (results presented in Chapter 6).

3. METHODS

I take a practice-led approach to investigate ethical dimensions of technology and design practitioners in their everyday work through the lens of professional roles. In the first part of my work, I study how practitioners engage with their primary professional role-focused notion of ethics, both individually and as they interact with practitioners from other professional roles in a survey study. In the second part, I design co-creation activities to engage practitioners in expressing the same.

In this chapter, I provide details on my research study design, my role as a researcher, preliminary work that guided my research, design of research instruments, data collection, and analysis for Study 1, 2.1, and 2.2. First, I provide an overview of the research questions and study design. Second, I detail the preliminary work— semi-structured interviews and ethics-focused methods collection—that guided my research. Third, I identify and describe my research design for Study 1 which focuses on describing how practitioners rely upon their notions of ethics and commitments to be ethically engaged in their everyday work as prescribed or codified by their primary professional role and alignment of their values during interactions with practitioners from other professional roles. Fourth, I describe my research design for Study 2.1 and 2.2, in which I designed and engaged practitioners in co-creation activities to create a platform for them to communicate about and participate in potentially ideating to be more ethically engaged in the responsibilities of their own professional role and with practitioners from other professional roles, revealing opportunities to align/ modify existing methods or specify new practice-resonant ethics-focused methods. Finally, I present various aspects of research quality such as trustworthiness, transparency, anonymization, and my researcher positionality.

3.1 Overview of Research Questions and Study Design

3.1.1 Research Study Design

I have divided the research design into two primary studies (Study 1 and Study 2). In Study 1, I *investigate* **ethical valence, orientation, and commitments** and in Study

2, I *design* and *engage* practitioners directly to support their **ethical engagement**, which is divided into Study 2.1 for designing co-creation activities and Study 2.2 for conducting co-creation sessions. I draw my knowledge and experience from preliminary work where I conducted interviews with a variety of technology and design practitioners to investigate their ethical awareness in everyday practice, and conducted content analysis of existing ethics-focused methods. The studies I use to answer my research questions are listed below, the details of which will be provided throughout this chapter:

- **Study 1:** Investigate Technology Practitioner’s Professional Role-focused Notions of Ethics in Everyday Practice
- **Study 2.1:** Design Co-Creation Activities to Articulate and Reflect about Ethics in Everyday Practice
- **Study 2.2:** Engage Practitioners to (Potentially) Strengthen Ethical Engagement in Co-creation Activities

3.1.2 Researcher Roles

Through these planned studies I intentionally took advantage of multiple explicit stances and roles, as shown in Table 3.1. I began with an *interpretivist lens* as a critical qualitative researcher to conduct a secondary analysis of interview data as a part of the preliminary study. In Study 1, I continued with the *interpretivist lens* as I designed, iterated upon, and analyzed the survey results as a **researcher** while characterizing broader trends in relation to professional roles. In Study 2.1, with a *design-focused lens*, I played the role of a **designer** to ideate, conceptualize, and iterate upon co-creation sessions, leveraging my design expertise and professional experience of working with practitioners from multiple professional roles. Using some of the designed co-creation activities, in Study 2.2, I took a *participatory lens* to be a **facilitator** as I engaged twelve practitioners in co-creation sessions. Prior to conducting these studies, I was well-aware of these multiple hats I was wearing throughout my research design and anticipating this, and I sought to be *reflective* and *reflexive* at every stage of my research to continuously design, deploy, and iterate upon my findings. I detail my strategies

of being reflective and reflexive throughout my data analysis procedures and my design process in Chapter 5.

Table 3.1.

Mapping research questions, my stance, study design, and data collection procedures.

RQ	Lens	Study: Methods	Research Design Stage
RQ1	<i>Interpretivist</i>	Study 1: Survey	DESCRIPTION- Investigate
RQ2(a)	<i>Design-focused</i>	Study 2.1: Designing Co-Creation Activities	PREPARATION-Design
RQ2(b)	<i>Participatory</i>	Study 2.2: Co-Creation Sessions with practitioners	ACTION-Engage

3.2 Preliminary Work: Practitioner Interviews and Ethics-focused methods Sensitization

To inform the landscape of the ethical realities and complexities that exist in technology and design practice, as a part of a larger research project, I have collaboratively conducted: 1) interviews with a range of technology and design practitioners and 2) content analysis of existing ethics-focused methods designed for technology practice. In this section, I describe how I rely on the analysis and findings from these two studies particularly to design survey instrument in Study 1 and take my design decisions in Study 2.1.

3.2.1 Practitioner Interviews

The focus of these interviews was to capture practitioner experiences, areas of disagreement, overlaps, and tensions related to ethics and value-related concerns “on the ground.” This study was built upon previous interview studies on ethical design complexity (Gray & Chivukula, 2019), broadening the area of focus from UX designers to include practitioners from a range of professional roles across the socio-technical spectrum (e.g., designers, technologists, developers, users, data scientists). During these interviews, I observed practitioners sharing their knowledge of ethics and values concerning their professional role, experiences during interactions and collaborations with practitioners from other professional roles, and

the particular language they use in relation to attitudes concerning their professional roles towards those (un)/ethical practices.

Semi-Structured Interviews

As a part of a larger project, my colleagues and I have conducted semi-structured interviews with a range of technology and design practitioners including UX designers, UX generalists, researchers, software and hardware developers, product managers, and CEO/Founder (participant demographics are provided in Appendix B). Each interview was 60-90 minutes in length, and participants were provided an incentive to participate in the study. The data collected to the point of writing this study included sixteen practitioners and a secondary analysis of this data was used to support Study 1 and Study 2.1. To create a varied sample (Cochran, 2007), we sought to identify a diverse set of practitioners using the following criteria: company type and size, job description, years of experience, team types, practitioner role, gender identity, education background, and past occupational experiences. The pool of practitioners was created through a recruitment screener that was distributed through personal and professional networks, social media networking sites, listservs, and e-mails or snowball sampling from previously interviewed participants (L. A. Goodman, 1961). To participate in the study, the practitioner had to be currently (at the time of conducting the interviews) holding a position in a tech company, have professional experience of two or more years, have a background in one or more technology and design strands (data science, computer science, business management, design, research), and volunteer to participate in this study. The interview protocol was formulated using a critical qualitative interview approach (Carspecken, 2013) to not only uncover the participant’s activities in daily practice, but also to understand the “why’s” of the practitioner’s perspectives, tensions and conflicts that arise through their stories or narrative. The interview protocol is presented in Appendix A. The protocol covered three broad topics: 1) *Individual practitioners’ personal values*: where we asked participants to share any ethically uncomfortable situations in the past, their process of dealing with that situation, and relevant interactions with other practitioners; 2) *Reflection on their ethical decision making*: where we probed the practitioners

to reflect on those situations to see what they could have done differently, where did they lack support through those situations, what kinds of support was expected for themselves in relation to their organization or other practitioners, and how they evolved through those situations and professional competence; and 3) *Need for ethics-focused methods/techniques*: where we presented the broader aim of a larger research project, asked the participants about their current support they rely on for ethical engagement, and solicited the kinds of supports they think are essential for present-day technology and design practitioners. This protocol was validated and refined through pilot interviews with practitioners eligible for the study. These interviews were conducted via Zoom calls depending on the availability of both the researcher and the participant which were decided via email conversation. These interviews were audio-recorded with the consent of the participants as approved by the Institution's Review Board (IRB). The recordings were transcribed, using online transcription tools such as DovetailApp or Otter.ai. We cleaned the transcripts to fill in inaudible instances and de-identify the transcripts.

Analysis and Results

As a researcher, I have taken on an interpretivist lens (H. S. Becker, [1996](#)) to conduct different kinds of analysis to sensitize myself to ethics in technology practice from the perspective of different professional roles. I list the different analysis or sensitization I conducted on the interview data and how that analysis helped me with Study 1 and Study 2.1:

- A broader sensitization of the conversations helped me capture a range of practitioner experiences including ethical dilemmas and scenarios faced by the practitioners through their professional experience, knowledge they rely upon through their decision making in such situations, interactions with practitioners from different professional roles, and potential resources that can better support them through those situations in the future. This prepared me to design the survey instrument in Study 2.1 to dig deeper into the specific methods they rely on (not the focus of the study) or values they care about in their decision making.

- A reflective thematic analysis (Braun et al., 2020) of the interview transcripts helped me to derive various identity claims practitioners had while describing their ethical awareness and action; this work was published at CHI 2021 (Chivukula, Hasib, et al., 2021). This analysis helped as a sensitization activity for my facilitator self to anticipate different archetypes of practitioners with whom I might conduct the co-creation activities in Study 2.2.
- A case study analysis of different ethical dilemmas practitioners faced instigated my ideation and design of Activity B in Study 2.1. The results of this analysis helped me build the content of the “Dilemma Postcards” probe kit. In this kit, I consolidated examples of a range of (summarized) stories shared by the practitioners and the respective derived ethical dilemmas in Appendix D. I detail more about the design of Activity B in Section 5.5.4.
- From the derived cases above, a thematic analysis of factors beyond the practitioner that influence, effect, strengthen, or obstruct ethical decision making provided me with a list of people, aspects, and bodies involved in the ecological complexity. I used this list in the design of Activity A: “Tracing the Complexity” toolkit. I detail more about the design of Activity A in Section 5.4.5.

3.2.2 Ethics-Focused Methods Collection

The focus of the ethics-focused methods collection was two-fold: 1) identify and collect existing ethics-focused methods designed for technology design work, and 2) describe and characterize these methods using method descriptors. A database of 80+ ethics-focused theories, methodologies, methods, frameworks, and conceptual frameworks were collected. A detailed collective effort of the content analysis of each unit from the database is provided in a preprint on Arxiv (Chivukula, Li, et al., 2021). For my research, I detail how the content analysis helped me with Study 1 and 2.1 as follows:

- The database provided a list of methods, methodologies, frameworks, and codes of ethics designed for practitioners which I have used in designing Section 3 of the survey instrument in Study 1. This section was not analyzed for my research.
- The content analysis conducted on the database sensitized me to a landscape of 80+ existing ethics-focused supports. This helped me in designing the “Methods Heuristics” toolkit in Activity C in Study 2.1. I detail more about the design of Activity C in Section 5.6.4.

3.3 Data Collection and Analysis Procedures

In this section, I detail data collection procedures, analysis of the collected data, and means of maintaining research quality for each study (refer to Table 3.1 for structure).

3.3.1 Study 1: Investigate Technology Practitioner’s Professional Role-Focused Notions of Ethics in Everyday Practice

This study addresses RQ #1. Based on the initial analysis of the semi-structured interviews previously conducted with a variety of practitioners, I designed a survey to capture responses from a range of technology and design practitioners. The aim of the survey was to describe and identify knowledge and values considered by individuals, their professional role, organization, and fellow practitioners from other professional roles. In this section, I provide details of the survey design, distribution, data collection, and data analysis of the survey results.

Survey Design

The primary instrument to support RQ #1, informed by initial analysis from the preliminary study, is a survey. It is important to note that the designed survey also captured additional perspectives beyond what is needed for RQ #1. I designed a survey protocol to document practitioners’ ethical awareness under these broader themes: 1) practitioners’ awareness of existing ethics-focused methods, their tool use, and other types of knowledge they gather (not the focus of this study); 2) practitioners’ ethical commitments and attitudes,

using the language of human values, in relation to their personal values, as defined or encouraged by their primary professional role, and as supported or followed by their organization; and 3) practitioners' anticipated alignment and perceptions of attitudes of practitioners they interact with from other professional roles. Along with these main topic domains, the survey is designed to record the demographics of the practitioners capturing details on their current role, primary professional role, education, and an opportunity to express interest in further engagement with other participatory studies. The survey protocol is presented in Appendix C.

The structure of the survey is as follows: *Section 1* of the survey requires the consent of participants; *Section 2* records information about their demographics; *Section 3* includes questions about their awareness of existing ethics-focused methods, their awareness and use patterns of these methods and details about their regular ethical training (not considered for this study); *Section 4* includes questions about their personal values, their organization's values and their professional role-based values (i.e. as represented or identified through their professional role in the industry), to compare and contrast the values of consideration; *Section 5* includes questions about their interactions with practitioners and anticipated ethical valence of practitioners from other professional roles and how that impacts their ethical engagement; and *Section 6* includes contact details for providing incentive and their interest in future engagement with related studies. As discussed in Sections 1.1 and 2.2, I have shifted my language from discipline to professional roles. Previously, I have framed the survey protocol using the language of "disciplinary values" or commitments towards the practitioner's "discipline." Given the shift, after the survey protocol design and data collection, I have presented my analysis with the framing around "professional role-focused" values and commitments reported by the participants.

Scales provided. In this study, I focused primarily on Sections 4 and 5 to answer research question RQ #1. In *Section 4* of the survey, practitioners were asked to share their personal, disciplinary, and organizational notions of ethics using the language of human values. Derived from different disciplinary values as mentioned in Computing Engineering, Psychology, and Design literature listed in Table 2.2, I have finalized a set of nine values, described in Table 3.2. In three separate questions, a five-point likert scale was pro-

Table 3.2.

List and description of nine human values.

Value	Similar to...	Definition
Property Rights	Ownership (Friedman & Kahn, 2007)	Value determining property rights such as copyright, patents, etc.
Human Rights	Equality, Justice, Democracy, Freedom, Related to a Citizen, Participation	Value determining the fundamental rights reserved by law such as Equality, Justice, Democracy, Freedom, etc.
Human Well-Being	Human Welfare	Value determining aspects of everyday such emotional or physical health
Usability	Usability, Accessibility	Value determining interactions that are easily and efficiently used.
Privacy	Privacy, Security, Confidentiality, Anonymity	Value determining authorization of one's data including Security, Confidentiality, Anonymity, etc.
Fairness	Diversity, Inclusion, Freedom from bias, Fairness, Respect for Others	Value determining impartial treatment of things at hand including Diversity, Inclusion, Freedom from bias, etc.
Advocacy	Autonomy (Friedman & Kahn, 2007)	Value determining active support for equal participation, equal voices, autonomy, etc.
Right to Information	Transparency, Informed Consent	Value determining appropriate access or full disclosure of required information including transparency, informed consent, etc.
Environmental Sustainability	Related to societal/global impact	Value determining protection, consumption, and exploitation of environmental resources.

vided to capture how practitioners rate these values personally (I), disciplinary-focused (We) (i.e. professional role-focused), and organization-focused (They). The scale ranged across “I/We/They do not care about this value,” “I/We/They rarely acknowledge this value,” “I/We/They acknowledge this value,” “I/We/They care about this value,” and “I/We/They deeply care about this value.” There are inherent limitations to the scale provided to the participants due to a potential conflation between the words “acknowledge” and “care” on the same scale. The assumption here was that practitioners never “do not care” about any

of the listed human values and this manifests in either *acknowledgment* of the value or *caring* about how they may apply that value in their work. In Sections 4 and 6, I have listed four aspects: *users*, *discipline*, *stakeholders*, and *society*, for practitioners to rank their ethical commitments through their own work (Section 4) and rank their perceptions of other practitioners' ethical commitments (Section 6). Additionally, in Section 6 of the survey, I have provided a seven-point likert scale ranging from “Strongly Misaligned” to “Strongly Aligned,” to capture how practitioners rate their alignment of values with other practitioners from different professional roles based on their everyday interactions.

Details on design of Section 3 of the survey are not provided here given the scope of my research and its lack of relevance to answer RQ #1. Given the length of the survey, two attentive questions were added at the end of Section 3 and Section 5 to make sure that responses were valid. The survey was tested, iterated, and validated with five practitioners from tech industry and six researchers in my lab, resulting in three rounds of iteration before the final dissemination. The testing helped me to estimate the approximate amount of time taken for each participant to finish the survey, iterate on the vocabulary used, scales provided, and usability of the survey, and solidify the demographic options in Section 2.

The purpose of this survey is evocative and not intended primarily to result in generalizable results (Jansen, 2010). The goal of the survey is not only to capture what values practitioners rely upon in their decision making, but to evaluate the resonance and dissonance across different professional roles. This aspect of resonance is measured based on: expressed notions of ethics using the language of human values across different professional roles; ranked ethical commitments towards users, discipline, stakeholders, and society; and recorded alignment with other professional roles.

Survey Distribution

The survey was shared and disseminated through personal and professional networks (LinkedIn), social media platforms (Twitter), and dissemination to past interview study participants, with an estimated sample size of a minimum of 100 practitioners with diversity across professions, roles, and geographical locations. The survey was created using Qualtrics

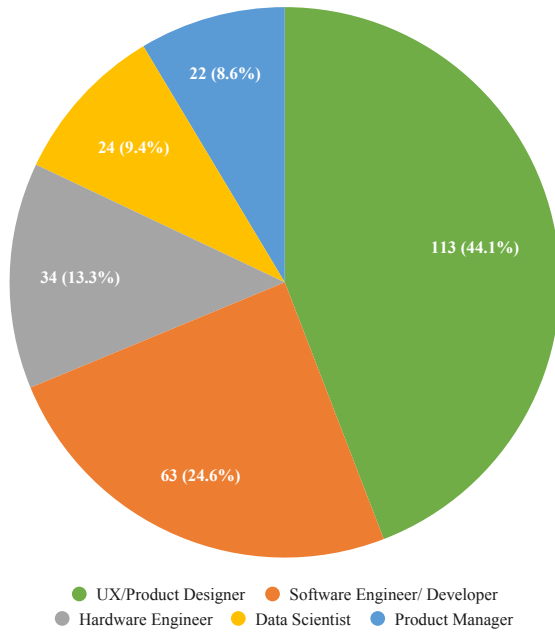
software, enabling me to collect and analyze data in a user-friendly manner. The collected data included participants' selection of listed options, scales, ranking, and frequency of different responses. An incentive was provided to the participants who provided valid responses. The recruitment text used for survey distribution is presented in Appendix [I.1](#). I detail my criteria to consider valid responses for my data analysis in the following section.

Survey Data

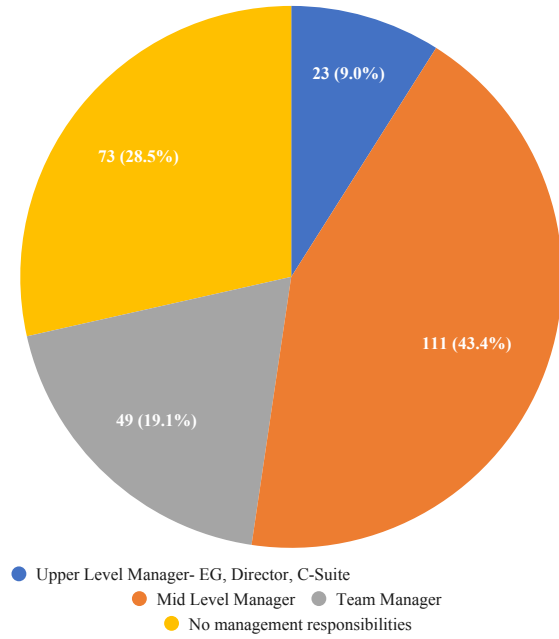
The survey received a rapid and large response recording 1022 data points in the first 6-8 hours after its distribution. The data were collected, cleaned, classified, and arranged for analysis purposes. The first step of cleaning included discarding “invalid” responses, resulting in 256 valid data points and 766 invalid responses. The criteria to finalize valid responses are:

- Any results with duplicated IP addresses were marked “invalid.”
- Any results with incomplete responses and complete responses who do not fit the age criteria (> 18 years) or professional experience criteria (currently employed in a tech industry) were marked “invalid.”
- Any results that had a recorded time less than 10 minutes were marked “invalid.”
- Any results that did not match the correct responses to the attentive questions were marked “invalid.”
- After the above filtering process, there were still suspicious patterns in the email addresses. I further eliminated any results of respondents who mentioned that they would be not willing to participate in future studies with one-to-one interactions were also marked “invalid.”

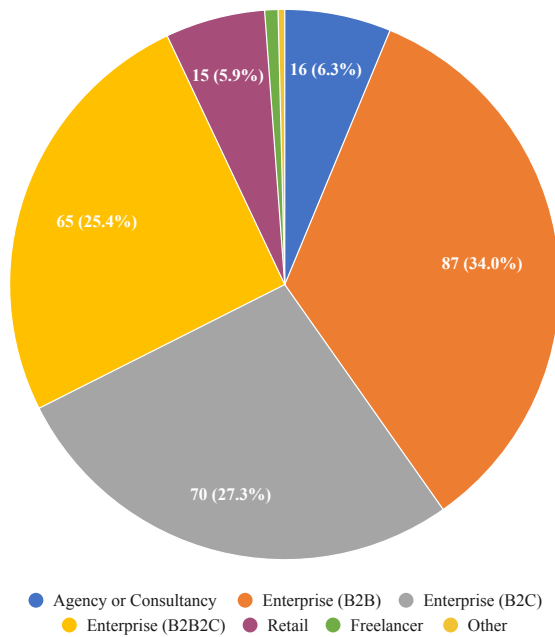
Survey Respondents' Descriptors. The cleaning of the data using the above criteria resulted in a final data set consisting of 256 valid data points. The distribution of the 256 participants across professional roles, company types, manager levels, and years of experience is presented in Figure [3.1](#). Out of the 256 respondents, the professional role frequencies,



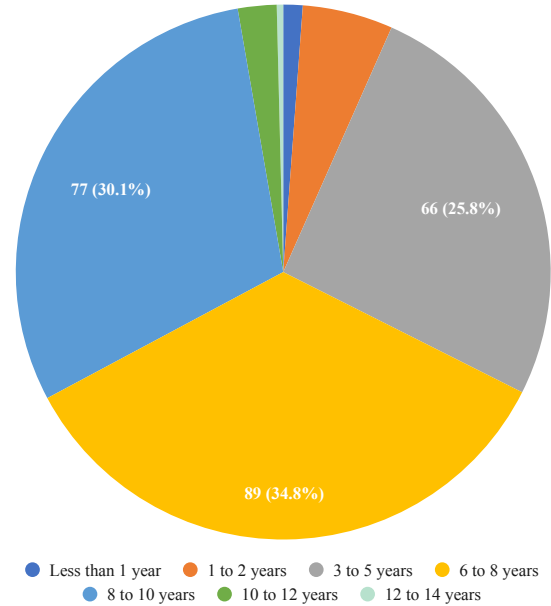
(a) Professional Roles



(b) Managerial levels



(c) Company types



(d) # of years of experience

Figure 3.1. Survey respondents distribution across professional roles, managerial levels, type of organization, and # of years of professional experience.

as identified by the participants, is as follows: UX Designers (n=113; 44.1%), Software Engineers (n=63; 24.6%), Product Managers (n=22; 8.6%); Data Scientists (n=24; 9.4%), and Hardware Engineers (n=34; 13.3%). The respondents represented various levels of hierarchy in their organization from having no management responsibilities (n=73; 28.5%) to being a team manager, mid-level manager (n=111; 43.4%), and upper level manager- EG, Director, C-Suite (n=23; 8.9%). There was good representation of practitioners across different company types: Enterprise B2B (n=87; 33.9%), Enterprise B2C (n=70; 27.3%), Enterprise B2B2C (n=65; 25.4%), other company types like Agency or Consultancy (n=16; 6.25%), Retail (n=15; 5.86%), and rare examples of Freelancing (n=2; 0.78%). The practitioners who responded to the survey had a range of years of experience: mostly 3-5 years (n=66; 25.8%), 6-8 years (n=89; 34.8%), and 8-10 years (n=77; 30.1%); represented 1-2 years (n=14; 5.5%), and 10-12 years (n=6; 2.3%); and one response from a practitioner with 12-14 years of experience. These results are only to show that the sample consisted of a variety and range of participants, but the analysis was only conducted across the variable of professional roles (i.e., UX designers, Software engineers, Product managers, Data scientists, and Hardware engineers). I detail the data analysis of the survey data to answer research question #1 below.

Survey Data Analysis

To answer Research Questions 1a, b, and c, I began by selecting appropriate portions of the survey data collected. As shown in Figure 3.2, Sections 4 and 5 of the survey collected data about professional role-focused values, self and perceived ranking, and alignment among different professional roles. In Section 4, practitioners indicated how their discipline does not care, acknowledge, or care about the provided list of human values. The analysis of these results helped answer research question 1a. In Section 4, practitioners indicated how they personally rank their ethical commitments towards users, discipline, stakeholders, and society. These results when compared with results from Section 5 about how practitioners perceive other practitioners' ranking of these ethical commitments helped answer research question 1b. In Section 6, practitioners reported their alignment with other practitioners

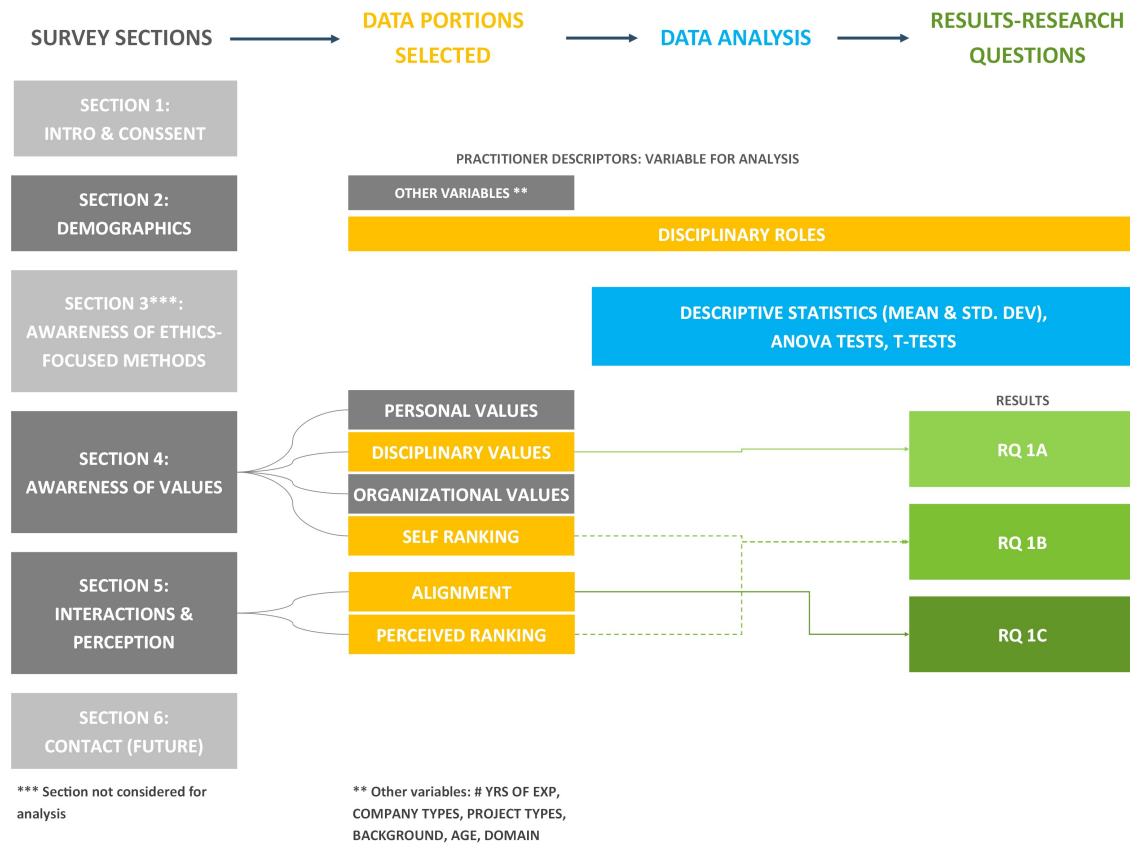


Figure 3.2. Data analysis process for Study 1: Survey.

from different professional roles that they interact with in their daily work. The analysis of these results helped answer research question 1c. Throughout the entire analysis, I have used basic descriptive statistical analysis such as deriving frequency, means, and standard deviation; and t-tests and ANOVA tests to identify statistical significance in rejecting or failing to reject null hypotheses across a pair and groups of variables. For analysis purposes, I have assigned particular numerical values to the variables on a scale. The assumption I had during the analysis was that each point on the scale is equidistant when quantified to conduct ANOVA tests, while acknowledging that the conversion from ordinal to continuous data for statistical analysis has its own limitations. In Chapter 4, taking an interpretivist lens, I detail my analysis per research question by presenting guiding hypotheses for each research question which were not framed as a part of my study design, with the intention

of presenting and structuring the results aligning with the research questions alongside my expectations based on preliminary work.

3.3.2 Study 2.1: Design Co-Creation Activities

This study addresses RQ2 and 2(a). Taking a practice-led framing, I took the role of a designer in this phase of my research drawing from my design expertise and past industry experiences to design co-creation activities. For this phase of my research, I built on Research through Design approaches (Blythe, 2014; W. Gaver, 2012; Zimmerman & Forlizzi, 2014), participatory design principles (Schuler & Namioka, 1993), and co-creation methodology (B. Gaver et al., 1999; McKercher, 2020; E. Sanders & Stappers, 2008) to design these co-creation activities. The primary goal of these activities is to engage and support practitioners in communicating about their felt ethical concerns in their primary professional role and as they interact with practitioners from other roles, with the goal of identifying the kinds of practices they seek to be better supported to engage or expand their primary role-focused notions of ethics and as they interact with practitioners from other professional roles.

I designed three main activities in this process: 1) *Activity A: “Tracing the Complexity”* mapping activity for practitioners to map their ecological complexity model to sketch different people, aspects, and bodies involved and identify kinds of support they seek through their ethical decision making in the mapped model; 2) *Activity B: “Dilemma Postcards”* probe kit for practitioners to filter, reflect, elaborate, and speculate about their ethical dilemmas faced through their ethical commitments, decision making, and complexity in everyday work; and 3) *Activity C: “Method Heuristics”* evaluative activity for practitioners to evaluate, map, and re-imagine ethics-focused methods for their resonance with their design activity and ecological settings. The intentions, purpose, design process, and descriptions of the three activities are provided in Chapter 5 under Sections 5.4, 5.5, and 5.6. I designed variations of each of the activities using two particular schemas, which I refer to and use as guiding structures: the A.E.I.O.YOU model and Classifiers, detailed in Section 5.3.

Building on these activities, I formulated sequences of these co-creation activities (detailed in Section 5.8) to answer research question 2(a) and conduct one-on-one workshops

with practitioners. The four sequences of activities designed are: 1) *Sequence 1–Activity A* $\rightarrow B$: Engaging practitioners in mapping their ecological complexity and filter their ethical dilemmas to position, reflect, and identify those dilemmas in relation to the mapped ecological model; 2) *Sequence 2–Activity B* $\rightarrow A$: Engaging practitioners in filtering and reflecting their felt ethical dilemmas by creating the ecological complexity model to speculate the kinds of support needed to solve those dilemmas; 3) *Sequence 3–Activity A* $\rightarrow C$: Engaging practitioners in mapping their ecological complexity and evaluating an ethics-focused method for its resonance or dissonance in relation to the mapped ecological model; and 4) *Sequence 4–Activity C* $\rightarrow A$: Similar to Sequence 3 only in reverse, designed to meta-evaluate engaging practitioners in mapping their ecological model first to instigate evaluating the method in relation to their mapping or vice versa. In a reflexive stance, I iterated on the design outcomes produced based on actual engagement with practitioners in Study 2.2, supporting the validity of the designed co-creation activities.

3.3.3 Study 2.2: Engage Practitioners to (Potentially) Strengthen Ethical Engagement in Co-creation Activities

This study addresses RQ #2, particularly 2(b). Using the co-creation activities designed in Study 2.1, I mainly played the roles of: 1) a *facilitator* to organize co-creation sessions with twelve practitioners, and 2) a *researcher* to provide a descriptive account of the impacts of the designed co-creation activities on these practitioners. The four sequences designed and described in Section 5.8 were used to conduct 4 groups of co-creation activities with practitioners from different professional roles. In total, I have engaged twelve practitioners with three practitioners from each of the four groups. In the following sections, I detail the sampling strategies, participant details, collected data, and analysis procedures.

Sampling and Recruiting Strategy

A recruiting screener was shared across personal, professional networks on LinkedIn, Slack channels, and organization communication channels; on social-networking sites such as Twitter, Facebook Groups, and Reddit; and via emails to survey participants in Study

1 who have showed interest to be contacted for future studies from prior study recruitment for the overarching project. The recruitment script and screener survey are attached in Appendix I.1. Initially, sign-ups through the screener received good responses from UX designers, researchers, and product managers due to the nature of the researcher’s personal and professional networks. To diversify and recruit participants from other professional roles, the screener was posted on targeted groups such as subreddits /r/softwareengineering, /r/ethics, /r/data, and with personal contacts who were software engineers to share on their professional networks. The recruitment and sampling strategy was to engage three different professional roles under each sequence of co-creation activities in any combinations across the roles of UX designers, software engineers, product managers, data scientists, UX researchers, and hardware engineers. Participants were chosen from the volunteer pool to represent variety in their organization type (Agency or consultancy, Enterprise B2B, Enterprise B2C, Enterprise B2B2C, Government) and years of experience (more than 2 years). After conducting several sessions, sign-ups from practitioners who have finished one year of full-time employment along with fewer months of internships were also considered to engage in the co-creation activities as an experiment to pilot these sessions with novice professionals. The intention here was to evaluate and collect data on how these co-creation activities may engage practitioners from different experience levels.

Participants

I conducted 90-120 mins co-creation activities with twelve practitioners. I engaged three practitioners in each sequence. In each sequence, the practitioners ranged across different organization types, professional roles, years of experience, and gender diversity. Table 3.3 presents participant demographics for each of the sequences. I have anonymized their identity by giving each participant a unique identifier. The identifier takes the format nP1,2,3 where n= 1,2,3,4 is for each of the four sequences. For instance, 2P3 is the third practitioner who was engaged in Sequence 2 co-creation activity. The years of experience of the practitioners ranged from 1 to 8 years. As shown in Table 3.3, for each sequence, there were three different professional roles engaged from different company types and years of experience. This variety

and range in practitioner demographics resulted in robust data of practitioners' experiences, reflections, and inputs to iterate the designed co-creation activities. Given the nature of the sequences and its constituents, all the twelve practitioners were engaged in Activity A, 6 out of the twelve practitioners were engaged in Activity B (i.e., 1P1,2,3 and 2P1,2,3), and 6 out of the twelve practitioners were engaged in Activity C (i.e., 3P1,2,3 and 4P1,2,3). The researcher did not conduct a cross-case analysis on stories shared and artifacts created by different professional roles during a particular sequence of co-creation activities as that falls beyond the scope of this research and posed research questions. The variety certainly helped to strengthen the diversity of experiences with the co-creation activities and my evaluation that the designed co-creation activities were successful to engage practitioners from multiple professional roles. I share the results from engaging these practitioners in Chapter 6 and a reflective account of how these co-creation activities acted as a "space for representation" in Section 7.2.

Data Collection

Twelve practitioners were engaged in four designed sequences of co-creation activities for 90-120 mins via Zoom calls. The co-creation activities were designed to be conducted on a digital platform named MIRO. Miro is a collaborative interactive whiteboard tool that easily allows users to create concept maps using the given features. The engagement, interaction, and conversations between the practitioner and the facilitator were audio, video, and screen-share recorded for research purposes. Practitioners were consented before the start of the session using consent form, attached in Appendix E, approved by the Institutional Review Board (IRB). I shared a password-protected Miro link with participants a day before their session using an Email Script, included in Appendix I. All practitioners were suggested to open the Miro link as a "guest" to avoid revealing their identity in the video recording.

The data collected through the co-creation activities included audio and video recordings, transcripts, and artifacts created through the activities. Artifacts created include ecological maps from Activity A (Figure 3.3(a)); filtering of ethical dilemmas faced, talked about, seen,

Table 3.3.

Participant descriptors for each sequence of co-creation activities.

Identifier	Professional Role	Company Type	Years of Experience
Sequence 1: Activity A1.1 → Activity B2.1			
1P1	UX Designer	Enterprise (B2C)	1.5
1P2	Product Manager	Enterprise (B2B)	5
1P3	Data Scientist	Agency or Consultancy	1
Sequence 2: Activity B2.1 → Activity A1.1			
2P1	UX Designer	Agency or Consultancy	8
2P2	Product Manager	Agency or Consultancy	2
2P3	Software Engineer	Enterprise (B2B)	2
Sequence 3: Activity A1.1 → Activity C1			
3P1	UX Designer	Enterprise (B2B)	5
3P2	Product Manager	Enterprise (B2B)	8
3P3	Software Engineer	Enterprise (B2B)	1
Sequence 4: Activity C1 → Activity A1.1			
4P1	UX Designer	Government	5
4P2	UX Researcher	Enterprise (B2C)	4
4P3	Software Engineer	Enterprise (B2C)	2

or not faced by practitioners from Activity B (Figure 3.3(b)); and mapping and evaluation results of an ethics-focused method called the Ethical Contract from Activity C ((Figure 3.3(c)). The conversations with the practitioners included interactions during the activities as they were interacting with the co-creation material, sharing their stories, asking clarifying questions, ideating new possibilities through the activities, de-briefing conversation at the end of the engagement with the co-creation activities, and providing feedback to improve the designs of the activities.

Additionally, I made de-briefing notes after each session to reflect on my overall experience of the session, facilitation notes, “aha” moments, any similarities or differences of the session with already conducted sessions, potential facilitation improvements for next sessions, and reflection on practitioner behaviors as they interacted with the activity material.



Figure 3.3. Examples of artifacts created as a part of (a) Activity A–Tracing the Complexity mapping activity created by 1P1; (b) Activity B–Dilemma Cards filtering created by 2P3; and (c) Activity C–Method Heuristics and Evaluation of an ethics-focused method created by 3P3.

This process of note-taking and facilitating the long and interactive co-creation sessions allowed me, as a researcher, to sensitize myself with the co-creation activities and deepen my understanding of my interactions with the practitioners. These notes also helped me in the analysis process to easily identify examples in the transcript for further analysis.

In total, I facilitated approximately 23 hours (1385.3 minutes) of co-creation sessions with an average engagement of 115 minutes per session across the twelve practitioners. My

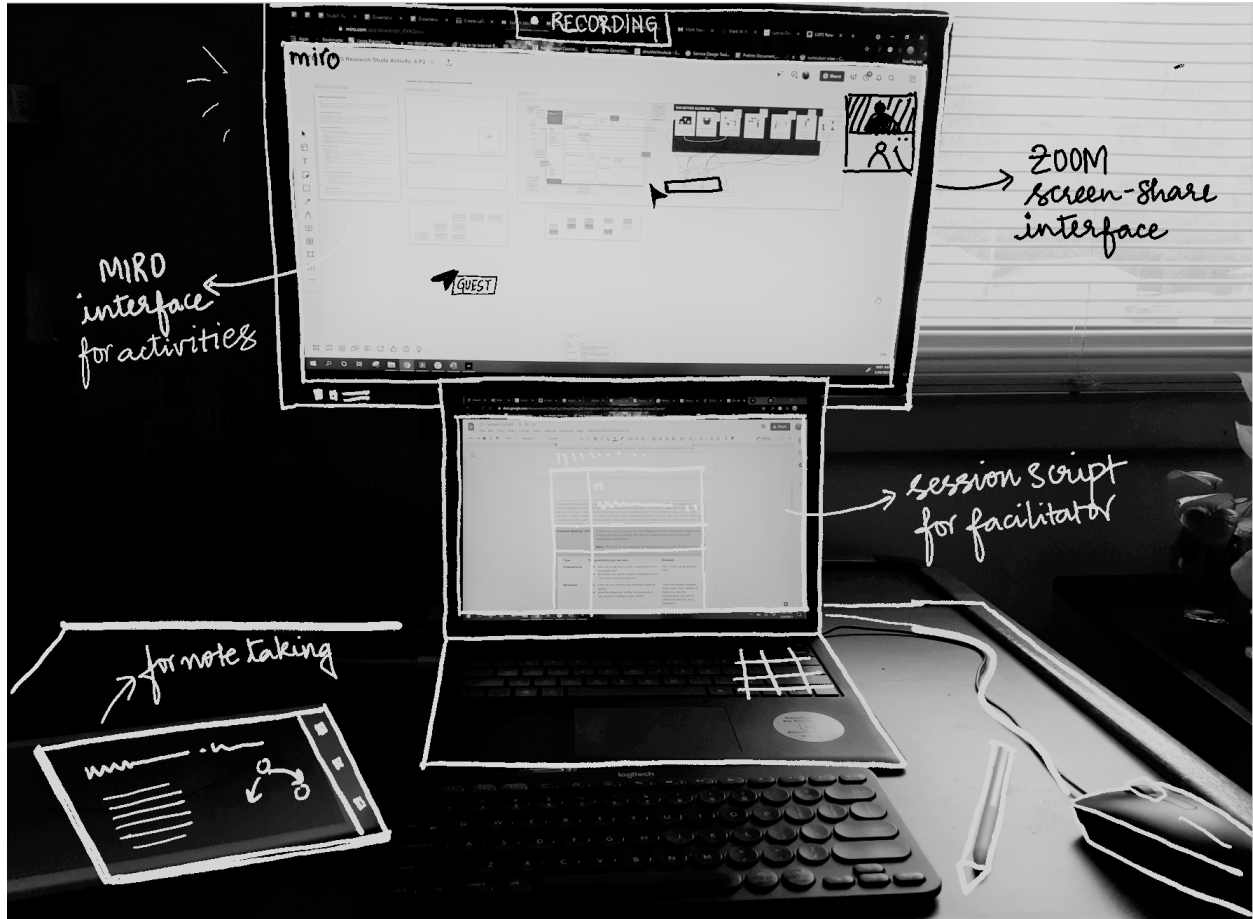


Figure 3.4. Set-up during conducting the co-creation activities with participants.

set-up during the co-creation sessions with the practitioners is illustrated in Figure 3.4. All the sessions were video recorded and transcribed using the online transcription tool Dovetail. Dovetail is an online qualitative data analysis software with embedded transcription tools that allow both cleaning the transcripts and coding the data in the same environment. The transcripts were not cleaned completely due to the large amounts of data, but selected parts of the transcripts were cleaned to anonymize the practitioner's identity and to support the analysis for this study. The selected portions of the transcripts and analysis conducted to answer research question 2(a) are detailed in the next section.

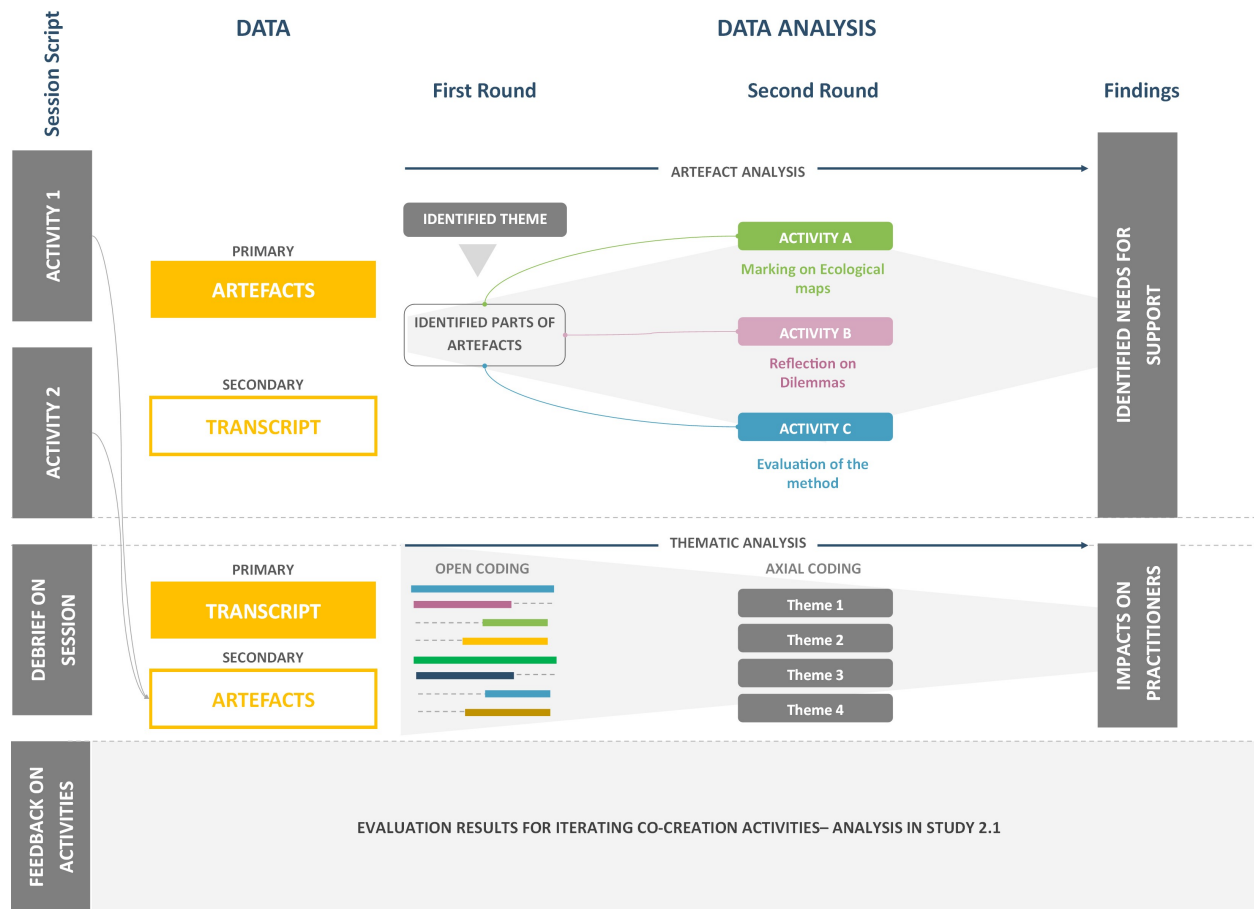


Figure 3.5. Data analysis process for Study 2.2.

Data Analysis

To answer my research question 2(b), I conducted two kinds of analysis as illustrated in Figure 3.5. One, *thematic analysis* (Braun et al., 2020) of the debrief session with the practitioner at the end of engaging with the sequence of activities. This analysis resulted in answering what the practitioners articulated, reflected, and expressed about their learning and experience with the co-creation activities and its impact for ethical engagement in their everyday design work. Two, *artifact analysis* of the artifacts created through the two activities in a sequence. This analysis resulted in answering the kinds of ethical practices practitioners seek to be better supported in their everyday ecological model, faced ethical dilemmas, and using ethics-focused methods.

Thematic Analysis. At the end of the co-creation session, practitioners were asked a debrief question about what they learnt through the engagement with the co-creation materials about themselves, themselves as a member of a profession, their ecology, and their design activity. The practitioners were asked which part of the designed sequences—activity A, B, or C—activated those reflections. In the first round of analysis, this part of the transcript was initially open coded using reflexive bottom up thematic analysis (Braun et al., 2020). The open themes included becoming self-aware, expanding their view, asking questions and support, realizing about their role and responsibility, reflecting on ethics related to their ecology, anticipating changes to their practice, new learning, general reflection, and other rare instances such as memory jogs, connections with researchers, and ideating along with the researcher. Tags were added to these open themes to easily identify which activity (Activity A, B, or C) allowed the practitioner to activate these reflections. In the second round of analysis, these open themes were revisited to strengthen the final set of themes by conducting axial coding. The four broad impacts on the practitioners are: 1) Expanding Their Ethical Horizons through Self-Awareness, 2) Learning New Approaches to Ethics Vocabulary, 3) Becoming (Re-) Aware About Their Current Practice, and 4) Imagining Trajectories of Change in Their Current Practice. To detail further the story behind these themes, specific parts of the transcript linking to practitioner’s examples were analyzed to illustrate and provide examples while describing these themes (in Section 6.2). These themes were also re-evaluated with the intended outcomes while designing the activities.

Artifact Analysis. Each practitioner was engaged in two of the three activities. The artifacts created through Activities A, B, and C were analyzed to identify the kinds of support practitioners expressed they need or expect for ethical decision making in their everyday work; explicitly asked to identify in different ways for the three activities. Here is the process I followed to identify specific instances and analyze to identify the kinds of support practitioners to potentially support their ethical action and awareness, per activity:

- For **Activity A**, the marking activity where practitioners were explicitly asked to circle in “red” (shown in Figure 3.3 (a)) to identify where they felt they needed more support in their ecological complexity map was analyzed across the twelve practitioners. These

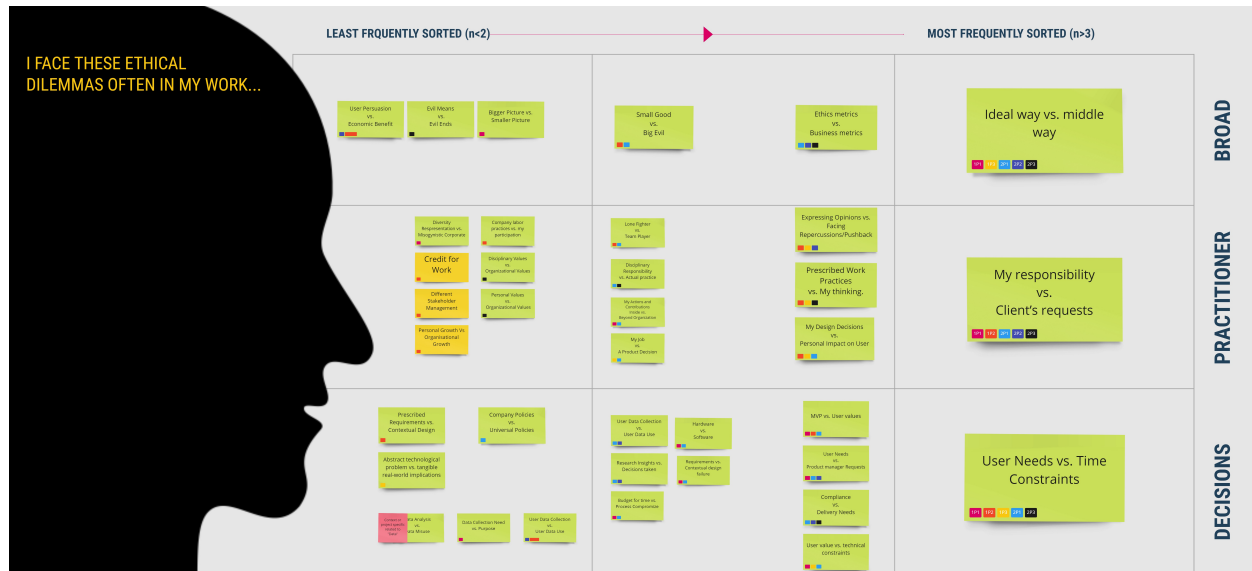


Figure 3.6. Artifact analysis of Activity B- Ethical Dilemmas faced by practitioners sorted based on frequency and affinity themes: broad, practitioner-focused, and product decisions-focused.

red circles marked on the ecological models acted as anchor points to identify the practitioner's need and the position on the map helped identify if those needs are individual to the practitioner, within organization, or beyond the organization. Once the red circles were collected, an affinity map was produced, providing a broad range of examples listed in Section 6.3;

- For **Activity B**, the filtering activity where practitioners were asked to filter “I face these ethical dilemmas in my everyday work” can help speculate and infer the dilemmas that they need support solving. I have created an affinity of the filtered ethical dilemmas (as shown in Figure 3.6) and identified three main clusters of ethical dilemmas dealing with: 1) broad/ philosophical sense of ethics (e.g., Ideal way vs. Middle Way), 2) practitioner-focused (e.g., My responsibility vs. Client's requests), and 3) product decision-focused (e.g., User Needs vs. Time Constraints). I present results on the most frequently faced (represented by pseudonym tags applied to each Green card) ethical dilemmas as a potential opportunity to design potential supports for practitioners in Section 6.3;

- For **Activity C**, the evaluation activity where practitioners were asked to evaluate the method's resonance with their everyday work by applying ecology heuristics and artefact heuristics tag can serve as a way to identify “resonant” needs of support for ethical decision making. I have collected the ecology heuristics and artifact heuristics tags that practitioners used to discuss aspects of dissonance of using the method in their current practice. I have collected them on the method to create a heat map, as illustrated in Figure 3.7, to speculate specifications for practice-resonant ethics-focused methods. The limitation of this analysis is that the results are specific to the method Ethical Contract used as a part of activity C.

Figure 3.7. Artifact analysis of Activity C- summarizing applied ecology heuristics and artifact heuristics tags to the method Ethical Contract showing dissonance of the method with their everyday practice.

The results of these two kinds of analysis are presented in Chapter 6 under Sections 6.2 and 6.3 to answer research question 2(b).

3.3.4 Methodological Issues

3.3.5 Trustworthiness and Transparency

In qualitative research work, the validity and reliability of the researcher's work is presented through the lens of trustworthiness and transparency of her process. The researcher has to be trusted as the instrument of analysis and conducting the research (Pezalla et al., 2012). In this research study, transparency and trustworthiness are illustrated in the following ways. First, peer debriefing (Carspecken, 2013) was done with my research advisor throughout every step of my decision making, data collection, and analysis to assure the data coding and analysis procedures are reliable and align with the research questions posed. Second, the description about the methods used are provided with details, along with researcher rationale, discarded ideas, limitations, and cases that did not work through the research study. This increases the reliability of the process I have taken to achieve the research aim. Third, I have been transparent about different roles and voices I took at every stage of my analysis process for Studies 1 and 2.2, design process in Study 2.1, and facilitating process during co-creation sessions in Study 2.2. Fourth, the studies have been reviewed by the Institutional Review Board (IRB) (Bruckman, 2014) as part of a larger grant-funded project. The approved consent forms for Study 1 and Study 2.2 used for the studies are presented in Appendix E. Study procedures were conducted only after approval from the IRB, validating protocols through pilot studies, and following Responsible Conduct of Research to abide by ethical considerations while conducting this research study. All the studies proposed above included validating the protocols designed through pilot studies and improved to answer the research questions. Finally, in this research study, various methods such as semi-structured interviews, surveys, and co-creation sessions were used, as detailed in the data collection procedures section. Various data sources are used for the triangulation of data, giving reliable evidence of the results from various standpoints or data points.

Anonymization and Privacy

During this research study, data was collected from participants through their narratives, artifacts created, and visual imagery. To protect the identity of the participants, they were given pseudonyms and de-identified using broader terms for their company type, role, and position in their company. In all the studies described, the participants were not required to reveal their identity and when revealed, were represented using archetypes or pseudonyms. In Study 2.2, practitioners were engaged in co-creation using a collaborative tool called Miro, and all boards were password protected and only shared with me and the practitioner. The participants were requested to sign into the tool as a guest so that their identity was not revealed in the screen recording. All the data was stored in secure data management systems which can be accessed only by the researcher (and other researchers working on the project) who have all been CITI certified. Any visuals were blurred to protect the participants' identity.

The Researcher

It is important to justify the experience of the researcher in a qualitative study because they are a “researcher [working] as an instrument” (Pezalla et al., [2012](#)). In the context of this research study, I am trained as a qualitative researcher through multiple research projects and graduate-level course work; as a designer through my undergraduate and graduate-level coursework and project work; and as a practitioner through my past internship and industry experience. My research experience as a qualitative researcher in an industry context and as a graduate research assistant in an academic setting illustrates my potential to conduct qualitative research methods and analysis that were proposed in this study. I am well versed with the practice of conducting interviews (Chivukula, Hasib, et al., [2021](#); Chivukula et al., [2020](#)), observations in industry contexts (Gray & Chivukula, [2019](#)), focus groups with practitioners (Bansal et al., [2016](#); Ghosh et al., [2017](#)), and lab protocol studies with designers (Chivukula, Gray, et al., [2019](#)). My industry experience through past positions as an intern and a full-time practitioner help me understand various dimensions of organizational factors that entangle with decision making, including working with practitioners from different pro-

fessional roles and jargon used in company culture. In the US context, the observational studies in past research projects allowed me to observe interactions among practitioners from different professional roles in various industry types such as a consultancy, an enterprise (B2B), and a startup. As a researcher, I believe in openly presenting my scoping, constraints, analysis failures, and emotions that might have impacted by design decisions. As a human instrument in conducting this study, I have identified and presented unsuccessful moments and discarded ideas as future opportunities and potential improvements. This provides a background about the reliability of the researcher for this kind of a research study.

In the next three chapters, I present results and findings to answer the research questions. Primarily, in the form of *professional role's story* where I present the survey results (Chapter 4), *designer's story* where I present my designer voice and outcomes of designing co-creation activities (Chapter 5), and *practitioner's story* where I present findings upon engaging practitioners from different professional roles in the co-creation activities (Chapter 6).

4. PROFESSIONAL ROLES' STORY: SURVEY RESULTS

4.1 Introduction

How do practitioners from a range of professional roles describe their ethical orientations, commitments, and alignment with other practitioners?

Research Question 1

In this chapter, I present my analysis of the survey results to answer research question #1. This research question had three sub-parts answered in following sections: In Section 4.2, I present results to describe the ethical orientations of practitioners from different professional roles using the language of human values; in Section 4.3, I present results on self ranking and anticipated ranking of various ethical commitments towards users, role, stakeholders, and society; and in Section 4.4, I present result to describe the degree of alignment of practitioner's values during their interactions with practitioners from other professional roles.

Before presenting the results to answer each question 1a, 1b, and 1c in the following sections, I would like to establish some common procedures I followed for statistical analysis of the survey results. The following practices apply to all the questions and analysis done as a part of this chapter:

1. There are five professional roles I focused on: UX designers, software engineers, product managers, data scientists, and hardware engineers.
2. There are nine human values presented to the survey participants, as listed in Table 3.2: advocacy, environmental sustainability, privacy, fairness, property rights, right to information, human rights, human wellness, and usability.
3. Hypotheses stated under each research question were not a part of the study design. I created these hypotheses as a way to frame and convey my results and guide the use of inferential statistics. Wherever stated, I have provided a null (means across the variables are equal) and alternative (means across the variables are not all equal) hypothesis.

4. The significance level across all the tests run for the analysis is set at $\alpha = 0.05$. This means that I set my risk level to 5 % to show that a difference exists when there is no difference in the mean values.
5. All statistical tests run on the data provided a p-value which indicates the probability that data could occur under the null hypothesis. For example, $p = 0.03$ indicates that there is a 3% chance to observe means that are this different or more under the null hypothesis (that all the means are equal).
6. I ran ANOVA tests to test groups (e.g., professional roles, human values) with Tukey adjustment for multiple comparisons (e.g., value 1 vs. value 2, professional role 1 vs. professional role 2) to see if there's a difference between them.
7. These tests provide a p-value, which when less than the set significance level ($\alpha=0.05$) shows that there is a statistically significance difference among one or more pairs of the contestants in the group (e.g., one or more pairs of professional roles, one or more pairs of human values per professional role).

4.2 1a: How do practitioners describe their ethical engagement as a member of their profession through the language of human values?

In the survey, practitioners were provided a list of nine human values to report how their professional role cares for these values using a five-point likert scale as a degree of acknowledgement to care. Numerical values were assigned to each of the degrees for statistical analysis. The scale and assigned values are as follows: “We do not care about this value” (1), “We rarely acknowledge this value” (2), “We acknowledge this value” (3), “We care about this value” (4), and “We deeply care about this value” (5). To answer research question 1a, I provide two kinds of analysis: 1) Results of hypothesis if each professional role reports that their professional role cares similarly or differently about all values under Section 4.2.1, and 2) Results of hypothesis on how each value was cared similarly or differently across the professional roles under Section 4.2.2.

4.2.1 Describing a professional role's orientation towards human values

Hypothesis derived to describe how members of each professional role reported how their role is oriented towards the list of provided human values:

H₀- A practitioner from a particular professional role mentions that their role cares similarly about all values

H_a - A practitioner from a particular professional role mentions that their role cares differently about one or more values

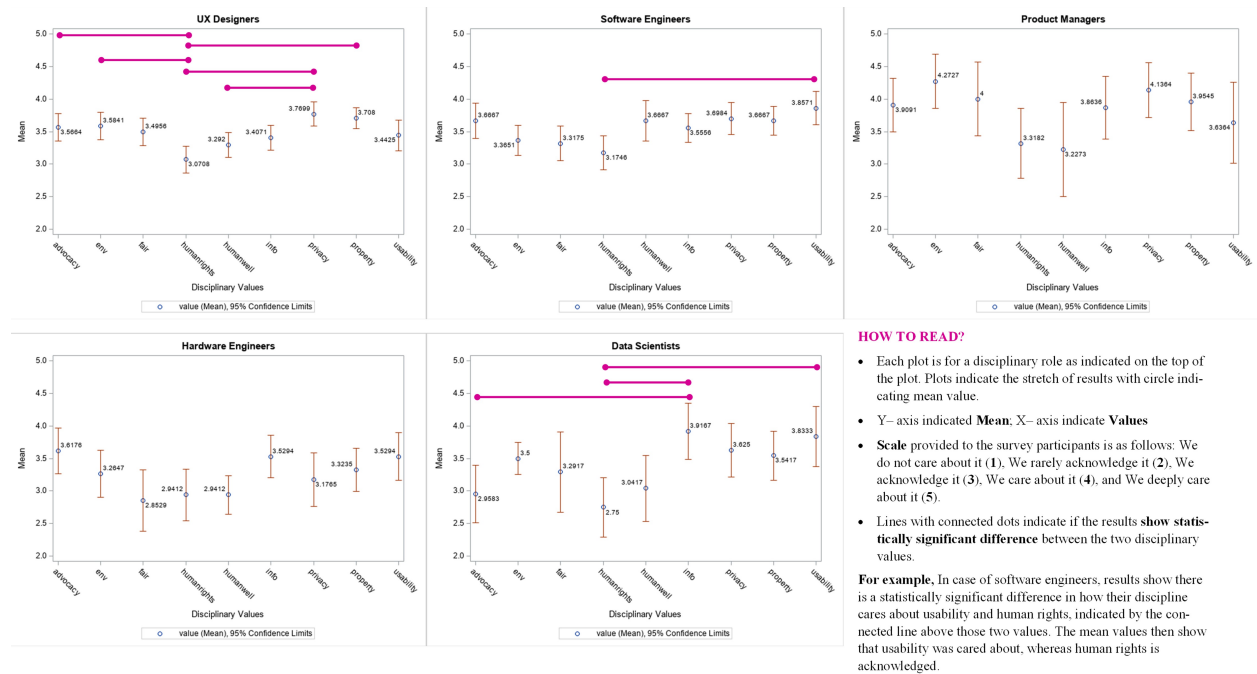


Figure 4.1. Distributions for each of the five professional roles and their average valence of acknowledgement and care of their professional role values.

Results from an ANOVA test ($\alpha=0.05$) indicated professional role-focused values that show statistical significance in differing mean values for each professional role. Among the five roles, hardware engineers ($p=0.0137$) and product managers ($p=0.0501$) results showed significant differences in how their professional role cares about the provided nine values, but ANOVA tests could not show further results about which pair of values reported the difference. To set the statistical analysis standard and not rig the analysis based on explorative

data gathering, I have not conducted any more statistical tests to find which of values were reported to be cared for differently by hardware engineers and product managers. ANOVA results showed that results from data scientists ($p = 0.0009$), software engineers ($p = 0.0029$), and UX designers ($p < 0.0001$) show that their professional role cares about one or more values differently among the provided nine values. The results for each role is as follows, shown in Figure 4.1:

- In the case of **UX designers**, the mean values show that their professional role cares about the values in the order of privacy ($m=3.77$; $sd=0.99$), property rights ($m=3.71$; $sd=0.86$), environmental sustainability ($m=3.58$; $sd=1.14$), advocacy ($m=3.56$; $sd=1.11$), fairness ($m=3.5$; $sd=1.14$), usability ($m=3.44$; $sd=1.28$), right to information ($m=3.4$; $sd=1$), human wellness ($m=3.3$; $sd=1.02$), and human rights ($m=3.07$; $sd=1.1$). Results show a statistically significant difference in how UX designer's role cares more about privacy, property rights, environmental sustainability, and advocacy and only acknowledges human wellness and human rights.
- In the case of **software engineers**, the mean values show that their professional role cares about the values in the order of usability ($m=3.86$; $sd=1.01$), privacy ($m=3.7$; $sd=0.98$), property rights ($m=3.67$; $sd=0.86$), human wellness ($m=3.67$; $sd=1.23$), advocacy ($m=3.67$; $sd=1.08$), right to information ($m=3.56$; $sd=0.88$), environmental sustainability ($m=3.37$; $sd=0.92$), fairness ($m=3.32$; $sd=1.06$), and human rights ($m=3.17$; $sd=1.04$). Results show that there is a statistically significant difference in how software engineers reported that their role cares about usability and only acknowledges human rights.
- In the case of **product managers**, the mean values show that their professional role cares about the values in the order of environmental sustainability ($m=4.27$; $sd=0.94$), privacy ($m=4.14$; $sd=0.94$), fairness ($m=4$; $sd=1.27$), property rights ($m=3.95$; $sd=1$), advocacy ($m=3.91$; $sd=0.92$), right to information ($m=3.86$; $sd=1.08$), usability ($m=3.64$; $sd=1.4$), human rights ($m=3.32$; $sd=1.21$), and human wellness ($m=3.23$; $sd=1.63$). Results show that there is no statistically significant difference in how prod-

uct managers reported their role cares about all the values, but on average, they most care about environmental sustainability and acknowledge about human wellness.

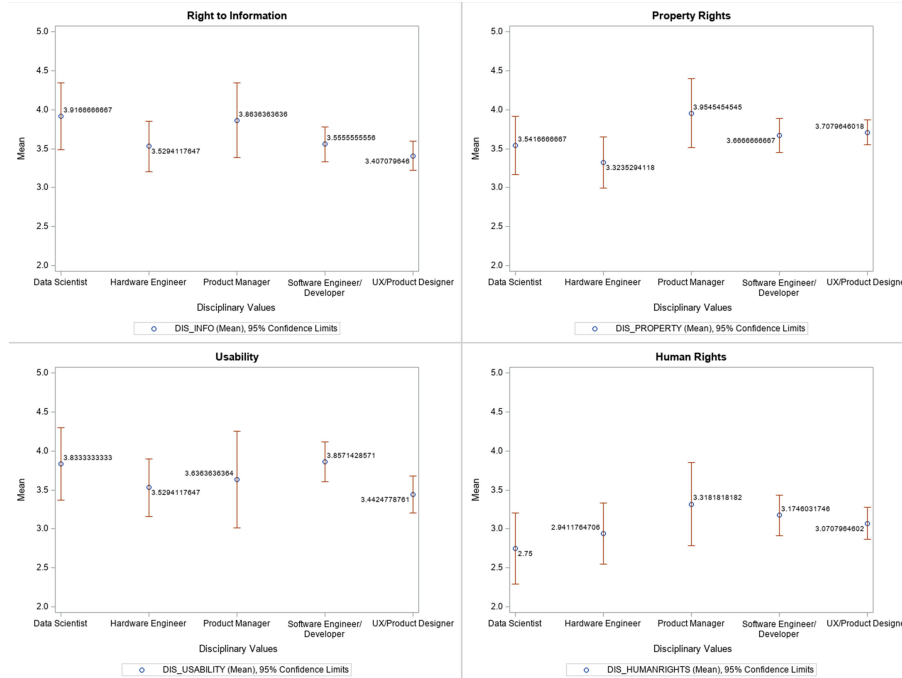
- In the case of **data scientists**, the mean values show that their professional role cares about the values in the order of right to information (m=3.92; sd=1.02), usability (m=3.83; sd=1.09), privacy (m=3.63; sd=0.97), property rights (m=3.54; sd=0.88), environmental sustainability (m=3.5; sd=0.59), fairness (m=3.29; sd=1.46), human wellness (m=3.04; sd=1.2), advocacy (m=2.96; sd=1.04), and human rights (m=2.75; sd=1.07). Results show that there is a statistically significant difference in how data scientists reported that their role cares most about right to information and usability and acknowledge about advocacy and human rights.
- In the case of **hardware engineers**, the mean values show that their professional role cares about the values in the order of advocacy (m=3.62; sd=1.02), right to information (m=3.53; sd=0.93), usability (m=3.53; sd=1.05), property rights (m=3.32; sd=0.94), environmental sustainability (m=3.26; sd=1.02), privacy (m=3.18; sd=1.17), human wellness (m=2.94; sd=0.85), human rights (m=2.94; sd=1.13), and fairness (m=2.85; sd=1.35). Results show that there is no statistically significant pair-wise difference in how hardware engineers reported their role cares about any of the values, but on average, their role most cares about advocacy and acknowledges fairness.

4.2.2 Describing how each human value is cared across different professional roles

Hypothesis derived to present results of how practitioners reported their professional role cares about human values as follows:

H₀- Members of the five professional roles mention that their role cares similarly about a value

H_a- Members of one or more professional roles mention that their role cares differently about a value



LIST OF VALUES

With results showing NO statistically significant difference across the five disciplinary roles ($p > \alpha$)

- Right to Information
- Property Rights
- Usability
- Human Rights

With results showing statistically significant difference across one or more pairs across the five disciplinary roles ($p < \alpha$)

- Privacy
 - Fairness
 - Human Wellness
 - Environmental Sustainability
 - Advocacy
- Distributions shown in the next figure.

Figure 4.2. Distributions of means of acknowledgement or care for each human value across the five professional roles, showing NO statistically significant difference among the roles ($p > \alpha$).

Practitioners were asked to grade the values they cared about in their professional role on a five-point likert scale, ranging from “We do not care about it” to “We acknowledge it” to “We deeply care about it.” Results from an ANOVA test ($\alpha=0.05$) indicated professional role-focused values that show statistical significance in differing mean values among the five different professional roles. Among the listed nine values, right to information ($p=0.09$), property rights ($p=0.09$), human rights ($p=0.38$), and usability ($p=0.2$) were shown to have no statistically significant differences in their mean values across the five professional roles. The detailed results for each of the values, presented in Figure 4.2 (going clockwise), with no statistical significance across the five professional roles is as follows:

- In case of **right to information**, on an average, data scientists ($m=3.92$; $sd=1.02$) cared for the value most of all professional roles followed by product managers ($m=3.86$; $sd=1.08$), software engineers ($m=3.56$; $sd=0.88$), hardware engineers ($m=3.53$; $sd=0.93$), and UX designers ($m=3.4$; $sd=1$).

- In case of **property rights**, on an average, product managers ($m=3.95$; $sd=0.99$) cared for the value most of all professional roles followed by UX designers ($m=3.71$; $sd=0.86$), software engineers ($m=3.67$; $sd=0.86$), data scientists ($m=3.54$; $sd=0.88$), and hardware engineers ($m=3.32$; $sd=0.94$).
- In case of **human rights**, on an average, product managers cared for the value most of all professional roles followed by software engineers ($m=3.17$; $sd=1.04$), UX designers ($m=3.07$; $sd=1.1$), hardware engineers ($m=2.94$; $sd=1.13$), and data scientists ($m=2.75$; $sd=1.07$). The mean values are low in the case of human rights indicating the five professional roles were more closely acknowledging the value.
- In case of **usability**, on an average with close mean values, software engineers ($m=3.85$; $sd=1.01$) cared for the value most of all professional roles followed by data scientists ($m=3.83$; $sd=1.09$), product managers ($m=3.63$; $sd=1.49$), hardware engineers ($m=3.53$; $sd=1.05$), and UX designers ($m=3.44$; $sd=1.28$).

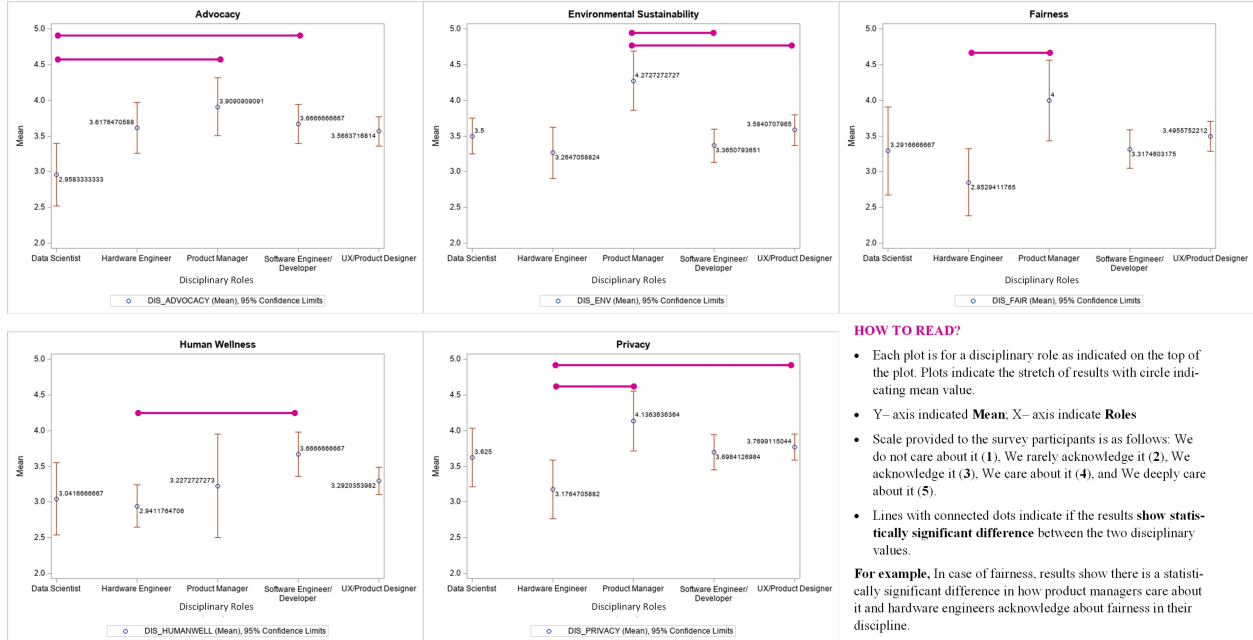


Figure 4.3. Distributions of means of acknowledgement or care for each value across the five professional roles, showing statistically significant difference among the roles ($p < \alpha$).

A list of values, as shown in Figure 3, including advocacy ($p=0.03$), environmental sustainability ($p=0.036$), fairness ($p=0.009$), human wellness ($p=0.025$), and privacy ($p=0.0085$) showed that there existed a statistical significance in how one or more pairs of the five different professional roles mentioned their role cares about a certain value. The detailed results for each of the values and statistical significance across one or more pairs of professional roles, represented clockwise in Figure 4.3, is as follows:

- In the case of **advocacy**, results show a statistically significant difference in how data scientists ($m=2.96$; $sd=1.04$) reported that their role acknowledges advocacy and product managers ($m=3.91$; $s=.092$) and software engineers ($m=3.67$; $s=1.07$) mentioned their professional role cares about advocacy. On average, UX designers ($m=3.57$; $s=1.11$) and hardware engineers ($m=3.62$; $s=1.02$) mentioned that their role cares about advocacy, but there is no statistically significant difference between these two roles.
- In the case of **environmental sustainability**, on an average, the mean values on the scales of acknowledgement and care towards this value ranged between 3.26-4.27 which indicates that all the professional roles mentioned that their role cares about this value. The results show a statistically significant difference in how product managers ($m=4.27$; $sd=0.93$) mentioned their role cares about this value and software engineers ($m=3.36$; $sd=0.92$) and UX designers ($m=3.6$; $sd=1.14$) comparatively care less than product manager's role. On an average, data scientists ($m=3.5$; $sd=0.589$) and hardware engineers ($m=3.26$; $sd=1.024$) did mention their role also cares about this value, but there is no statistically significant difference between these two roles.
- In the case of **fairness**, results show a statistically significant difference in how product managers ($m=4$; $sd=1.27$) mentioned their role cares about this value and how hardware engineers ($m=2.85$; $sd=1.35$) acknowledge this value. On an average, UX designers ($m=3.49$; $sd=1.14$), software engineers ($m=3.3$; $sd=1.06$), and data scientists ($m=3.3$; $sd=1.46$), but there is no statistically significant difference between these three roles.

- In the case of **privacy**, results show a statistically significant difference in how hardware engineers ($m=3.17$; $sd=1.17$) mentioned their role acknowledges about this value and product managers ($m=4.14$; $sd=0.94$) and UX designers ($m=3.77$; $sd=0.99$) reported that their role cares about privacy. On an average, software engineers ($m=3.7$; $sd=0.98$) and data scientists ($m=3.63$; $sd=0.97$) mentioned that their role cares about privacy, but there is no statistically significant difference between these two roles.
- In the case of **human wellness**, results show a statistically significant difference in how software engineers ($m=3.67$; $sd=1.23$) reported their role cares about human wellness and hardware engineers ($m=2.94$; $sd=0.85$) mentioned their role acknowledges this value. On an average, UX designers ($m=3.3$; $sd=1.02$), product managers ($m=3.23$; $sd=1.63$), and data scientists ($m=3.04$; $sd=1.2$) mentioned their role cares about the value, but there is no statistically significant difference between these two roles.

4.3 1b: How do practitioners describe their ethical commitments as an individual and anticipate ethical commitments of practitioners from other professional roles?

In the survey, practitioners were asked to rank how they personally would rank their ethical commitments towards four aspects: 1) User- “I feel responsible for supporting the users through the design”; 2) Role- “I feel responsible only for doing my job well”; 3) Stakeholder- “I feel responsible to support business and stakeholders decisions”; and 4) Society- “I feel responsible to think about the long term impact on the society through the design.” Practitioners were also asked to rank how they anticipated a different professional role’s commitment towards the listed aspects. The ranking order ranges from rank 1 (most important) to rank 4 (least important). Numerical values were assigned to the ranks as 1, 2, 3, and 4 for statistical analysis, meaning that lesser mean values correspond to a higher ranked importance. To answer research question 1b, I provide two kinds of analysis: 1) Results of hypothesis on how the practitioners self-ranked their ethical commitment similarly or differently across the four aspects under Section 4.3.1; and 2) Results of hypothesis on how they

anticipated ethical commitments of practitioners from other professional roles similarly or differently than the practitioners self-ranking of the four aspects under Section 4.3.2.

4.3.1 Individual practitioners' ethical commitments

Hypothesis derived to present results of self-ranking of ethical commitments reported by practitioners is as follows:

H₀- Members of a professional role rank their ethical responsibility similarly across user, stakeholder, discipline, and society.

H_a- Members of a professional role rank their ethical responsibility differently across user, stakeholder, discipline, and society.

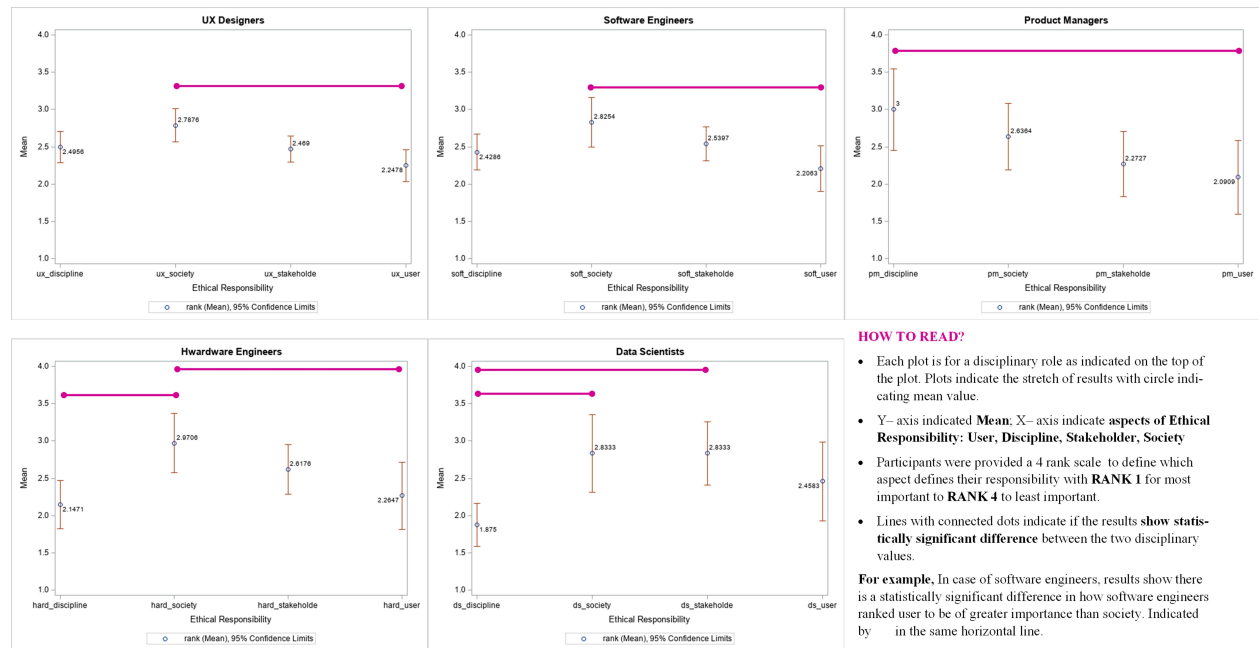


Figure 4.4. Distributions of means of rankings provided across the four aspects of ethical responsibility towards users, stakeholders, role, and society as indicated by the five professional roles.

To answer research question 1b about how practitioners rely upon their professional role-focused notions of ethics during practice, the survey recorded results from practitioners to rank aspects of ethics responsibility from most (rank 1) to least (rank 4) important

across user, discipline, stakeholder, and society. Below, I provide descriptive statistics about how each professional role ranked the four aspects of ethical responsibility. Additionally, I have provided results from ANOVA tests to describe if the practitioners ranked these aspects similarly or differently from each other. Figure 5 provides the distributions for each professional role with marking to visualize which aspects show significant differences in ranking. Going clockwise in Figure 4, The results are as follows:

- On an average, UX designers ranked their ethical responsibility in the order of user ($m=2.25$; $sd=1.14$), stakeholder ($m=2.47$; $sd=0.954$), role ($m=2.5$; $sd=1.11$), and society ($m=2.79$; $sd=1.21$). Results show there is a statistically significant difference in how UX designers ranked users to be most important ($n=31$ out of 113; 36.3 %) and society being least important ($n=46$ out of 113; 40.7 %).
- On an average, software engineers ranked their ethical responsibility in the order of user ($m=2.2$; $sd=1.21$), role ($m=2.43$; $sd=0.94$), stakeholder ($m=2.54$; $sd=0.89$), and society ($m=2.83$; $sd=1.31$). Results show there is a statistically significant difference in how software engineers ranked users to be most important ($n=26$ out of 63; 41.3%) and society being least important ($n=32$ out of 63; 50.8 %).
- On an average, product managers ranked their ethical responsibility in the order of user ($m=2.09$; $sd=1.11$), stakeholder ($m=2.27$; $sd=0.98$), society ($m=2.64$; $sd=1$), and role ($m=3$; $sd=1.23$). Results show there is a statistically significant difference in how product managers ranked users to be most important ($n=10$ out of 22; 45.4 %) and role being least important ($n=12$ out of 22; 54.5 %).
- On an average, hardware engineers ranked their ethical responsibility in the order of role ($m=2.15$; $sd=0.93$), user ($m=2.26$; $sd=1.29$), stakeholder ($m=2.62$; $sd=0.95$), and society ($m=2.97$; $sd=1.14$). Results show there is a statistically significant difference in how hardware engineers ranked users ($n=14$ out of 34; 41.2 %) and role ($n=10$ out of 34; 29.4 %) to be more important than society ($n=16$ out of 34; 47.1 %), that was ranked to be least important among the four aspects.

- On an average, data scientists ranked their ethical responsibility in the order of role ($m=1.44$; $sd=0.68$), user ($m=2.46$; $sd=1.25$), stakeholder ($m=2.83$; $sd=1$), and society ($m=2.83$; $sd=1.24$). Results show there is a statistically significant difference in how data scientists ranked role to be more important ($n=20$ out of 24; 83.3 % ranked it 1st and 2nd) than stakeholders ($n=16$ out of 24 ranked it 3rd and 4th; 66.7%) and society ($n=10$ out of 24; 41.7 %).

In summary, different professional roles ranked to have their ethical responsibility towards their role (“I feel responsible only for doing my job well”) in different ways. UX designers and software engineers ranked their responsibility towards their users first, although their role in either case advocates for users (e.g., “User” experience design). An evident difference can be seen in how product managers, hardware engineers, and data scientists ranked their responsibility towards role. Results show a statistically significance difference ($p = 0.0026$) in how product managers ($m=3$; $sd=1.23$; Rank 4 among the 22 product managers) rank their ethical responsibility towards role than data scientists ($m=1.44$; $sd=0.68$; Rank 1 among the 24 data scientists) and hardware engineers ($m=2.15$; $sd=0.93$; Rank 1 among the 34 hardware engineers) who rank they follow role at a higher rank than the product managers. Figure 6 provides an overview on how different roles ranked the four aspects to indicate their ethical responsibility. I discuss this figure in later sections to show how the self ranking was similar or different from how a group of practitioners who interact with those roles perceived their responsibility.

4.3.2 Comparison of self vs. anticipated ranking of practitioners’ ethical commitments

Hypothesis derived to present results of anticipated ranking of ethical commitments of other practitioners is as follows:

H₀- In terms of ethical responsibility towards users, role, stakeholder, and society, the group of practitioners who interact with a particular role perceived that role similarly to how the role reported their responsibility.

H_a- In terms of ethical responsibility towards users, role, stakeholder, and society, the group

of practitioners who interact with a particular role perceived that role differently than how the role reported their responsibility.

		RANK 1 (MOST IMPORTANT)	RANK 2	RANK 3	RANK 4 (LEAST IMPORTANT)
UX DESIGNERS	SELF RANKING	USER	STAKEHOLDER	DISCIPLINE	SOCIETY
	PERCEIVED RANKING	USER	DISCIPLINE	STAKEHOLDER	SOCIETY
SOFTWARE ENGINEERS	SELF RANKING	USER	DISCIPLINE	STAKEHOLDER	SOCIETY
	PERCEIVED RANKING	USER	STAKEHOLDER	DISCIPLINE	SOCIETY
PRODUCT MANAGERS	SELF RANKING	USER	STAKEHOLDER	SOCIETY	DISCIPLINE
	PERCEIVED RANKING	USER	DISCIPLINE	STAKEHOLDER	SOCIETY
DATA SCIENTISTS	SELF RANKING	DISCIPLINE***	USER	STAKEHOLDER	SOCIETY
	PERCEIVED RANKING	USER	DISCIPLINE	SOCIETY	STAKEHOLDER
HARDWARE ENGINEERS	SELF RANKING	DISCIPLINE***	USER	STAKEHOLDER*	SOCIETY*
	PERCEIVED RANKING	USER	STAKEHOLDER	DISCIPLINE***	SOCIETY

Figure 4.5. Self and perceived ranking of four aspects of ethical responsibility for the five professional roles. Self ranking is where a professional role ranked their own ranks and perceived ranking is where a group of practitioners who mentioned they interact with a professional role ranked that role. Aspects marked with * (one asterisk) indicates that the aspects were ranked similarly. Aspects with *** (three asterisks) indicates that aspect was significantly different when comparing self and perceived ranking.

To answer research question 1b about how practitioners anticipated ethical commitments of practitioners from other professional roles, the survey recorded results from practitioners to rank aspects of ethics responsibility from most (rank 1) to least (rank 4) important across user, discipline, stakeholder, and society for practitioners they interact with from other professional roles. In Figure 4.5, I provide a comparison on how the self and anticipated ranking compare across different professional roles as indicated by the mean values. Below, I provide details on the comparison between the self and anticipated ranking as indicated by practitioners per professional role as follows:

- **UX designers** ranked the aspects of ethical responsibility in the order of user, stakeholder, discipline, and society. On an average, practitioners who mentioned they interact with UX designers (n=183) ranked their perceived responsibility of UX designers in the order of user, discipline, stakeholder, and society. As shown in Figure 6, there is a practical difference, although not statistical, in how UX designers themselves ranked and others interacting with UX designers ranked UX designers' responsibility towards stakeholders and discipline. As much as there is no statistically significant difference for this difference in perception, UX designers ranked their ethical responsibility towards stakeholder higher and discipline lower than the perceived ranking.
- **Software engineers** ranked the aspects of ethical responsibility in the order of user, discipline, stakeholder, and society. On an average, practitioners who mentioned they interact with software engineers (n=171) ranked their perceived responsibility of software engineers in the order of user, stakeholder, discipline, and society. As shown in Figure 6, there is a practical difference, although not statistical, in how software engineers themselves ranked and others interacting with software engineers ranked software engineers' responsibility towards stakeholders and discipline. As much as there is no statistically significant difference for this difference in perception, software engineers ranked their ethical responsibility towards discipline higher and stakeholders lower than the perceived ranking.
- **Product managers** ranked the aspects of ethical responsibility in the order of user, stakeholder, society, and discipline. On an average, practitioners who mentioned they interact with product managers (n=78) ranked their perceived responsibility of product managers in the order of user, discipline, stakeholder, and society. As shown in Figure 6, there is a practical difference, although not statistical, in how product managers themselves ranked and others interacting with product managers ranked product managers' responsibility towards discipline, stakeholder, and society. As much as there is no statistically significant difference for this difference in perception, product managers ranked their ethical responsibility towards stakeholder and society higher and discipline lower than the perceived ranking.

- **Data Scientists** ranked the aspects of ethical responsibility in the order of discipline, user, stakeholder, and society. On an average, practitioners who mentioned they interact with data scientists (n=110) ranked their perceived responsibility of data scientists in the order of user, discipline, society, and stakeholder. As shown in Figure 6, there is a difference in how data scientists themselves ranked these aspects and others interacting with data scientists ranked their responsibility towards all the aspects. Results show a statistically significant difference ($p=0.017$; a) in how data scientists ranked themselves to follow discipline higher (rank 1, ranked by 7 out of 24 (29.2 %) data scientists) than what others perceived (rank 2, ranked by 32 out of 110 (29 %) practitioners interacting with data scientists).
- **Hardware engineers** ranked the aspects of ethical responsibility in the order of discipline, user, stakeholder, society. On an average, practitioners who mentioned they interact with hardware engineers (n=131) ranked their responsibility in the order of user, stakeholder, discipline, and society. As shown in Figure 6, there is a difference in how hardware engineers themselves ranked these aspects and others interacting with hardware engineers ranked their responsibility towards all the aspects concerning discipline, user, and stakeholder. There is no statistical significance in the results of how the perception is different for ranking users, stakeholder, and society; whereas, results show a statistically significant difference in how hardware engineers ranked themselves to follow discipline higher (rank 1, ranked by 10 out of 34 (29.4 %) hardware engineers) than what others perceived (rank 3, ranked by 43 out of 131 (32.8 %) practitioners interacting with hardware engineers).

4.4 1c: How do practitioners describe their degree of ethical alignment of their professional role with other professional roles?

In this section, I present results on how practitioners described the alignment of their own values with practitioners from different professional roles. For instance, the question posed in the survey is as follows: “How well do you feel that your own values are aligned with the values of a typical <Product Manager>?” These professional roles were selected by the practitioners

as the roles they most typically interact on a daily basis as a part of their everyday design work. The practitioners were given a 7-point scale as degree of alignment and numerical values were assigned to each degree for statistical analysis. The scale and the assigned values (in parenthesis) are as follows: strongly misaligned (-3), moderately misaligned, somewhat misaligned (-1), neutral (0), somewhat aligned (1), moderately aligned (2), and strongly aligned (3). To answer research question 1c, I provide two kinds of analysis: 1) Descriptive stats about how different professional roles described their alignment or misalignment with practitioners they interact and 2) Results of hypothesis if a professional role describes their alignment or misalignment with another professional role in similar or different ways.

4.4.1 Descriptive statistics of alignment or misalignment as reported by the five professional roles

In this section, I provide tables with descriptive stats of alignment or misalignment as reported by each professional role with provided five professional roles across five tables, one each fas reported by UX designers (Table 4.1), software engineers (Table 4.2), product managers (Table 4.3), data scientists (Table 4.4), and hardware engineers (Table 4.5). Each table consists (column wise) of different professional roles they interact with, sample size indicating number of participants from a particular role interacting with the other roles, mean of alignment (>0) or misalignment (<0), standard deviation of the distribution, frequencies and percentage of the sample size for each interaction that reported any kind of misalignment or alignment.

- As shown in Table 4.1, participants who are **UX designers** (n=113) mentioned their interactions with a total of 100 UX designers, 56 software engineers, 34 product managers, 37 data scientists, and 50 hardware engineers. On average, UX designers indicate **alignment** of their values, with no statistical significance, with software engineers (reported by 26 of 56 UX designers interacting with software engineers, i.e., 46.44 %), product managers, and data scientists (reported by 13 of 41 UX designers interacting with data scientists, i.e., 31.72 %); and **misalignment** with hardware engineers (reported by 26 of 50 UX designers interacting with hardware engineers, i.e., 54 %)

and UX designers (reported by 49 of 100 UX designers interacting with UX designers, i.e., 49 %). Results show statistically significant difference in how UX designers reported their alignment with data scientists in comparison to their misalignment with UX designers and hardware engineers.

Table 4.1.

Table providing descriptive statistics representing alignment (along positive axis(>0)) or misalignment (along negative axis(<0)) as described by UX designers (n=113) about their interactions with each of the five professional roles.

<i>As Reported by UX Designers, interaction with...</i>	# of UX de- signers inter- acting with...	Mean	Std. Devia- tion	# Mis- align- ment	# Neu- tral	# Align- ment
UX Designers	100	-0.19	1.73	49 (49%)	7 (7%)	44 (44%)
Software Engi- neers	56	0.14	1.63	21 (37.5%)	9 (16.07%)	26 (46.43%)
Product Man- agers	34	0.03	1.82	10 (29.41%)	7 (20.59%)	17 (50%)
Data Scientists	37	0.92	1.28	11 (29.73%)	17 (45.95%)	13 (35.14%)
Hardware Engi- neers	50	-0.28	1.51	27 (54%)	5 (10%)	28 (56%)

- As shown in Table 4.2, participants who are **software engineers** (n=63) mentioned their interactions with a total of 35 UX designers, 56 software engineers, 18 product managers, 21 data scientists, and 27 hardware engineers. On average, software engineers indicate **alignment** of their values, with no statistical significance, with all the roles they interact as follows: UX designers (reported by 23 out of 35 software engineers interacting with UX designers, i.e., 65.71 %), software engineers (reported by 30 out of 56 software engineers interacting with software engineers, i.e., 53.57 %), product managers (reported by 13 out of 18 software engineers interacting with product managers, i.e., 72.22 %), data scientists (reported by 16 out of 21 software engineers

Table 4.2.

Table providing descriptive statistics representing alignment (along positive axis(>0)) or misalignment (along negative axis(<0)) as described by software engineers (n=63) about their interactions with each of the five professional roles.

<i>As Reported by Software Engi- neers, interaction with...</i>	# of Soft- ware engi- neers inter- acting with...	Mean	Std. Devia- tion	# Mis- align- ment	# Neu- tral	# Align- ment
UX Designers	35	0.6	1.7	10 (28.57%)	2 (5.71%)	23 (65.71%)
Software Engi- neers	56	0.54	1.46	14 (25%)	12 (21.43%)	30 (53.57%)
Product Man- agers	18	0.83	0.79	1 (5.56%)	4 (22.22%)	13 (72.22%)
Data Scientists	21	0.81	0.81	3 (14.29%)	3 (14.29%)	16 (76.19%)
Hardware Engi- neers	27	0.37	1.39	6 (22.22%)	9 (33.33%)	12 (44.44%)

interacting with data scientists, i.e., 76.19 %), and hardware engineers (reported by 12 out of 27 software engineers interacting with hardware engineers, i.e., 44.44 %).

- As shown in Table 4.3, participants who are **product managers** (n=22) mentioned their interactions with a total of 12 UX designers, 18 software engineers, 10 product managers, 11 data scientists, and 15 hardware engineers. On average, product managers indicate **alignment** of their values, with no statistical significance, with UX designers (reported by 10 of 12 product managers interacting with UX designers, i.e., 83.33 %), software engineers (reported by 14 of 18 product managers interacting with software engineers, i.e., 77.78 %), data scientists (reported by 9 of 11 product managers interacting with data scientists, i.e., 81.82 %), and hardware engineers (reported by 12 of 15 product managers interacting with hardware engineers, i.e., 80 %); and

Table 4.3.

Table providing descriptive statistics representing alignment (along positive axis(>0)) or misalignment (along negative axis(<0)) as described by product managers (n=22) about their interactions with each of the five professional roles.

<i>As Reported by Product Managers</i>	# of Prod- uct man- agers inter- acting with...	Mean	Std. Devia- tion	# Mis- align- ment	# Neu- tral	# Align- ment
UX Designers	12	1.25	1.6	1 (8.33%)	1 (8.33%)	10 (83.33%)
Software Engi- neers	18	1.17	1.69	4 (22.22%)	0	14 (77.78%)
Product Man- agers	10	-0.2	2.04	5 (50%)	1 (10%)	4 (40%)
Data Scientists	11	1.55	1.69	2 (18.18%)	1 (9.09%)	9 (81.82%)
Hardware Engi- neers	15	1	1.31	1 (6.67%)	2 (13.33%)	12 (80%)

misalignment of their values with product managers they interact with (reported by 5 of 10 product managers interacting with product managers, i.e., 50 %).

- As shown in Table 4.4, participants who are **data scientists** (n=24) mentioned their interactions with a total of 13 UX designers, 19 software engineers, 6 product managers, 12 data scientists, and 19 hardware engineers. On average, data scientists indicate **alignment** of their values, with no statistical significance, with all the roles as follows: UX designers (reported by 8 out of 13 data scientists interacting with UX designers, i.e., 61.54 %), software engineers (reported by 12 out of 19 data scientists interacting with software engineers, i.e., 63.16 %), product managers (reported by 5 out of 6 data scientists interacting with product managers, i.e., 83.33 %), data scientists (reported by 6 out of 12 data scientists interacting with data scientists, i.e., 50 %), and hardware

Table 4.4.

Table providing descriptive statistics representing alignment (along positive axis(>0)) or misalignment (along negative axis(<0)) as described by data scientists (n=24) about their interactions with each of the five professional roles.

<i>As Reported by Data Scientists</i>	# of data scien- tists inter- acting with...	Mean	Std. Devia- tion	# Mis- align- ment	# Neu- tral	# Align- ment
UX Designers	12	1.25	1.6	1 (8.33%)	1 (8.33%)	10 (83.33%)
Software Engi- neers	18	1.17	1.69	4 (22.22%)	0	14 (77.78%)
Product Man- agers	10	-0.2	2.04	5 (50%)	1 (10%)	4 (40%)
Data Scientists	11	1.55	1.69	2 (18.18%)	1 (9.09%)	9 (81.82%)
Hardware Engi- neers	15	1	1.31	1 (6.67%)	2 (13.33%)	12 (80%)

engineers (reported by 12 out of 19 data scientists interacting with hardware engineers, i.e., 63.16 %).

- As shown in Table 4.5, participants who are **hardware engineers** (n=34) mentioned their interactions with a total of 23 UX designers, 22 software engineers, 10 product managers, 21 data scientists, and 20 hardware engineers. On average, hardware engineers indicate **alignment** of their values, with no statistical significance, with software engineers (reported by 9 out of 22 hardware engineers interacting with software engineers, i.e., 40.91 %), data scientists (reported by 7 out of 21 hardware engineers interacting with data scientists, i.e., 33.33 %), and hardware engineers (reported by 12 out of 20 hardware engineers interacting with hardware engineers, i.e., 60 %); and misalignment with their values with UX designers (reported by 12 out of 23 hardware engineers interacting with UX designers, i.e., 52.17 %) and product managers (reported by 5 out of 10 hardware engineers interacting with product managers, i.e., 50 %).

Table 4.5.

Table providing descriptive statistics representing alignment (along positive axis(>0)) or misalignment (along negative axis(<0)) as described by hardware engineers (n=34) about their interactions with each of the five professional roles.

<i>As Reported by Hardware Engi- neers</i>	# of hard- ware engi- neers inter- acting with...	Mean	Std. Devia- tion	# Mis- align- ment	# Neu- tral	# Align- ment
UX Designers	23	-0.3	1.58	12 (52.17%)	2 (8.7%)	9 (39.13%)
Software Engi- neers	22	0.27	1.03	6 (27.27%)	7 (31.82%)	9 (40.91%)
Product Man- agers	10	-0.8	1.32	5 (50%)	3 (30%)	2 (20%)
Data Scientists	21	0.24	1	6 (28.57%)	9 (42.86%)	7 (33.33%)
Hardware Engi- neers	20	0.5	1.32	5 (25%)	3 (15%)	12 (60%)

4.4.2 Do practitioners report similarly about alignment or misalignment?

Hypothesis derived to report results on how two professional roles reported their alignment or misalignment of values with each other is as follows:

H₀- Role A mentioned their alignment of values with Role B the same way as how Role B mentioned their alignment with Role A.

H_a- Role A mentioned their alignment of values with Role B differently than how Role B mentioned their alignment with Role A.

Left (<i>this role says so...</i>) to right (<i>about this role...</i>)	UX Designers	Software Engineers	Product Managers	Data Scientists	Hardware Engineers
UX Designers	Misalign (m=-0.19)	Align (m=0.14)	Align*** (m=0.03)	Align (m=0.92)	Misalign (m=-0.3)
Software Engineers	Align (m=0.6)	Align (m=0.54)	Align (m=0.83)	Align (m=0.81)	Align (m=0.37)
Product Managers	Align*** (m=1.25)	Align (m=1.17)	Misalign (m=-0.2)	Align (m=1.55)	Align*** (m=1)
Data Scientists	Align (m=0.92)	Align (m=0.47)	Align (m=1.5)	Align (m=0.92)	Align (m=0.79)
Hardware Engineers	Misalign (m=-0.28)	Align (m=0.27)	Misalign*** (m=-0.8)	Align (m=0.24)	Align (m=0.5)

Figure 4.6. Table providing responses of alignment or misalignment of values of five professional roles in their interactions with other professional roles. Read the table from left to right with each row representing what a particular professional role indicated about the roles in each column. Cells with *** (three asterisks) indicate a statistically significant difference in rejecting the null hypothesis.

Figure 4.6 provides a heat map on practitioners' response about alignment or misalignment with other practitioners from different professional roles. The text in the cells indicate if the responses of professional role in the row about the professional role in the column align/misalign and the mean values of the responses. The cells colored in **Green** indicate alignment ($m > 0$) and cells in **Red** indicate misalignment ($m < 0$) across the two professional roles in the row and the column. Additionally, darker the green indicates higher mean value. For example, on average, Product Managers reported alignment with Data Scientists ($m = 1.55$) is greater in mean value than results of Data Scientists reporting alignment with Software Engineers ($m = 0.47$). Few interesting insights from this analysis show:

- On average, both UX designers and hardware engineers reported their values misaligned with each other. This is indicated in Red in Figure 4.6,

- Results show a statistically significant difference ($p=0.0027$) in how, on an average, product managers mentioned their values align with hardware engineers ($m=1$), whereas hardware engineers reported misalignment in their values with product managers ($m=-0.8$). This is indicated with *** (three asterisks), red, and green cells in Figure 4.6.
- Results show a statistically significant difference ($p=0.0455$) in how, on an average, UX designers mentioned their values align with product managers ($m=0.03$) and product managers reported alignment in their values with UX designers ($m=1.25$). This is also indicated with *** (three asterisks) in Figure 4.6.
- Other than these highlighted results, practitioners from Role A often reported their alignment with Role B similarly to how Role B reported about Role A (hence, not rejecting null-hypothesis).

4.5 Summary

In this chapter, I have provided the story of the role as reported by practitioners from different professional roles. In this section, I provide a summary of all the results across the three sub-questions of RQ #1.

Figure 4.7 provides a summary of results of RQ #1a. The graph in the figure presents an overview of how the nine human values are acknowledged or cared for across the five professional roles. Per value (on horizontal axis), the scatter of plot across the five roles gives a clear visual indicator of similarities and differences in how practitioners from different professional roles indicated their value orientation. For example, there is a clear difference in how *advocacy* is acknowledged by data scientists, whereas the members of other professional roles had similar results of caring about this value. In the case of *environmental sustainability*, product managers represented their role deeply cares about this value in comparison to other roles. In case of fairness and privacy, there is a similar pattern on how product managers indicated their role cares about these values more in comparison to hardware engineers who acknowledge these values. In case of usability, there is a similar response from members of



Figure 4.7. Summary of human values acknowledged and cared for by different professional roles.

all of the professional roles on how their role cares about this value. The table in the figure provides the most important to least important (left to right) order of the values cared and acknowledged by members of different professional roles. These results provide a descriptive account of *value archetypes* of various roles and what these roles are traditionally known for or represent ethics as using the language of human values.

Figure 4.5 provides a summary of the comparison across various professional roles between their own and anticipated ranking of the ethical commitments towards user, discipline, stakeholder, and society. The differences portrayed in the self and perceived ranking indicate the volatile nature of some of these roles. Practitioners from inside their role have a

much stronger sense of what they think their role prioritises, whereas others who interact with these notions have a different perception. For example, data scientists and hardware engineers do not have a similar purview, within and as seen from outside, of what these roles are about. In contrast, software engineering, UX design (comparatively new field), and product management seems to have a good sense of that perception about what these roles are for and what they represent. This leads to ponder about how data science and hardware engineering is less predictable from the outside in terms of values.

Figure 4.6 provides a summary of the reported alignment or misalignment in the values in interactions between two professional roles. These results of alignment or misalignment represent harmony or tensions between the various value archetypes (as looked in 1a) and perceived notions of these archetypes (as looked in 1b). The results mostly show cases of alignment between any two chosen professional roles across the five roles chosen for analysis. Rare cases include hardware engineers reporting misalignment with product managers, although the vice versa does not report the same. The varied mean values ($m=0.3$ vs. $m=1.55$) provide opportunity space into further investigation of the differences.

Building on some of these thoughts, I present the need of a transdisciplinary approach to ethics for HCI researchers, educators, and co-creation researchers in Chapter 7. In the next chapter, I provide my *designer story* where I design co-creation activities to further explore how to engage practitioners to describing and communicating their perceptions, knowledge, reflections, and action through the lens of professional role.

5. DESIGNER’S STORY: DESIGN OF CO-CREATION ACTIVITIES

What supports are needed to facilitate practitioners’ engagement in discussions or generative activity regarding ethical dimensions of their work?

Research Question 2a

5.1 Introduction

In this chapter, I answer research question 2a by presenting my work on designing co-creation activities. I detail different voices I took in the design process (Section 5.2); the overall design process I led and the guiding structures I formulated (Section 5.3); the design, description, variants, and use cases of three broad co-creation activities (Sections 5.4, 5.5, and 5.6); and the sequencing of these activities (Section 5.8). For each activity and sequence of activities designed, I provide: 1) my design process, guiding material, rationale, and decisions taken; 2) description and prototypes of the activities designed; and 3) facilitation material in the form of *session scripts* and probes wherever required.

5.2 My Voices

I primarily take the role of a research-through-designer, constantly drawing from my previous experiences as a practitioner, researcher, and designer as I ideated, framed, and iterated different co-creation activities. In this chapter, I mainly use my designer voice to show the design of the co-creation activities. In addition, I was constantly designing for my future self—a facilitator and researcher—who would later engage with practitioners using these designed co-creation activities. This was a big challenge, as I was talking to myself in different tongues with different intentions as I took on different roles! For example, I was a designer when I was designing the co-creation activities but had to constantly think about my facilitator self to consider what materials I would need later to facilitate the activities with the practitioners. My designer self can talk about all the sheets of paper and sticky

notes she crushed and my facilitator self can talk about the number of hours she spent on Zoom calls to engage the practitioners and collect the data using what my designer self created. Personally, I usually think in the form of questions. Here are the multiple voices that were playing out in my head or on paper and the respective questions I was constantly asking through those voices:

1. **Me as a designer:** I had two voices as a designer regarding my design intent and framing, and the design evaluation of the co-creation activities. What are my intentions to design a particular activity? What am I trying to learn from and share with the practitioners through this activity? What is my vocabulary when I talk about these intentions? What do I need to design to achieve those intentions? What knowledge do I already have to design these activities? What should the form and materiality of this activity look/feel like? What is my design process and how can I document it? How should I iterate these activities based on evaluation from pilot sessions? How should I package a co-creation activity?
2. **Me as facilitator:** What material do I need to prepare and create for facilitating? What kinds of support do I need to facilitate the co-creation activities? Beyond this study, what do I need to create for other co-creation researchers acting as facilitators? How do I package these designed co-creation activities for other facilitators? I discuss the last two questions in my Discussion Chapter in Sections [7.1](#) and [7.2](#).
3. **Me as a researcher:** What do I learn about practitioners and their ethical responsibility? What kinds of knowledge do I gather by engaging practitioners from different professional roles through these co-creation activities? How do I analyze the data collected through the co-creation activities?
4. **Me as a practitioner:** How would I react to this co-creation activity as a practitioner? What will the practitioner share as they are a part of this co-creation activity? How will my industry experience help me prepare for facilitating the activity? What practitioner experiences can I build on?

The way I represent these voices is jumbled up in my writings and can be confusing as these roles are not independent of each other, but I tried to manifest those representations through as many details as possible. The multiple voices had a ripple effect into every action of my design process, data collection and analysis process, facilitation process, and writing process. As I was documenting and writing this chapter, I was constantly referring to this quote from my advisor:

I think you're a designer. You're a designer that's designing with the intent of facilitation. But you're not facilitating yet.

Colin Gray, Advisor

5.3 Guiding schema and structures

5.3.1 Overall Design Process

In this section, I detail my overall design process of designing the co-creation activities, their variants, and sequences. Figure 5.1 illustrates an overview of the process to include the guiding material (left column) I used and formulated in the process of designing and prototyping the co-creation activities. Using Figure 5.1, I unpack my design process in the following sections detailing my process decisions to bring together ethics, design, and pragmatic elements of the designed co-creation activities. I use my designer voice to detail my process decisions, unless stated otherwise.

Initial Guiding Material. The broad goals I had in mind were to engage practitioners more deeply than the conversations I had with practitioners through the 60-90 minute interviews (Section 3.2.1) where I frequently started with a question: “Can you tell me about a time where you made a project decision that made you feel uncomfortable?” There was much more to a practitioner’s everyday work that I wanted to know and I wanted the practitioners to reflect about too. How can I do that? What initial guidance do I have to start creating literally anything? What do I know? I started to list the following knowledge I already have before starting to sketch some ideas. I have had previous experience as a practitioner

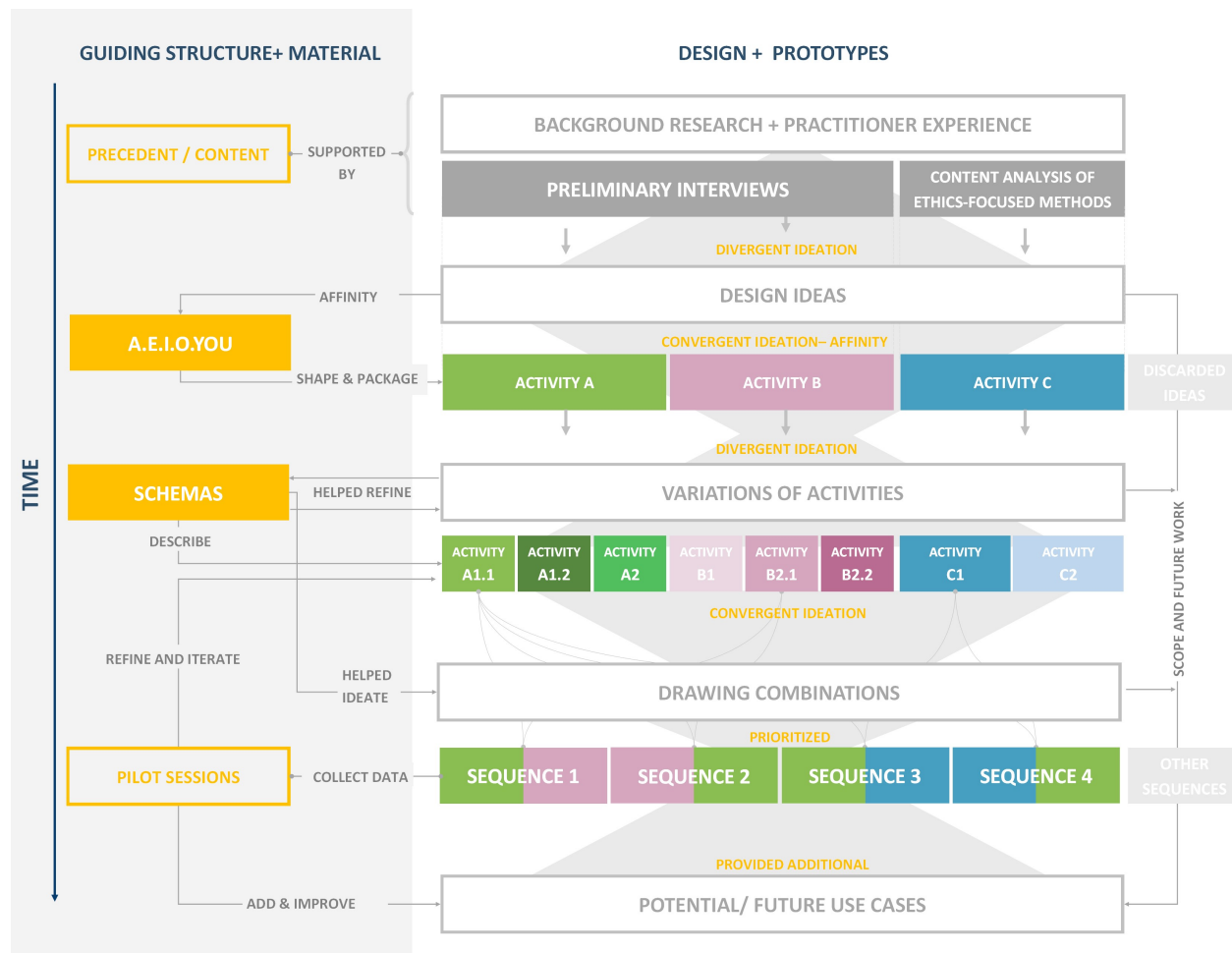


Figure 5.1. Overall design process of co-creation activities.

where I learned that creating a product did not just involve my skills and expertise, but also many levels of decision making by people whom I did not see in the system. I had experience as a researcher who has been having conversations with practitioners for the last three years to learn about their ethical responsibility, factors that influence their decision making, their ethical awareness, and ethical action. I had also conducted various kinds of analysis about ethical design complexity that a practitioner engages as a part of mediation among organizational, individual, and decision making factors; ethical dilemmas they face as a part of creating a technological product; various identities they claim to describe their ethical awareness and action in everyday practice; characterizations of different disciplinary, professional, or organizational roles of practitioners towards their manipulative intentions

(drawing from examples of asshole designers, dark patterns, etc.); and analysis of a set of existing ethics-focused methods designed for practitioners’ design work. Additionally, the collection and initial analysis of the survey data from Study 1 provided me with a framing for my *facilitator self*, allowing me to anticipate the potential professional role-based notions of ethics during engagement with practitioners during co-creation workshops. The studies were run in parallel and hence, there was no direct input of survey results into my design process except for the validation of differences across the professional roles. All this background work and my practitioner experience acted as a guiding material and existed as part of my design repertoire (Schön, 1990), allowing me to initiate, shape, and intentionally frame my ideation process. I represent this as “precedent/content” in Figure 5.1.

Need for guiding structures. As shown in Figure 5.1, my ideation process consisted of multiple divergent and convergent thinking processes (indicated by grey triangular shapes in the background). At the end of every divergent process, I had a pool of ideas and created guiding structures to move forward with the convergent process. These guiding structures, represented as schemas, helped me formulate a vocabulary to describe and ideate the activities and its possible variations. Throughout my entire ideation process I formulated two different guiding schemas: the A.E.I.O.YOU model and classifiers. I draw from Nelson and Stolterman’s (2003) definition of a *schema*: “the primary means for representing holistic concepts, ideas, and fundamental knowledge in visual form. This means that there is an increased importance vested in the graphics— that is, the schemas— to expand and complement the text in revealing or reflecting deeper understandings of design.” The creation of schemas helped me visualize and identify the differences in my ideas and classify the designed activities to further explore and detail each activity in later stages of my design process (as a part of the divergent process). Along with these two main guiding structures, I had multiple other guiding factors specific to each activity such as questions from my different voices, frameworks from literature, my preliminary analysis (detailed in Sections 3.2.1 & 3.2.2 in the Methods Chapter), and logistics such as my timeline and scope for the research project.

5.3.2 A.E.I.O.YOU Model

With a bunch of sketched ideas in front of me, I started to realize the various ways in which I might describe ethics in a practitioner’s everyday work. You can see the range of ideas when you combine the finalized activities detailed in the following sections and discarded ideas listed in Appendix F. I started by creating an affinity mapping of the sketched ideas based on the salient aspects of what they are targeting to understand from a practitioner. The affinity mapping resulted in the three main themes: the individual practitioner and their interactions; ecological factors that practitioners are a part of; and attitudes that they would like to change or support. This affinity mapping gave me an overarching structure to describe my ideas. At this stage, I had one holistic schema that I could package all my activities under which I call the *A.E.I.O.YOU model*. This reminded me of how Lim, Stolterman, & Tenenberg (2008) talk about prototypes as filters and manifestations: “We view prototypes not only in their role in evaluation but emphasize their generative role in enabling designers to reflect on their own design activities in exploring a design space.” I was using the sketches (a form of a prototype) to explore the space of “ethics in HCI practice” and the different perspectives a researcher can take to investigate this space. As I have sketched ideas from these various perspectives, unintentionally to begin with, the prototypes helped me formulate these guiding structures and schema to provide vocabulary, showing my approach towards investigating ethics in practice to engage practitioners from different professional roles.

The vowels in the A.E.I.O.YOU model describe flavors that evoke and surface various kinds of support needed by practitioners through the co-creation activities I sketched, yet to be detailed and refined, and helped me, as a researcher, to investigate:

A—Artifacts for support for practitioner’s ethical engagement.

E—Ecological Factors and Complexity that the practitioner is a part of.

I—Interactions with other practitioners during ethical engagement.

O—Other practitioners and their responsibility in ethical decision making.

YOU—YOU refers to individual practitioners, their ethical awareness, responsibility, and

action (participants I am interacting with), both within and beyond ecological, professional role-focused, and disciplinary borders.

Overview of Activities A, B, and C

I began to classify all my sketched ideas using the A.E.I.O.YOU model schema (Figure 5.2) as a part of my convergent process to finally sort three broad ideas for the co-creation activities. At this stage, I had mostly combined I,O, and YOU aspects of this model to target more human aspects such as the practitioner and their interactions with other practitioners. This left the other two aspects to be E (ecological) and A (artefact). Here is an overview of these three broad activities:

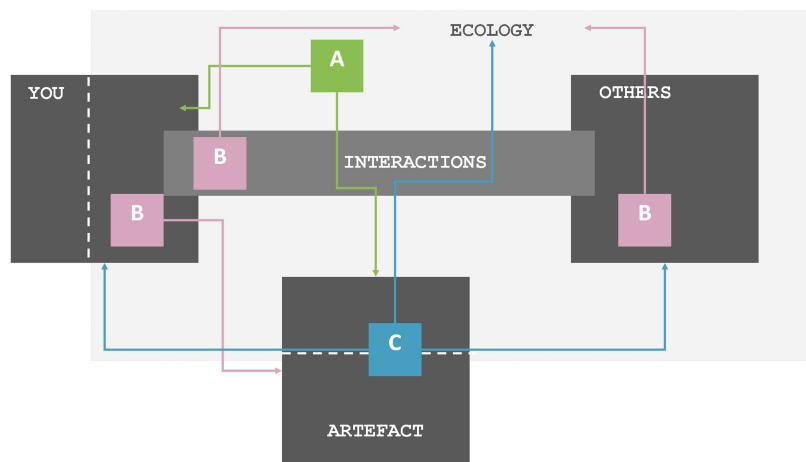


Figure 5.2. A.E.I.O.YOU model schema guiding the design of various co-creation activities.

1. **ACTIVITY A:** “Tracing the complexity” is a mapping activity that allows practitioners to map out a model consisting of the various individual, ecological, or societal factors using the toolkit provided to them. This activity seeks to describe the ethical responsibility of practitioners; at the ecological (E) level. As shown in Figure 5.2, in the A.E.I.O.YOU model, the salient property of Activity A is **E** (Ecology) and covers YOU, I and A aspects of practitioner’s everyday ethics. The design of Activity

A is detailed in Section 5.4.5. From here on, Activity A will be represented in color **GREEN**.

2. **ACTIVITY B:** “Dilemma Postcards” are elicitation and communication tools to engage with practitioners through ethical dilemmas they face in their everyday practice and factors that lead to those dilemmas. This activity seeks to describe and create awareness of ethical dilemmas and tensions faced by practitioners (Individual, YOU), as they perceive others (O) and during interactions (I) among the practitioners; at the practitioner level. As shown in Figure 5.2, in the A.E.I.O.YOU model, the salient property of Activity B is **I,O,and YOU** and covers E and A aspects of practitioner’s everyday ethics. The design of Activity B is detailed in Section 5.5.4. From here on, Activity B will be represented in color **PINK**.
3. **ACTIVITY C:** “Method Heuristics” is a toolkit that provides practitioners with heuristics to evaluate existing ethics-focused methods designed for technology design work. This activity seeks to evaluate ethics-focused supports; at an artifact (A) level. As shown in Figure 5.2, in the A.E.I.O.YOU model, the salient property of Activity C is **A** (Artifact) and covers YOU and E aspects of practitioner’s everyday ethics. The design of Activity C is detailed in Section 5.6.4. From here on, Activity C will be represented in color **BLUE**.

Discarded Ideas

Before I detailed the (convergent) ideation of each of Activities A, B, or C, the A.E.I.O.YOU model helped me refine and discard some of the sketched ideas which could later be packaged as potential ideas under a A.E.I.O.YOU toolkit. But for now, I include the list of discarded ideas that I could not combine with Activities A, B, and C in Appendix F. As much as these ideas had potential to be detailed and designed as their own co-creation activities, I made a strict judgment call due to my time frame and scope, instead putting these ideas in “my back pocket,” with the rationale that there was good representation of the vowels in the A.E.I.O.YOU model with at least one activity each. In addition, some of these ideas

replicated the preliminary interview structures in a different medium and felt force-fitted into a co-creation setting.

Standing at the cross-roads. I was very skeptical if I could come up with even one activity which had to be “perfect” so that it will answer really good questions and engage the practitioners in a way that they would become experts of their own ethical awareness and action. The fear was real as I had to put all this knowledge I gathered about ethics in HCI practice in the past years into this one dissertation process. The perfectionist in me was constantly thinking if this activity was “perfect” or “valuable” to even implement. I think it was the designer in me speaking, but the researcher in me overpowered that voice saying that I can act as the expert in the stages of designing these activities as I have studied this space and then later just have a fun conversation with the practitioners through the designed co-creation activities. Additionally, the A.E.I.O.YOU model gave me a tangible or visual framework showing me the potential for designing co-creation activities to investigate each aspect of the model.

I started with the model at the end of my first convergent thinking process, but that does not mean that I fully formulated this model. I improved and re-structured to add more definition to this model as I was creating more variations and combinations of different activities. I provide more details about how A.E.I.O.YOU model can be treated as a mindset, approach, methodology, and toolkit in goal setting the use and analysis of these co-creation activities in Section [7.1](#).

5.3.3 Classifier Schemas

With the finalized three broad activities, I started another round of divergent ideation to create variations under each activity. As I started to sketch and map potential variations under for each Activity A, B, and C, I felt the need to formulate a Classifier schema that could help me describe the functions of these activities and provide me with more precise yet designerly language. I needed a structure, worksheet, or an evaluation tool to separate different variations and *visually* depict the differences. Being a visual thinker, I again used

schemas as “cognitive models, or mental models, that humans create for themselves to help make sense of complex real-world experiences” (H. G. Nelson & Stolterman, 2003). Below, I detail the designing of these classifiers, the final set of schemas, and the functions of the schemas in my design process.

Designing of Schemas

In addition to the A.E.I.O.YOU model, I needed an additional set of classifier Schemas that could help me define, ideate, and evaluate Activities A, B, C, and their variations. The formulation of a final set of schemas to describe all the activities was in itself a design process. As much as it was a parallel ideation to the design of co-creation activities, the iteration process of updating the schemas helped me constantly evaluate my designs and give them more structure—using schemas as ideation and evaluation tools. These schemas started as a visual expression of my intentions of the designed co-creation activities and evolved into descriptions of those co-creation activities. I went through four stages of iteration to end up with the final set of Classifiers presented in Figure 5.3. Throughout my design process, I had debrief sessions with my advisor where I presented ideas and had conversations that guided me through re-shaping or re-defining some of these schemas. In the *first iteration* of the schema, I defined the ideas for different activities based on the individual or group-based engagement during activities; some of the ideas were more design-focused (interactive in nature and engaging to create artifacts) and some were research-focused (discursive in nature and trying to answer a question). At this point, I was more focused on designing the activities than seeking to describe them with clear descriptors. The range and variety in my activities were not represented through this first iteration.

In the *second iteration* of the schema as shown in Figure 5.3, I added a list of descriptors across different variations to the first version as follows: 1) the A.E.I.O.YOU model, 2) an axis between temporality and reflective/ contrasting properties, and 3) a scale to mark if a particular activity is evocative, generative, or definitive. This set of schemas did not work to define and express the variety of the activities. The spectrum from reflect to contrast did not make sense as contrasting was also a form of reflection. I started questioning if the activities

are evaluative, evocative, or generative which encouraged me to look back into design theory literature for definitions of these terms. I found precision in relation to these terms, such as this quote from Politis: “Generative thinking involves developing many new possibilities. Generation of ideas is an open exploration or search for ideas in which a person generates many ideas (fluency in thinking), varied ideas and new perspectives (flexibility), and unusual or novel ideas (originality)” (Politis & Houtz, 2015). I realized that the designed co-creation activities are not themselves providing a space for generative work, but rather the outcomes from these activities may provide opportunities for generative work in the future. This allowed me to define and strengthen my intentions through these activities: whether I am designing them to engage practitioners in an evocative, evaluative, or generative manner. The final answer was to remove the “generative” descriptor in the schemas as it was not within my scope for these co-creation activities.

In the *third iteration* of the schemas, I was getting closer to the final version where I could describe my co-creation activities and the differences across the variants. Among the four schemas I had at this stage, the A.E.I.O.YOU model was redundant as it was describing the *salient aspects* of activities A,B, and C on a broader level (as shown in Figure 5.2), but not differentiating the variations under each activity.

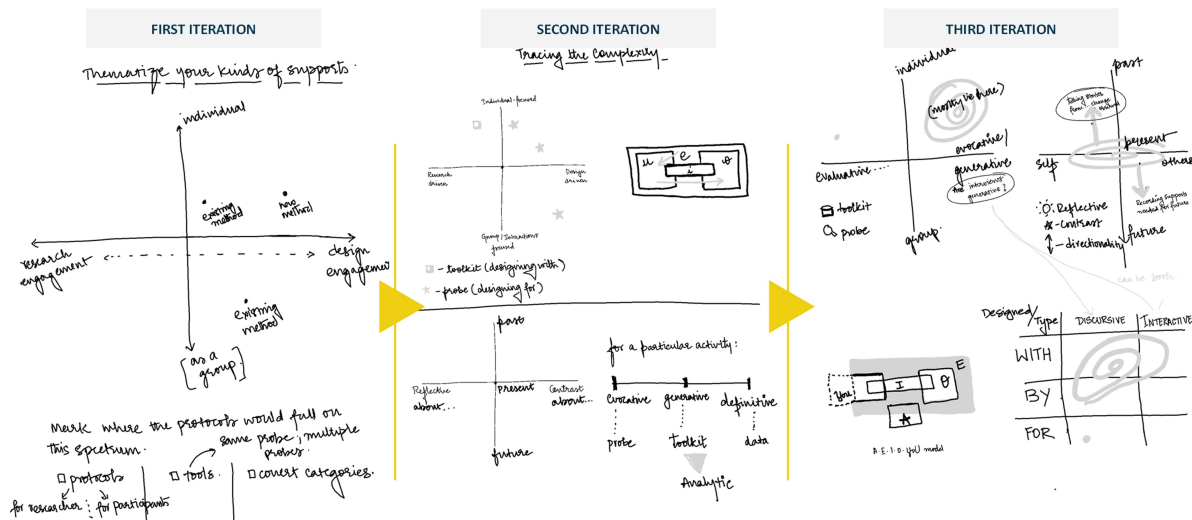


Figure 5.3. Iterations of classifier schemas.

Final Schema

The *final* set of classifiers included descriptors to attribute and differentiate various activities based on characteristics of workshop group size (individual based vs. group-based), function of the activity (evaluative vs. evocative), time frame (past, present, vs. future), form (probe vs. toolkit), intended impact on practitioners (reflective vs. contrasting cases), involvement of the practitioners (designed with or by vs. designed for practitioners), and mode of practitioner engagement (discursive vs. interactive). Figure 5.4 shows final A, B, and C schemas that I used to describe all the variations of the three co-creation activities.

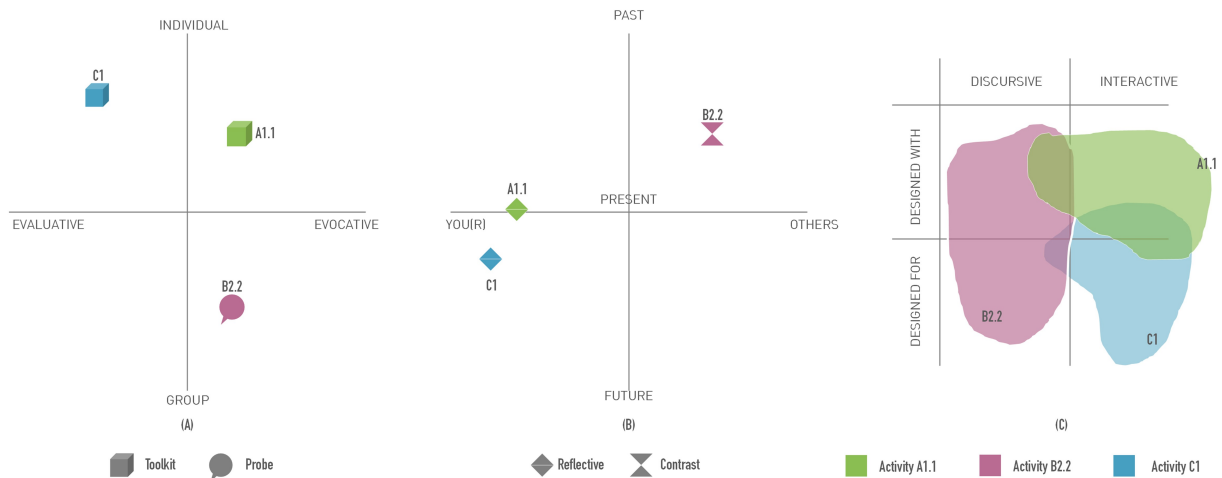


Figure 5.4. Schema of Classifiers to describe various co-creation activities.

Schema A: Axis between Size (Individual/Group) and Function (Evaluative/Evocative)—*Individually*-focused activities engage a single practitioner with a primary professional role. *Group*-focused activities engage a group of same or different roles and capture interactions among the group members as they engage in an activity. The group-focused activities can be extended as a focus group, facilitating discussion of what different practitioners have created during an individual activity. *Evaluative* activities are designed with a primary goal of assessing an artefact, situation, practitioners’ mindset, shared scenarios, or knowledge. *Evocative* activities are designed with the primary goal of assisting practitioners

in “articulating their (mostly tacit) knowledge of the phenomenon” (K. M. Nelson et al., 2000), about everyday ethics, ethical supports, or practitioners’ mindset. The designed activity can take the form of a *toolkit* or a *probe*, indicating the form of the activity. A *toolkit* consists of different components that can be collaboratively used by facilitators and practitioners to express, whereas a *probe* is designed for the practitioners for thought-elicitation and can be used independent of the presence of a facilitator. For example, in Figure 5.4, the variant of Activity A (marked in Green) is designed to engage individual practitioners with the toolkit whereas the variant of Activity B (marked in Pink) is designed to engage practitioners in a focus group or a team of practitioners using the probe, both in an evocative manner.

Schema B: Axis between Personnel (You(r)/ Others) and Temporality (Past/ Present/ Future)–*You(r)*-focused activities are designed to engage the participant about their “own” situation, scenarios, ecology, knowledge, roles, discipline, or ethical support. *Others*-focused activities are designed to engage the participant about other practitioners from the same or different scenario, roles, discipline, ecology, or ethical valence. The temporality axis is divided into three parts: *Past*, *Present*, and *Future*, where the activity designed engages the practitioner in past, present, or future professional experiences. The intended impact on the practitioners through the activities is either to *reflect* or *contrast* about their own or other practitioners’ ethical awareness, engagement, and action across the provided time frames. For example, in Figure 5.4, Activity A (marked in Green) engages practitioners in a reflective activity about their own present professional experience, whereas Activity B (marked in Pink) engages practitioners to compare and contrast other practitioners’ past and present experiences through presented stories with their own stories. Compare and contrast is also a form of reflective activity, but here I am referring to reflecting about self (i.e., reflect) vs. reflecting about others in relation to self (i.e., contrast).

Schema C: Matrix across Involvement (For/With practitioners) and Mode of Engagement (Discursive/ Interactions)–Designed *for* practitioner activities mostly include the designed probes and toolkits. Designed *with* practitioners activities mostly in-

clude practitioner’s engagement with the provided toolkits or probes to create artifacts or produce stories through two modes of engagements: *discursive* and *interactive*. *Discursive* activities engage practitioners in a conversational act using the designed probes and *interactive* activities engage practitioners in creating artifacts (bearing a material property) using the designed toolkits. This does not mean that interactive activities do not have discursive elements or vice versa, but rather my focus is on how the salient nature of the activities can be discursive or interactive (represented by the area covered in the matrix). For example, in Figure 5.4, Activity B (marked in Pink) consists of a probe designed for the practitioners to engage them in a more discursive way as they interact with the probe. Through this activity, designed with practitioners in a discursive manner means that the end product is more in the form of stories or narratives, whereas through Activity A (marked in Green) designed with practitioners in an interactive manner will result in tangible artefacts (e.g., ecological maps).

Reading the Classifier Schemas. It is important to note that the schema created provides a spectrum indicating that the activities have qualities that are sometimes disproportionate, but still consists of both the ends of the spectrum. For instance, according to Schema A, an activity designed can be both evocative and evaluative, but sometimes a variant can be more evaluative or evocative than the other given the intended outcomes of that activity. For example, Activity C1 in Figure 5.4 has more evaluative function, although it also involves evocative aspects. Any mid-point states on an axis mean that the activity includes both states in a representative proportions. For example, according to Schema B, activity B2.2 is looking at both past and present temporal aspects, whereas activity A1.1 is focusing more on the present time frame.

5.3.4 Schemas- Heuristics, Ideation tools and Evaluation Tools

Throughout my design process, I used these schemas as:

- **Heuristics:** Schemas provided me visual and verbal guidelines and designerly language to describe the designed co-creation activities. The three activities A, B, and C enabled me to tackle different perspectives based on the A.E.I.O.YOU model, but the

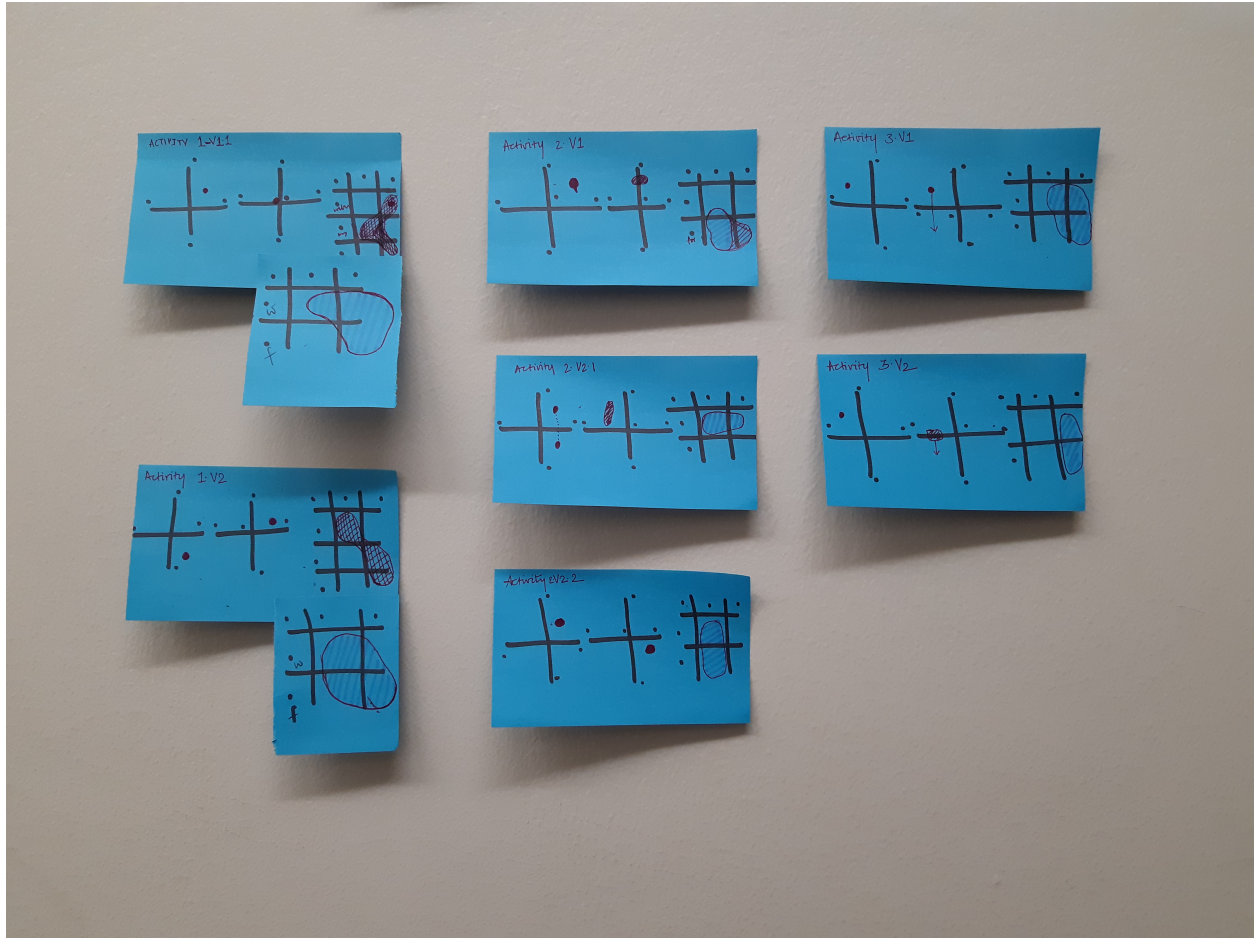


Figure 5.5. Schemas guiding me with differences among the activities and variations.

variations under each of these broad activities definitely needed a guidebook I could use to describe and differentiate.

- **Ideation Tools:** Schemas were visual tools to map, filter, and combine different axes that informed the creation a design frame, supporting ideation and sketching of new variants. As I was updating and working on my schemas, this was a playful activity where I was mixing and matching to think through potential ways to engage practitioners. Schemas gave me new ideas about different forms (probes or toolkits), functions (evocative or evaluative), intentions (reflect or contrast), etc. Apart from designing new co-creation activities, the visual tool also helped me package a designed co-creation activity with all details corresponding to each schema.

- **Evaluation Tools:** Schemas helped me to constantly evaluate and reflect the differences among variations of the co-creation activities and if a certain designed activity fell under my scope for this research. For example, I designed a variation of activity A that had more generative properties which is not defined in my current scope as described by the heuristics offered by the schemas. Similarly, I started to re-evaluate the already designed variants, asking if they are more focused towards the “generative” aspects which would cause me to eliminate them for this study.

Figure 5.5 is a picture of sticky notes with schemas of the activities that were constantly on the wall at my work space to look at all the variations together and see potential design spaces to create more co-creation activities. In this document, I provide different variations under Activities A, B, and C to illustrate some of those design spaces, but would like to note that they are not exhaustive. The schemas can be used as codified language to extend, re-design, and customize the activities based on the practitioner context.

Laying the groundwork for future research and design exploration. These schemas helped me in the above stated ways, but also laid a foundation for how other designers or co-creation researchers can tweak them to structure their own design space. I talk about these schemas based on the ethics/value-focused affordances that I am inscribing into these co-creation activities, but these affordances could be changed to fit any context. For example, in the case of Activity A, there is a paradigmatic quality where I proposed a tracing activity to allow practitioners map their ecological complexity model, but other researchers could do a card sort or use another affordance or mechanic to explore the space and engage practitioners. I propose the guiding structures as a methodological contribution for researchers to investigate ethics in technology practice. I talk more about the “metamorphic” kind of space in Section 7.1 where I describe how the designed co-creation activities can act like stand-alone ethics-focused research methods.

Based on the overall process diagram in Figure 5.1, after designing the variations of Activities A, B, and C, I started to use these variations to create various permutations and

combinations to create *sequences* of paired co-creation activities. I used these combinations for data collection with practitioners from various professional roles such as User Experience Designers, Software Engineers, Product Managers, Data Scientists, and UX researchers. I detail this process of drawing combinations in Section 5.8. Before that, I provide detailed descriptions of the individual activities, their design process, and sessions scripts for activities A, B, and C in the following sections: Activity A (in Section 5.4), Activity B (in Section 5.5), and Activity C (in Section 5.6).

5.4 Activity A: TRACE THE “COMPLEXITY”

5.4.1 Overview

“Tracing the Complexity” is a mapping activity that allows practitioners to map an ecological complexity model consisting of various individual, organizational, or societal factors using a toolkit provided to them. As the practitioners map various components, they are asked to identify interactions between and among various individual, organizational, and societal (beyond organization) components as they think of ethical decision making or ethical responsibility towards a designed product. This activity is intended to allow the researchers to identify and uncover further ethical design complexities that represent the interplay between personal, ecological, and professional roles in an interactive way with practitioners “driving the pen.”

These are the following designed variations of “Trace the Complexity” mapping activity:

- A1.** Mapping an ecological model to identify felt ethical complexities and marking activity to pinpoint needs for ethical support with individual practitioners.
- A2.** A marking activity to identify and discuss felt ethical complexities and needs for ethical support with a group of practitioners.

5.4.2 Activity A Schema

Building on the A.E.I.O.YOU model, this activity seeks to describe the ethical responsibility of practitioners at the ecological (E) level as the mapping activity engages them

to identify various components such as people, practices, policies, and parameters in their ecology that impact ethical decision making in relation to designed products.

As described using Schema in Figure 5.6, Activity A and its variants consist of a *toolkit* for *evocation* (Schema A) that is designed *for* the practitioners by me to be *interactive* and ecological models mapped are designed *with* the practitioners (Schema C). Variations A1 and A2 capture present or past ecological models of practitioners, to be reflective of their own models or contrast with other's ecological models (Schema B) respectively.

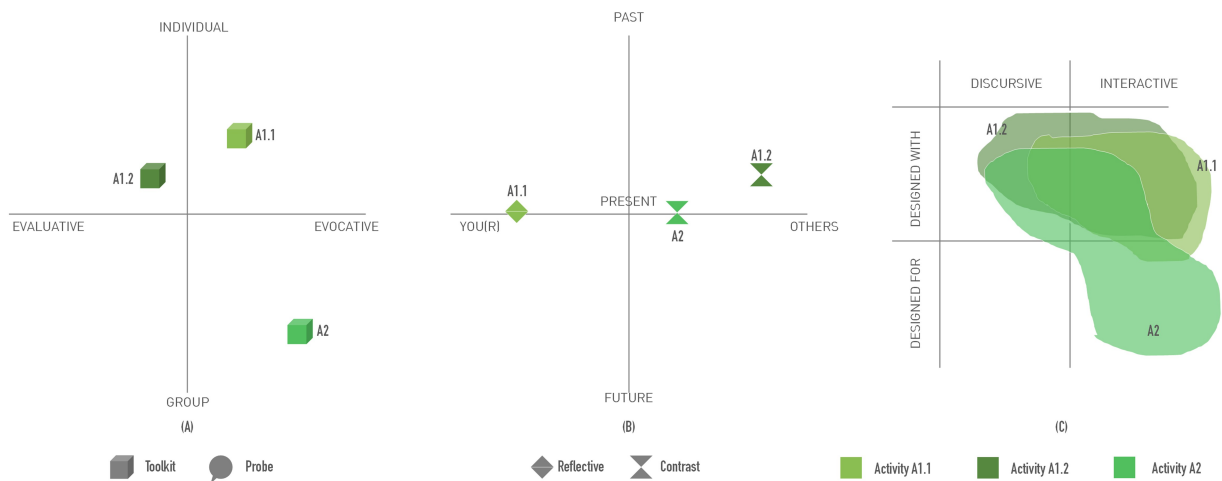


Figure 5.6. Schema describing Activity A and its variations.

Differences between the two variations based on the Schema. Major differences between A1 and A2 are as follows: 1) A1 is designed to engage with individual practitioners, whereas A2 is designed to engage a group of practitioners (Schema A); and 2) A1 provides a toolkit to create the ecological models of self or others with the practitioners, whereas A2 already provides a basic framework of an ecological model that the practitioners edit and tweak making its intended discursive levels more than interactive levels (Schema C). Further details of these variants are provided under Sections 5.4.6 (for Activity A1) and 5.4.7 (for Activity A2).

5.4.3 What am I trying to achieve through this activity?

1. Allow practitioners to map their everyday interactions, supporters, and barriers of their ethical responsibility towards a product.
2. Support practitioners to reflect about individuals, within organization, and beyond organization aspects of ethical awareness and action in their everyday work.
3. Guide practitioners to position themselves and visualize the boundaries of their ethical responsibility in their ecology.
4. Evoke practitioners to think through the support they need (or needed in the past) to solve in their everyday work by helping them visualize their ecological model.

5.4.4 What does the “Trace the Complexity” Toolkit consist of?

The Trace the Complexity toolkit consists of the following components:

1. **Activity Manual** details the purpose of the mapping activity, expectations, inventory of the toolkit, and steps to follow as a part of the activity. An activity manual is designed for the facilitator of the activity. The manual for activity A1.1 is attached in Appendix G, Figure G.1.
2. **Practitioner Playboard** provides a three-part framework (individual, within organization, and beyond organization) to build a practitioner’s complexity model using the interactive elements provided. A *legend* is provided for the practitioners for constant reference and allows the facilitator to describe the practitioner playboard to the activity participants. The descriptions of the three parts are as follows:
 - *Individual*: Components that comprise, define, or interact within the practitioner’s personal ethical responsibility as an individual without any ties with their organization or society.

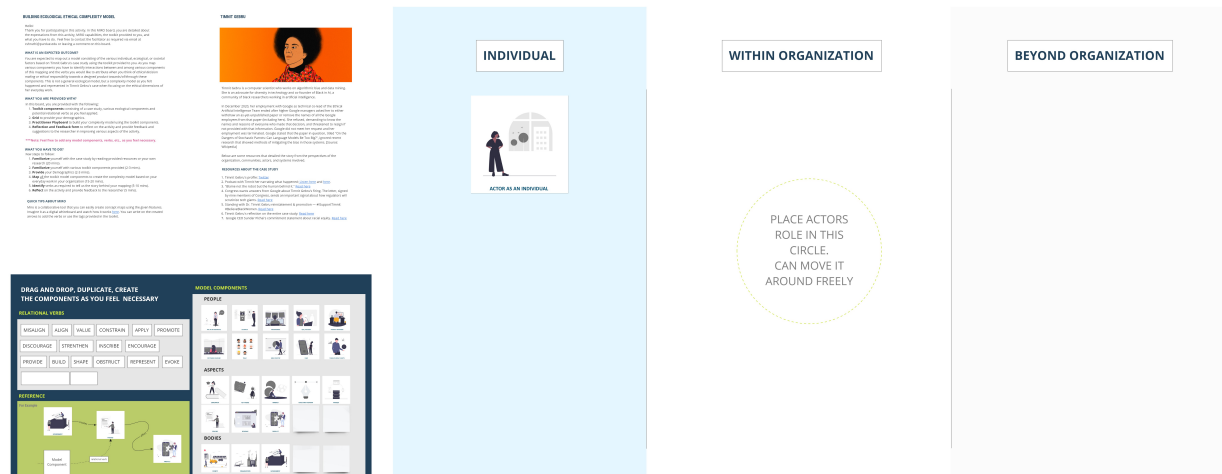


Figure 5.7. Activity A: “Trace the Complexity” toolkit inventory.

- *Within Organization*: Components that comprise, define, or interact during ethical decision making or ethical responsibility within practitioner’s current organization where they play a professional role.
 - *Beyond Organization*: Components that comprise, define, or interact towards ethical responsibility beyond practitioner’s current organization and them as an individual.
3. **Ethical Complexity Model Template** provides a template of the three-part framework (Practitioner Playboard) with the model components positioned in the three sections, allowing the practitioners to edit wherever they feel necessary by adding relational verbs and drawing interactions among the model components. This is specific for Activity A2 (Section 5.4.7) where a group of practitioners are expected to edit, compare, and contrast each other’s complexity model and the template provides some common ground.
 4. **Model Components and Relational Verbs Collection** supplies various individual, ecological, and societal components and potential relational verbs to describe interactions between various model components. Practitioners can drag, copy and

paste, or create their own components and verbs necessary to map their complexity model.

5. **Case Study** describes a practitioner’s story related to their ethical responsibility or ethically uncomfortable/ questionable situations. This is specific for Activity A1.2 where practitioners are expected to contrast their own complexity model with a case study.

Table 5.1.
Facilitator probes for Activity A.

Type	The question(s) you can ask...	Example
<i>Propositional</i>	Did you forget any model components from the given list? Are there any other model components that I can add to the existing list?	<i>“Oh, I think we forgot the CEO.”</i>
<i>Relational</i>	How do you see the two identities playing along? How do these two similar components in two sections relate to each other?	<i>“How this whole complex thing down here relates to these two identity components, you as an individual and you as a designer?”</i>
<i>Interactional</i>	Where can you draw if you have to draw an arrow between those two sections/ components?	<i>“You have these key values on the left-hand side and you also have key values and the team aspect. So can you just talk or reflect about how these two connect?”</i>
<i>Positional</i>	Why did you place this component under this section (individual, within organization, beyond organization)?	<i>“I was wanting to know how you put revenue within the organization and you put stakeholder clients beyond organization. So can you talk a little bit about that?”</i>
<i>Directional</i>	How can this interaction relate to the product you are creating?	<i>“How do you see that in relation to the product that you’re implementing in the society or from the organization as well?”</i>

6. **Facilitator Probes** guides the facilitators to help practitioners build, expand, or interact with their complexity model. These are the different kinds of facilitator probes designed:

- *Building probes* will help facilitate the mapping activity to build and expand the complexity model including propositional, relational, interactional, positional, and directional probes as described in Table 5.1.
- *Marking probes* will guide the practitioners through the marking activity on the finished complexity model. Ask the practitioner: ‘Take the pen tool and mark or point using...’ 1) **GREEN** where most of your ethics-related knowledge lies; 2) **PINK** where you mostly focus your ethics-related decision making through your work; 3) **BLUE** where you mostly face ethics-related tensions in your everyday work; and 4) **RED** where you feel you would like to be supported through these interactions in your everyday work.
- *Reflection and Debrief probes* will allow the practitioners to reflect and express about their learning through the mapping activity. Facilitators can ask the following questions: 1) How did the case study help looking at your own model? How did it impact your thinking? [Specific To Activity A1.2]; 2) What did you learn about yourself and your professional role?; 3) What did you learn about your ecology or other supporters or barriers looking at the bigger picture?; and 4) What are some ways you might want to think about your design work after this activity?

7. **Reflection and Feedback Form** provides a space to reflect on the activity and provide feedback and suggestions in improving the activity.

5.4.5 Design of Activity A

Referring back to the overall design process in Figure 5.1, Activity A is the first affinity of ideas which builds on the “Ecology (E)” aspect in the A.E.I.O.YOU model. Figure 5.8 illustrates the design process of Activity A consisting mainly of divergent steps in expanding

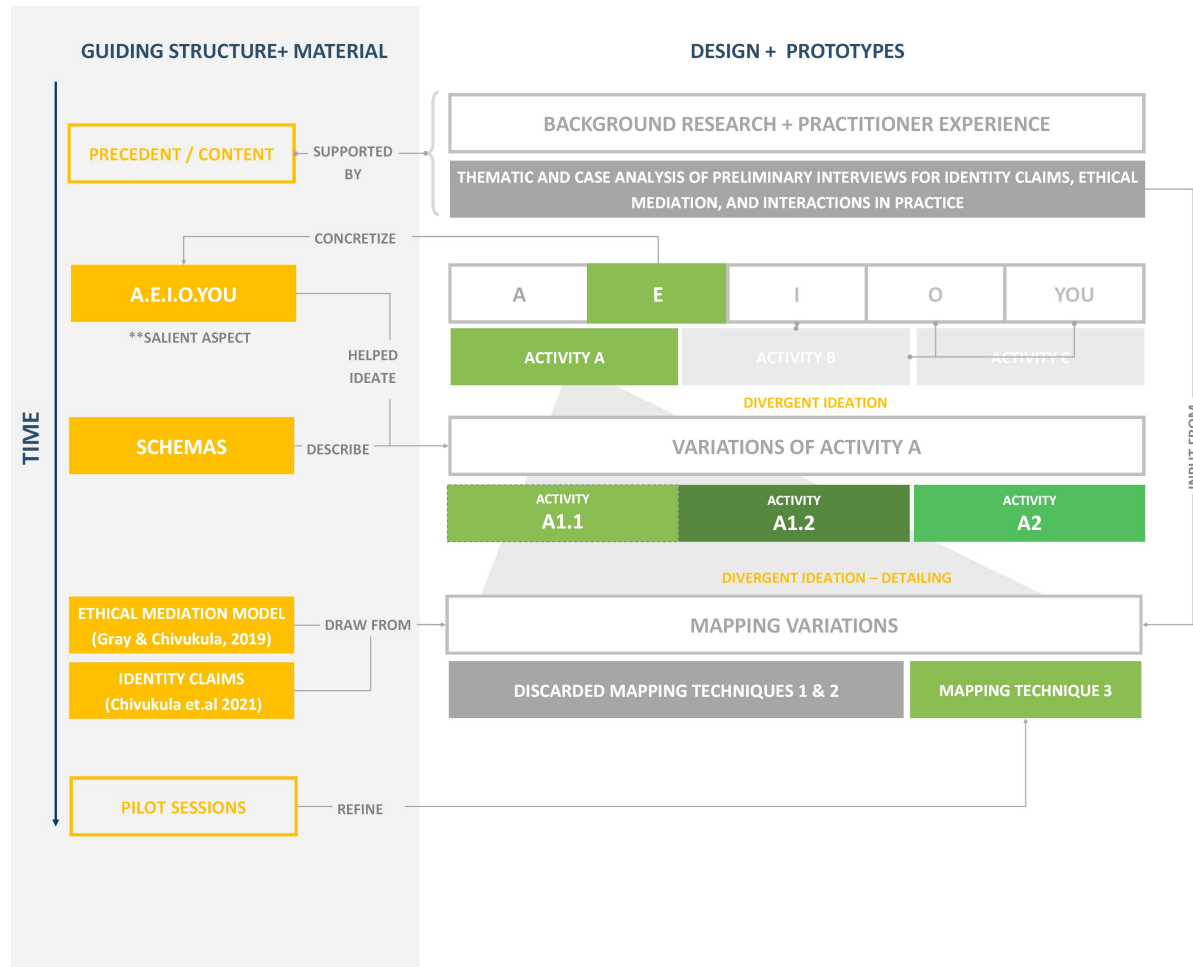


Figure 5.8. Design process of co-creation Activity A.

my initial idea of building complex maps of practitioner’s ecological models. This was a broad idea I had in the beginning to dissect the complexity—ethics-focused, design-focused, or other pragmatic structures—practitioners are a part of in their everyday design work. My basic idea through this activity was to look at a *holistic* picture of a practitioner’s everyday work including interactions, ethical tensions, positionality, etc. I was imagining an outcome like a force body diagram (complexity) in physics sketched to get an overall picture of different components of force acting on a body (practitioner). The highlighted parts of my ideation for Activity A include: 1) Variations of activity A; 2) Ideation of mapping techniques to create an ecological complexity model; and 3) Form and Materiality of the co-creation activity.

Sketching Variations of Activity A

Building on the basic idea of mapping practitioner's ecological model and complexity, I ideated variations of Activity A using Classifier schemas (Figure 5.3.3) as ideation tools. It is important to note that I did not have a definite mapping technique at this stage and wanted to loop back to detailing the mapping techniques based on all the potential variants I could come up with. This is an evocative activity, but I chose differences by designing for individual (variation A1.1 and A1.2) or group (variation A2); building their own (variation A1.1) or other's complexity model based on a case study (A1.2); and reflecting and contrasting on their own complexity model (variations A1.1 and A1.2) or about other practitioner's complexity models (variation A2). I detail and describe each variation based on the Schemas in later sections. After I established these potential variations, I started to sketch multiple ways of mapping ethical complexity in everyday practice.

Ideating potential mapping techniques

Through Activity A, I wanted practitioners to map their everyday ecological complexity as they experience it. I was aware that this model could not be defined in advance for an individual practitioner, but only as the practitioners can visualize it *during* the activity. I was also aware that an ecological model cannot be generalized across multiple technology and design practitioners based on my preliminary research with a variety of professional roles, organization types, technological products, etc., involved. I sat down to create a worksheet providing as much flexibility as possible to the practitioners to reflect, replicate, and visualize their everyday complexity. I sketched three mapping techniques drawing from my previous research acting as my main guiding structures and material: 1) *Ethical Mediation model* defined as “choreographed arrangements of ethical considerations that are continuously mediated by the designer through the lens of their organization, individual practices, and ethical frameworks” (Gray & Chivukula, 2019), providing three main mediators in everyday complexity; 2) Identity Claims analysis (Chivukula, Hasib, et al., 2021) based on preliminary interviews data describing how practitioners identify their ethical awareness and action, often separating them as an individual and a member of their profession; and 3) my sensitization

through preliminary interviews and experience as a practitioner to identify external factors influencing a practitioner's everyday ethical decision making in terms of people (professional roles such as designers, software engineers, product managers, stakeholders/clients, users, founders), aspects (knowledge, values, mindset, education, methods, processes, policies), and bodies or entities (government, organizations, society). I printed these factors on 5cm X 5cm cards to play around on paper as I visualized three mapping techniques, detailed below.

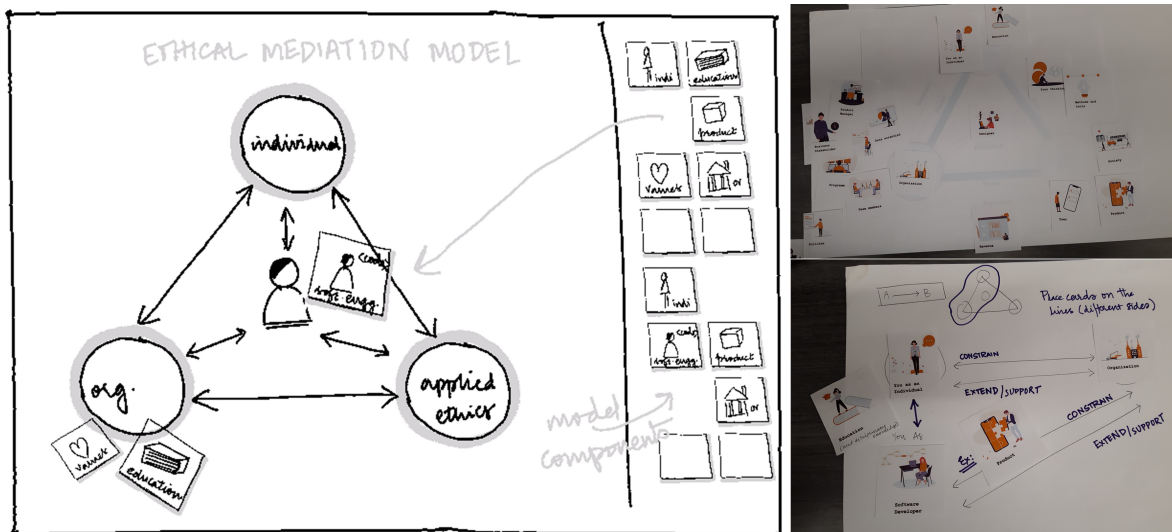


Figure 5.9. Mapping technique 1 for Activity A.

Mapping technique 1: Ethical Mediation Model as framework. As shown in Figure 5.9, I used the ethical mediation model from Gray and Chivukula (Gray & Chivukula, 2019) for practitioners to sort the various factors, which I started calling “model components”, across the three circles in the model. I was designing to dissect the triangle taking two aspects at a time to dig deeper into factors that extend/support and constraint the practitioner as an individual and a member of profession. Although not exactly a “mapping” technique and more of a filtering technique, I assumed I could use practitioner’s filtering to probe about ecological, interactional, professional role-focused, and disciplinary tensions as a part of the identified complexity. This mapping technique of taking two aspects at a time helped me sketch mapping technique 2.



Figure 5.10. Mapping technique 2 for Activity A.

Mapping technique 2: Matrix of supporters and barriers. As shown in Figure 5.10, I created a worksheet with a matrix across “You as an individual” and “You as a member of profession” vs. “Those who support” and “Those who restrict.” My aim through this matrix is for practitioners to sort the model components over the matrix. Similar to technique 1, my idea was to probe more based on how practitioners filter using the matrix.

I realized that both mapping techniques 1 and 2 were not mapping the potential interactions or providing insight into practitioner’s complexity when it comes to their everyday design work. I had to design for an approach that does not restrict the practitioner in “looking at the bigger picture.” I discarded mapping technique 1 and 2 and sketched mapping technique 3.

Mapping technique 3: Playboard to mind map. As shown in Figure 5.11, I created a playboard so that it is blank, flexible, and expansive providing some structure to maintain uniformity across multiple practitioners’ maps. I divided the playboard into three parts- before industry, within industry, and beyond industry; replicating a user experience map (Morales, 2020). The before industry was renamed and intended to capture aspects that practitioner want to map “as an individual,” within industry is intended to capture aspects that practitioner want to map “as a member of profession” inside an organization,

and beyond industry is intended to capture aspects that are not included as a part of the individual or organization.

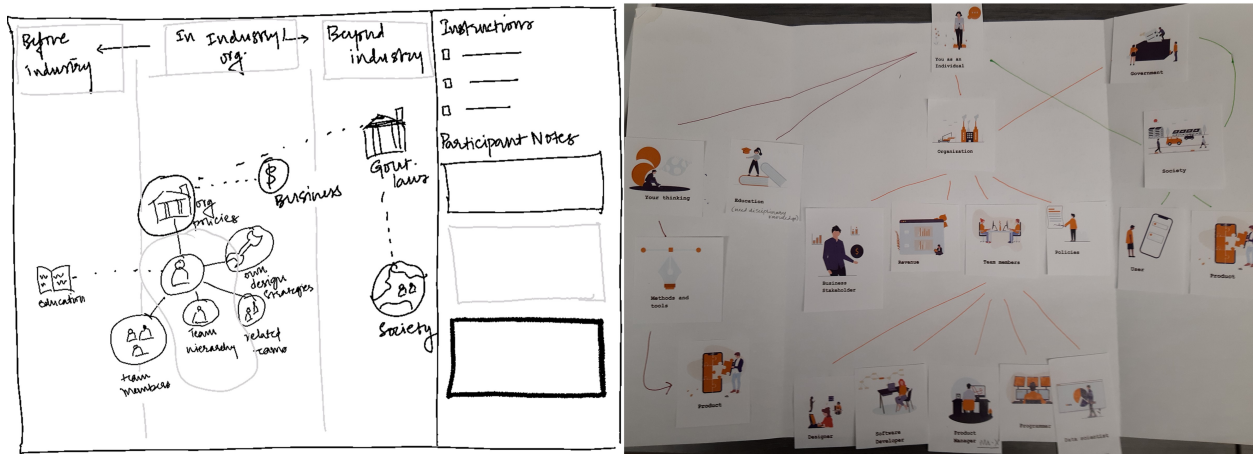


Figure 5.11. Mapping technique 3 for Activity A.

I finalized mapping technique 3 to refine Activity A in order to answer my research question 2(a). I developed a marking scheme for practitioners to pinpoint their ethics-focused knowledge, decision making, tensions, and need for more support on a mapped ecological model. I present these as marking probes in Section 5.4.4. The marking scheme was inspired from mapping techniques 1 and 2 where practitioners could directly identify factors that supported or obstructed them in their complexity model. During the whole activity with a practitioner, I envisioned mapping technique 3 as a part where they could reflect and share their version of ecological complexity and marking activity as a part that they would pinpoint salient ethical aspects looking at the whole map (or bigger picture).

There were many other aspects to Activity A in addition to finalizing a mapping technique, such as deciding how to facilitate creating that complexity and probing practitioners to create connections and a well-visualized map. As much as I tried to create an activity manual with clear step-by-step instructions, the pilot sessions I conducted gave me insight into how Activity A has to be a facilitated activity. Practitioner 1P1 mentioned “I don’t

think I realized, I was supposed to use all of them.” After the first pilot session, I analyzed the types of probes I was asking the practitioner as she created her current complexity model and prepared “Building Probes” as a part of facilitator support.

Thinking through materiality of the activity

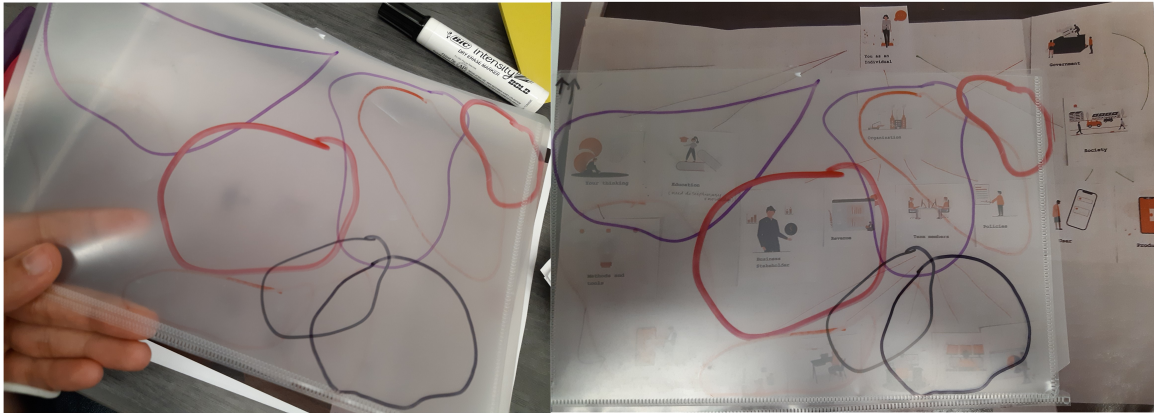


Figure 5.12. Prototyping tracing sheet experience for Activity A.

Given the pandemic situation, it was obvious that these co-creation activities could not be conducted in person. So, I had to design digital means of conducting these activities which at first felt restrictive as the physical material I could have used might have made the co-creation more tangible and playful. My initial idea was to incorporate *tracing sheets* to mark (as I ask them using “Marking Probes”) and overlap the tracing sheets over a lightbox or projector cam on their mapped complexity model. For activity A2, I was planning to engage practitioners in a focus group by overlapping all the tracing sheets on top of each other on a light box in the center of a table for discussion. This technique could have worked best to visually map the similarities and differences in the marked ethical tensions and needs for support in their decision making. Additionally, the physical material could have worked as an easy way to sort and group the tracing sheets of paper for conducting analysis based on professional role, organization type, years of experience, etc. Figure 5.12 shows me prototyping this experience using a transparent plastic cover as a tracing sheet.

I could not accomplish my co-creation activities in person using physical materials. But, I replicated the function of the tracing sheet using Miro boards and its features (i.e., pen tool). This was a very typical example of how my ideation using the tangible materials allowed me to explore what I could achieve through these co-creation activities, even if had to replicate and conduct the activities in a digital medium.

On the other hand, mapping the ecological model could not have been possible using physical material as it might have needed large sheets of paper and a lot of hand effort to draw, write, and organize material. It may have been impossible to rearrange the components or the arrows and easily “undo” pen strokes. After creating some maps using preliminary interviews (as shown in Figure 5.33) through a couple of initial pilot sessions, I started to realize that conducting the activity on Miro gave flexibility to edit the map and reduced the potential for cognitive overload on how to draw lines, arrows, connections, etc. Form and materiality were really important for this activity given the complex nature of mapping, as compared to Activities B and C. Activities B and C involved actions of filtering and sorting based on frameworks designed and it was similar to actions of card sorting, bookmarking, or sticking post-its on a whiteboard. These actions were simpler in both physical and digital mediums.

I packaged Activity A as a *facilitated activity* which requires a facilitator to guide the practitioner through the whole process of mapping their ecological model. As anticipated, I received similar feedback from my participants. Practitioner 2P1, a designer working in a consultancy, said: *“I felt it was really helpful for you to do the mapping and then I could watch and make sure that felt accurate because it felt like an overwhelming activity.”* I took over the mapping session as the participant was offering care for her newborn baby, but it was difficult for her *“to be talking about it and building it on my own, even though I do these kinds of things [as a designer]”*. Practitioner 3P1 said: *“So had you not been around or guided me or like have left to myself how to draw these, still struggled a bit more, a more organized perspective.”* Having established that Activity A would work only as a facilitated activity, I realized mapping the ecological complexity can be a warm-up or ice-breaking exercise between the facilitator and practitioner during the co-creation activity to

understand practitioner’s everyday work, even if it takes 30-40 minutes. I reflect more about this in Section 6.4 based on the results from the pilot sessions with twelve practitioners.

5.4.6 Activity A1: Mapping ecological model to identify felt ethical complexities and tracing activity to pinpoint needs for ethical support with individual practitioners.

Description

Activity A1 allows practitioners to map an ecological complexity model consisting of individual, organization, and societal (beyond organizational) dimensions; as they impact the practitioner’s interactions with practitioners from other professional roles and their decision making towards the designed technological product.

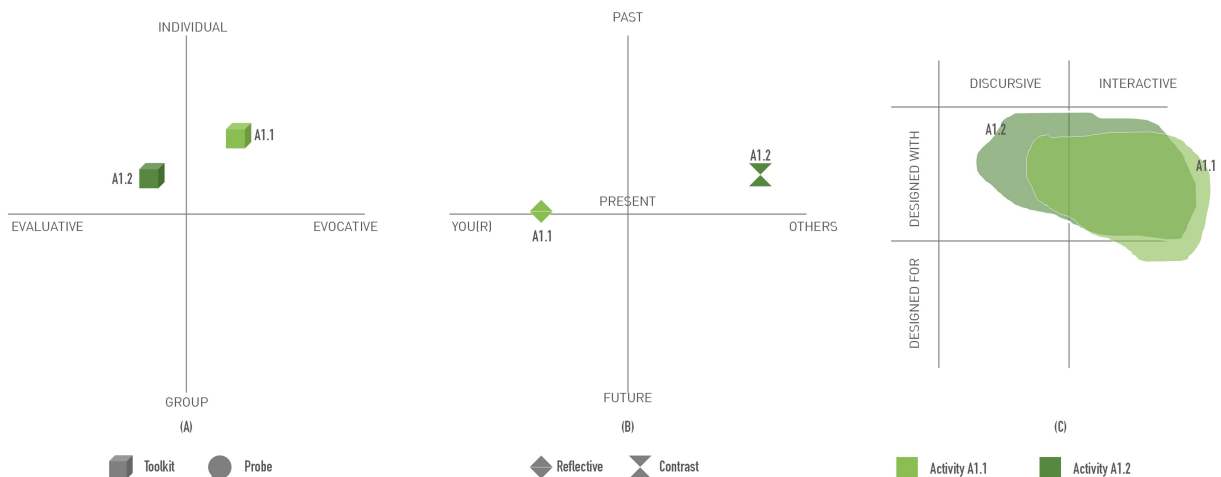


Figure 5.13. Schema to describe Activity A1 and its variations (A1.1 and A1.2).

As described in Schema in Figure 5.13, Activity A1 provides a *toolkit* for practitioners to be *evocative* while visualizing their complexity model (Schema A), hence it is *interactive* in nature in that is designed *with* the practitioner (Schema C). This activity has two variations:

- *Activity A1.1* builds a model based on their own experience and everyday work, making it *reflective* about the practitioner’s *present* organization (Schema B).

- *Activity A1.2* builds, compares, and contrasts the practitioner’s model to a case study, making it a *contrast* activity with *others’* story (Schema B).

As shown in Figure 5.13, A1.2 is more evaluative than A1.1 as it is contrasting (Schema B) the practitioner’s model with others. Activity A1.2 can be easily conducted with a *group* of practitioners as the case study acts to be a common ground; whereas, Activity A1.1 which is more focused on an individual practitioner. The sessions scripts for both Activities A1.1 and A1.2 for facilitators are presented in Tables 5.2 and 5.3 providing estimated times for each step, action, and descriptions.

Table 5.2.
Session script for Activity A1.1.

Est. Time	Action	Description
<i>Before Activity</i>		
<i>T-1 day</i>	Prepare	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features. Share via email.
<i>During Activity</i>		
<i>5 mins</i>	Introduce	Skim through provided materials. Introduce the mind-mapping activity to the practitioner. Detail the expectations of the activity and the practitioner’s role.
<i>10 mins</i>	Create	If practitioner has to do the mapping activity, provide time to the practitioner to build their model through a think-aloud process
<i>20-30 mins</i>	Probe & Expand	Facilitate the mapping activity using “Facilitation Probes.”
<i>5 mins</i>	Mark or Trace	Place the tracing sheet [hand-on] or select colored pen tool [virtual] to draw using “Marking Probes.”
<i>10 mins</i>	Reflect & Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using “Reflection and Debrief probes.”
<i>5 mins</i>	Feedback	Practitioners provide feedback to improve the activity for other participants.

Session Script for A1.1: Building Practitioner’s Own Ecological Complexity Model

As a part of activity A1.1, practitioners are introduced to a toolkit consisting of the *Practitioner Playboard*, *Model Components*, *Relational Verbs Collection* (refer to Section 5.4.4), and stationery (pens, paper clips, additional sheets of paper, etc)/ Miro board. Facilitators engage the practitioners with the toolkit using “Facilitator Probes” for different stages of the activity to create the practitioner’s ecological complexity model. The session script for this activity is presented in Table 5.2.

Table 5.3.
Session script for Activity A1.2.

Est. Time	Action	Description
Before Activity		
<i>T-1 day</i>	Prepare	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features. Share via email.
<i>20-30 mins</i>	Homework	Practitioners map the complexity model based on a case study provided as a part of the toolkit prior to the session with the facilitator.
During Activity		
<i>5 mins</i>	Introduce	Skim through provided materials. Introduce the mind-mapping activity to the practitioner. Detail the expectations of the activity and the practitioner’s role.
<i>10 mins</i>	Present	Practitioners will present the case-study based model created and their thought process.
<i>20-30mins</i>	Create, Probe, and Expand	Practitioners map their own complexity model through a think-out loud process. Facilitate the mapping activity using “Facilitation Probes.”
<i>15 mins</i>	Compare and Contrast	Facilitator asks practitioners to reflect about the takeaways from the activity by comparing and contrasting the two models using “Reflection and Debrief probes.”
<i>10 mins</i>	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using “Reflection and Debrief probes.”
<i>5 mins</i>	Feedback	Practitioners provide feedback to improve the activity for other participants.

Session Script for A1.2: Building and Contrasting Practitioner’s Ecological Complexity model based on a Case Study

As a part of activity A1.2, practitioners are introduced to a toolkit consisting of a *Case Study*, *Practitioner Playboard*, *Model Components*, *Relational Verbs Collection* (refer to Section 5.4.4), and stationery (pens, paper clips, additional sheets of paper, etc)/ Miro board. Facilitators engage the practitioners with the toolkit using “Facilitator Probes” for different stages of the activity to create an ecological complexity model based on the case study. After mapping the case study, practitioners reflect and contrast about their own ecological complexity to draw connections and identify required support. The session script for this activity is presented in Table 5.3.

5.4.7 Activity A2: Tracing activity to identify felt ethical complexities and needs for ethical support with a group of practitioners.

Description

Activity A2 allows a group of practitioners to reflect and discuss as they map, identify, and edit an ecological complexity model template consisting of individual, organization, and societal (beyond organizational) dimensions; to identify practitioner’s interactions with practitioners from other professional roles and their decision making towards the designed technological product.

As described in Schema in Figure 5.14, Activity A2 provides a *toolkit* for a *group* of practitioners from the same or different professional roles to be *evocative* as they edit and strengthen their complexity model through the provided Ethical Complexity Model Template (Schema A). Hence, it is more *discursive* in nature compared to A1 as there is a basic framework and is slightly *interactive* in nature as the practitioners interact and refer to the basic model (Schema C). The complexity model template can be tweaked based on the A.E.I.O.YOU model by the researcher depending on the aspect of ethics they would like to discuss and represent using the model. Given the numerous possibilities of combinations and connections among all the model components under individual, within organization, and beyond organization components, the researcher can frame and edit the template depending

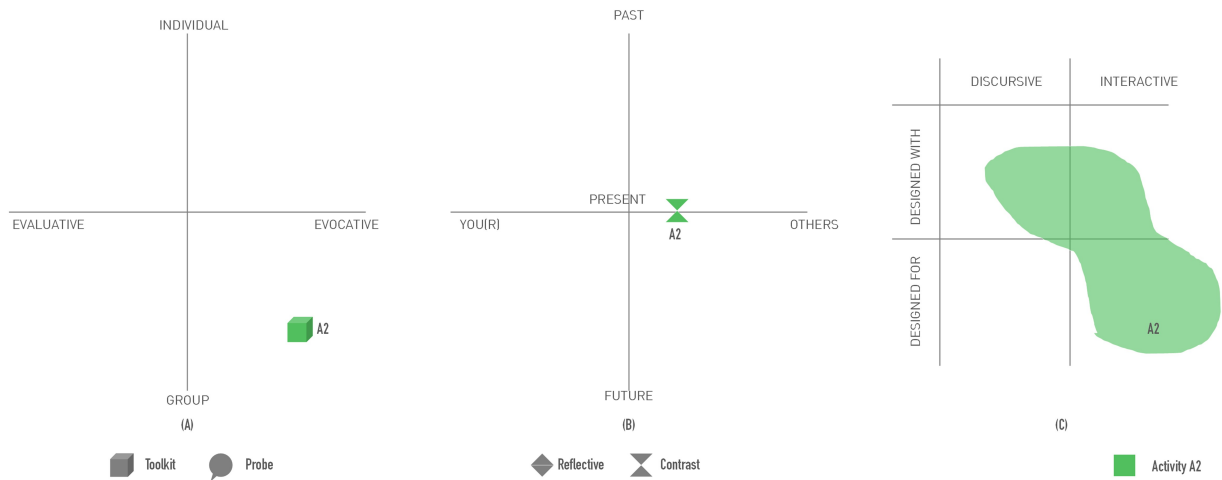


Figure 5.14. Schema describing Activity A2.

on their research questions. In the de-brief session, the created and edited models will allow the facilitator to draw similarities and differences among practitioners' models and have a focus group discussion using the maps as elicitation tools.

Session script for this activity follows the same structure as Activity A1 with the difference of engaging a group of practitioners and constantly reflecting after each step about the similarities and differences among same or different professional roles.

5.4.8 Future/ Potential Use Cases

These co-creation activities are designed for answering my research questions, but have potential to be used in other use cases or scenarios by HCI practitioners, researchers, and educators. Table 5.4 provides potential opportunities on how these activities can be used by different audiences, both the activity as is and the outcomes from the activities. I describe contents of Table 5.4 as follows:

- HCI practitioners can use: 1) Activity A1 as a *reflective activity* as a part of team building exercises to see all practitioner's perceptions and need for support in their ecological model to develop better training facilities and practitioner education; 2) Activity A2 as an *evocative and reflective activity* about ecological models from various

Table 5.4.

Future use cases of using the designed co-creation Activity A by various HCI audience.

Audience	Activity A1	Activity A2	Outcomes from the activity
Practitioners	Team orientation and building exercise	Team alignment and building exercise	Case Libraries of maps for teams, experts or leaders
Researchers	Data collection activity to build case libraries	Data collection activity to build case libraries	Analytic activity using visual thematic analysis
Educators	Take-home exercise to build on a case study	In-classroom reflective activity to prepare students for practice	Educational activity using Case libraries of maps

practitioners' perspectives and understanding others ethical awareness and knowledge; and 3) Outcomes from activities A1 and A2 can act as *case Libraries of maps* can provide experts or leaders with current perceptions of ethical responsibility of their employees, need for support, tensions or conflicts, and aspects that can be changed and leveraged to build a collective sense of ethical responsibility towards the product and society.

- HCI researchers can use: 1) both Activities A1 and A2 as *data collection* strategy to build case libraries. Taking a practice-led approach, of various perspectives and definitions of ethics in technology and design practice, encompassing individual, organizational, disciplinary, role-focused, educational, methodological, and societal aspects. [Note: the above stated intentions and session scripts for Activities A1.1, A1.2, and A2 can be directly used by HCI researchers.]; and 2) Outcomes from the activities for an analytic activity through visual thematic analysis of the models and markings created by the practitioners can present cases of the tensions/ conflicts, need for support, and current ethics-focused knowledge of practitioners.
- Educators can use: 1) Activities A1 and A2 as evocative, evaluative, and reflective in-classroom (A1) or take-home exercises (A2) to showcase potential dimensions of

ethics-related tensions or leverages in technology and design practice based on perceived knowledge or experiences during internships, encompassing individual, organizational, disciplinary, role-focused, educational, methodological, and societal aspects. This mapping can allow educators to improve curriculum to prepare students for their professional experience; and 2) Outcomes can be used to prepare students to interact and study ethics in practice, beyond classroom project learning.

5.5 Activity B: DILEMMA POSTCARDS

5.5.1 Overview

“Dilemma Postcards” are elicitation and communication tools to engage with practitioners in the ethical dilemmas they face in their everyday practice to document factors that create, engage, support, or propagate those dilemmas. The postcards allow practitioners to easily communicate about their dilemmas for self, among practitioners from different professional roles, and with experts. The supporting probe includes elicitation tools called *ethical dilemma cards* that list possible dilemmas faced by practitioners from a range of technology and design-focused professional roles through their everyday decision making as they create ethically-sound products.

These are the following designed variations of Activity B:

- B1.** Elicitation and communication with individual practitioners through a probe and a follow-up interview.
- B2.** Elicitation with an individual or group of practitioners based on listed *dilemma cards* (B2.1) or produced *dilemma postcards* (B2.2).

Activity B Schema

Building on the A.E.I.O.YOU model, this activity seeks to describe and create awareness of ethical dilemmas and tensions faced by practitioners (Individual, YOU), as they perceive others (O) and during interactions (I), engaging at the practitioner level.

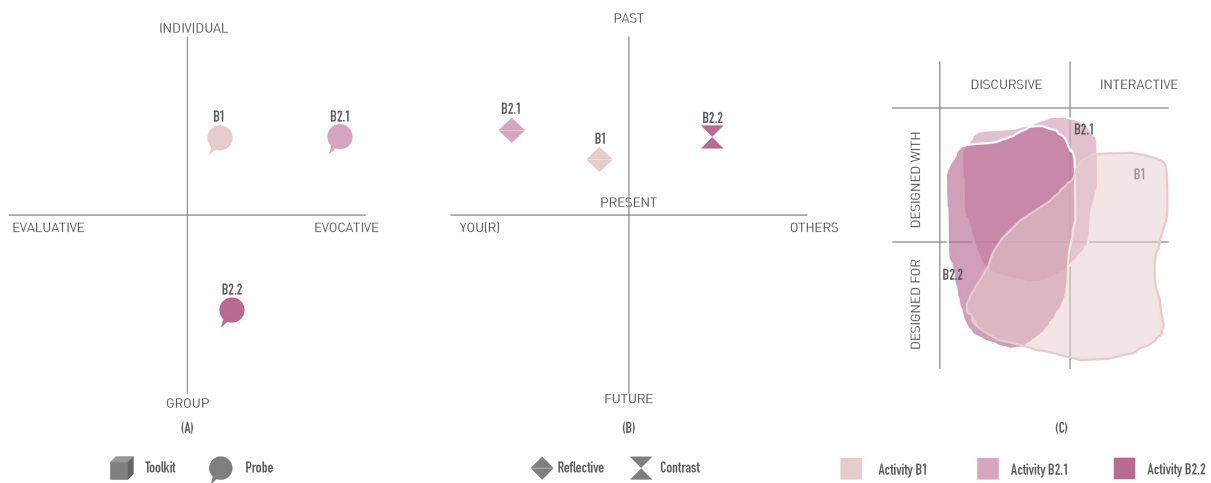


Figure 5.15. Schema describing Activity B and its variations.

As described in Schema in Figure 5.15, Activity B and its variations consist of a *probe* for *evocation* (Schema A) that is designed *for* the practitioners by me to be *discursive* (Schema C). Variations B1 and B2 capture stories shared *by* the practitioners (Schema C) as they are *reflective* about their *past or present* professional experiences in Activity B2.1 and *contrast*ing other practitioners' shared stories in Activity B2.2 (Schema B). The stories are shared by the practitioners through *discursive* and *interactive* forms based on the variants (Schema C).

Difference between the two variations based on the Schema. Primary differences between B1 and B2 are as follows: 1) B1 and B2.1 are designed to engage with individual practitioners asynchronously (via Activity B1) or synchronously (via Activity B2.1), whereas B2.2 is designed to engage a group of practitioners as they discuss shared stories; and 2) B1 and B2.1 are designed to be reflective about practitioners own ethical dilemmas, whereas B2 is designed for practitioners to contrast other practitioners' ethical dilemma stories (Schema B). Further details of these activities are provided below in Sections 5.5.5 (for Activity B1) and 5.5.6 (for Activity B2).

5.5.2 What am I trying to achieve through this activity?

1. Allow practitioners to think and reflect on their ethical dilemmas.
2. Encourage practitioners to communicate about their ethical dilemmas, including lived, heard, and un-reflected.
3. Evoke practitioners to think through the support they need (or needed in the past) to solve their ethical dilemma situations.
4. Bridge the communication gap between HCI researchers and practitioners to easily express their dilemmas.

5.5.3 What does the “Dilemma Postcards” Probe consist of?

The “Dilemma Postcards” probe consists of the following components:

1. **Activity Manual** details the purpose of the probe or sorting activity, expectations, inventory of the probe, and steps to follow as a part of interacting with the probe. This activity manual is designed for the facilitator of the activity.
2. **Dilemma Postcards set** shares ethical dilemma stories from various professional roles on the front side and provides blank space on the back side for practitioners to write and express their ethical dilemmas. These postcards can be “posted” and shared with different professional roles, a researcher, or a particular person in their organization. The probe kit also contains some blank cards. Mock-ups of the postcards are shown in Figure 5.20 and some examples of the dilemma stories are presented in Appendix D.
3. **Ethical Dilemma cards** provide a list of (possible) ethical dilemmas faced by practitioners. The list is presented in Figure 5.16 (A) as provided to the practitioners in the probe kit (Activity B1) and co-creation activity (Activity B2.1).
4. **Thought Process cards** provide a template for practitioners to quickly record their thought process behind writing the stories in postcards. As shown in Figure 5.16 (B),

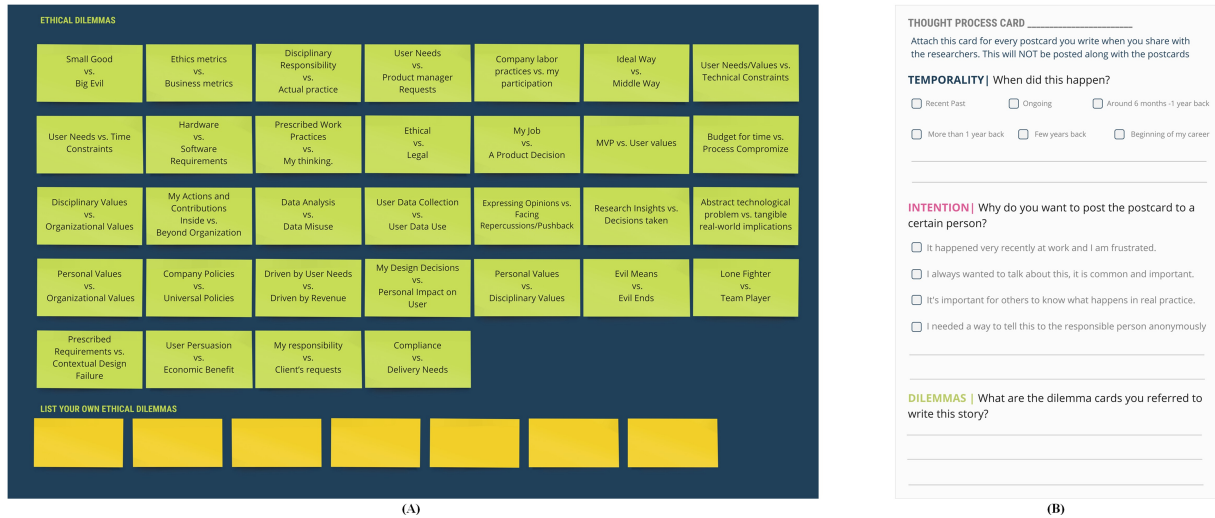


Figure 5.16. (A) Ethical Dilemma Cards for Activities B1 and B2.1; (B) Thought Process Card for Activity B1 as a part of “Ethical Dilemma Postcards” Probe Kit.

there are three broad questions: 1) *Temporality*: When did this happen?; 2) *Intention*: Why do you want to send the postcard to a certain person?; and 3) *Dilemmas*: What dilemma cards helped you write this story? This is specific for Activity B1 where practitioners are sent a probe kit and they engage with the probe asynchronously without a facilitator and to record their process of writing stories using the postcards.

5. **Dilemma Cards Categorization Worksheet** lays out a framework to sort Ethical Dilemma cards that practitioners often face, have seen others face, have talked about, have faced in the past, and never faced. This is specific for Activity B2.1 where practitioners are expected to sort the list of Ethical Dilemma cards before having a conversation using the “Storytelling Probes.”
6. **Facilitator Probes** guide the facilitators to help practitioners express, communicate, share, or interact with the designed probe kits. These are the different kinds of facilitator probes I designed:
 - (a) *Storytelling Probes* act as a reference for the facilitators to engage the practitioners after they sort the Ethical Dilemma cards using the Dilemma Cards

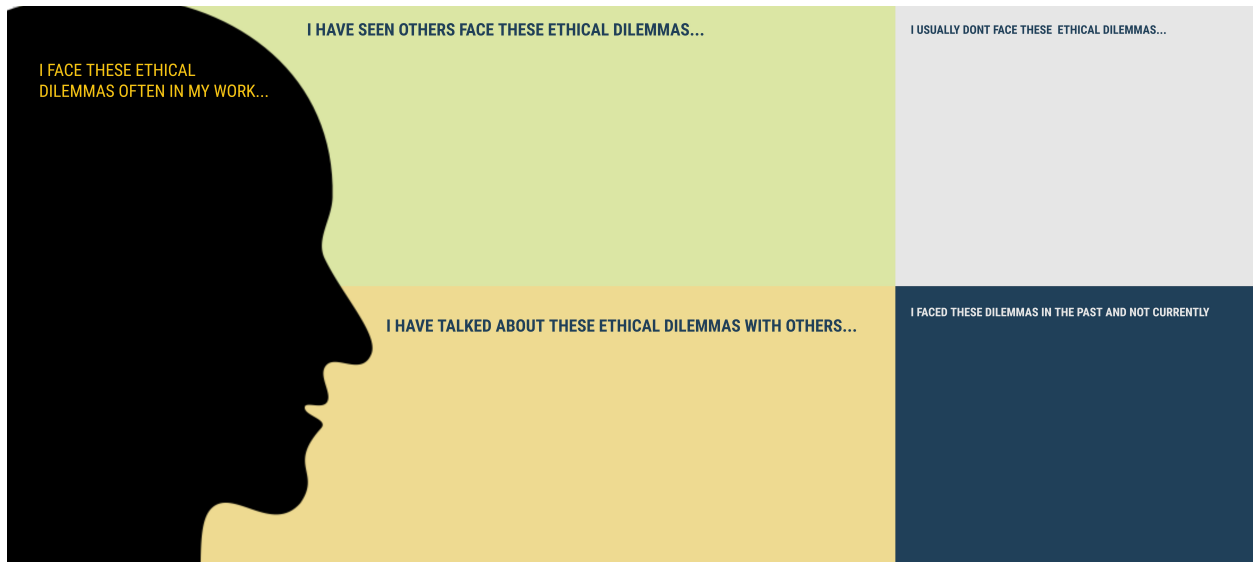


Figure 5.17. Dilemma Cards Categorization Worksheet for Activity B2.1 to sort Ethical Dilemma Cards.

Categorization Worksheet. Probes facilitators can ask for each part of the worksheet:

- i. I FACE THESE ETHICAL DILEMMAS OFTEN IN MY WORK: “Tell me about a time when you faced these dilemmas one at a time or in combination in your previous or current experiences while designing a product.”
- ii. I HAVE SEEN OTHERS FACE THESE ETHICAL DILEMMAS: “Can you give an example of situations when others faced these dilemmas? Who are the “others” in these situations?”
- iii. I HAVE TALKED ABOUT THESE ETHICAL DILEMMAS WITH OTHERS: “Can you elaborate? What kind of situations lead to such discussions? How do you talk about them and why (What is the language you use to talk about ethical dilemmas?)?”
- iv. I HAVE FACED THESE ETHICAL DILEMMAS IN THE PAST: “You sorted these dilemmas as you faced them in the past, can you share what changed?”

(b) *Reflection and Debrief probes* allow the practitioners to reflect and express about their learning through the filtering and story-telling activity. Facilitators can ask the following questions: 1) How did reading other practitioner’s stories impact your thinking? [Specific To Activity B1 and B2.2]; 2) What did you learn about yourself and your professional role?; 3) What did you learn about your ecology or other supporters or barriers looking at the bigger picture?; and 4) What are some ways you might want to think about your design work after this activity?

7. **Reflection and Feedback Form** provides a space to reflect on the activity and provide feedback and suggestions in improving the activity.

5.5.4 Design of Activity B

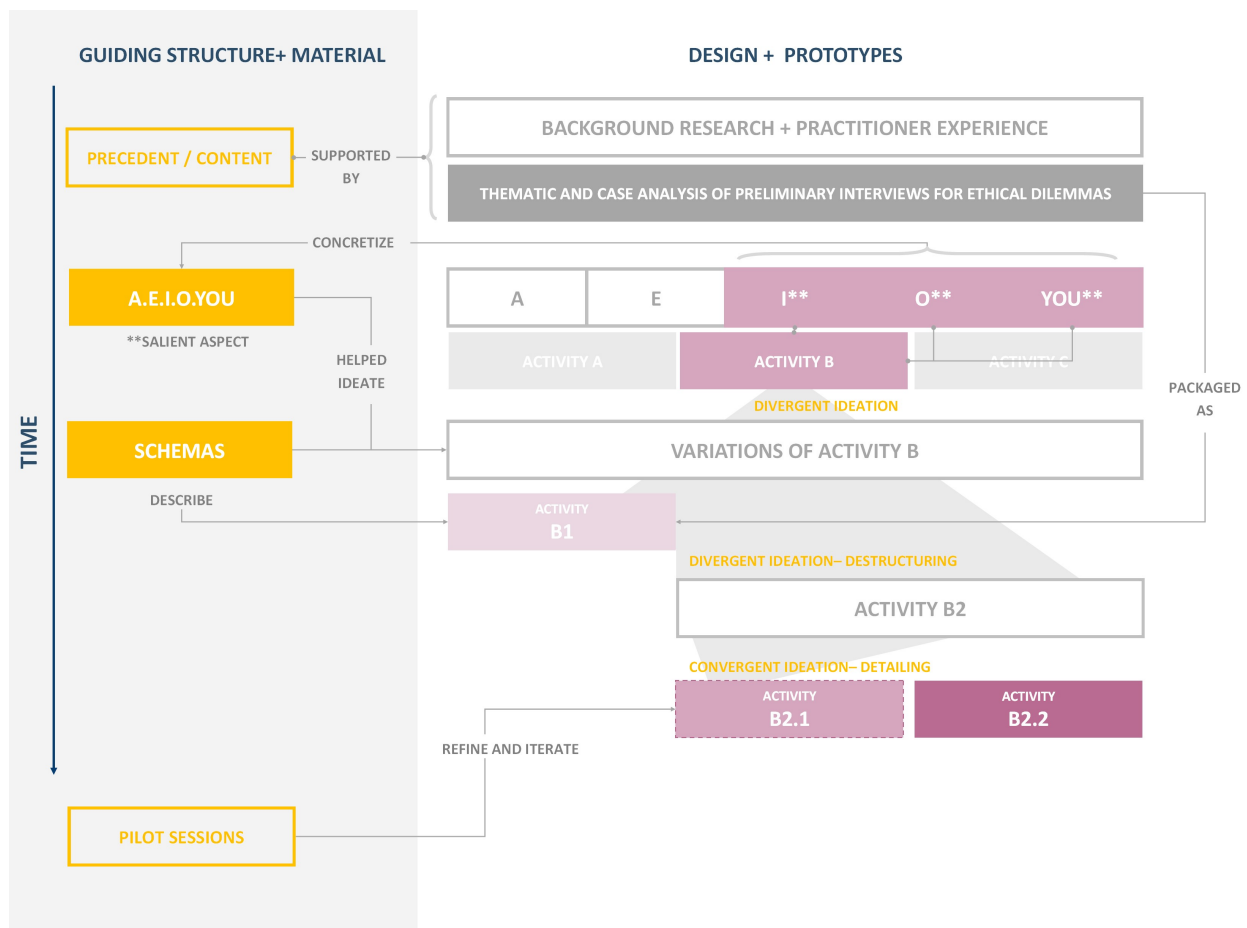


Figure 5.18. Design process of co-creation Activity B.

Referring back to the overall design process in Figure 5.1, activity B is the second affinity of ideas which builds on “Individual (YOU), Others (O), and Interactions (I)” aspects of the A.E.I.O.YOU model. Figure 5.5.4 presents the design process of Activity B consisting mainly of divergent steps in expanding my initial idea of implementing various ethical dilemmas and stories shared by practitioners in preliminary interviews. I detailed my analysis of these interviews to capture various ethical dilemmas faced by a range of practitioners from various professional roles in Section 3.2.1 in Chapter 3.

The design of Activity B was a direct implementation of the findings from my preliminary interviews. The main intention was to engage practitioners in a co-creation activity where they can interact with other practitioners’ ethically successful or uncomfortable stories and reflect on their ethical dilemmas. Before I began translating these results into the form of an activity, I had collected stories from 16 technology and design practitioners representing a range of professional roles, and I had built a list of ethical dilemmas they faced based on a case analysis of these interviews. An example of one of those cases and related ethical dilemmas are presented in Figure 5.19 and a list of these stories with analyzed ethical dilemmas are provided in Appendix D.

I wanted practitioners to know, read, and share their own stories and learn about other practitioners’ stories relating to ethics in everyday design work. My main intention was to create a *communication channel* that would provide a space for technology and design practitioners to learn about the stories and feel safe to voice their own ethically uncomfortable situations, dilemmas, and decision trajectories. I started to sketch a probe kit drawing from different forms of communication channels such as *messaging platforms* to replicate chat conversations, *blog posts* to replicate anonymous comment sections, *letters or postcards* to replicate asynchronous forms of conversation, etc. Out of all these communication types, I decided to design my probe in the form of a *postcard* giving me an interface to print a story on one side and leave the other side blank for practitioners to write their story. I used the idea of “posting” a postcard where practitioners can anonymously send their story to another practitioner or a researcher or even post it in a “post box” installed in an organization. Some



Figure 5.19. Example case and ethical dilemmas faced by SP03, participant of preliminary interviews.

initial mockups of the postcards are illustrated in Figure 5.20.

The designing of the probe began with prototyping the postcards. This allowed me to design the other components of a probe kit that can help practitioners think through writing their own stories on the postcards. I designed *Ethical Dilemma cards* which present a list of ethical dilemmas practitioners face while designing a product that relates to societal and ethical impact; analyzed from preliminary interviews. The vocabulary used in these Ethical Dilemma Cards changed through my initial pilot sessions as I generalized the terms used to allow practitioners from any professional role to easily reflect on their dilemmas. For example, instead of using “Code-based Feasibility” (i.e., Software Engineer-focused), I generalized the term as “Technical Constraints” to allow members of any professional role to reflect on the technical aspects of their design process. Thinking of what consists of a typical probe kit, I had to think of ways to capture practitioners’ ideation process as they interact with the postcards and write their stories. I then designed *Thought Process cards* so



Figure 5.20. Initial mock-ups of Dilemma Postcards.

that practitioners can clip them to their postcards and re-post or digitally share them with the researcher (in this case, me). The final mock-ups of Ethical Dilemma cards and Thought Process cards are shown in Figure 5.16. The other components of this probe also included blank postcards, blank ethical dilemma cards, sheets of paper, and stationery in an envelope.

There were some discarded ideas in the postcard designs which included: 1) anonymizing the professional role of the original practitioner whose story was printed on the postcard to engage practitioners from different professional roles in speculating and taking on the perspective of a storyteller; and 2) a questionnaire to guess which professional role could have shared the story on the postcard. I had a constant question in mind while sketching these ideas: How central do I want professional roles to be on the postcards? After a debrief session with my advisor, I eventually decided not to emphasize too much on professional roles, seeking not to “test” practitioners to guess whose story it was.

Dividing the probe into two activities. At this stage in my design process, I had a fully designed probe kit which I proposed as Activity B1. If I was to practically deploy and evaluate this probe, I would need at least one week from a practitioner including a follow-up interview. Given my timeline and scope with two other activities to explore, I wanted

to replicate a smaller version of this probe kit and engage practitioners synchronously. As shown in the process diagram (Figure 5.5.4), I dissected this probe into two sub-activities as a part of Activity B2. I separated the postcards and Ethical Dilemma cards from each other to create two different activities, using the schemas as my heuristics. I designed Activity B2.1 with only the Ethical Dilemma cards for engaging individual practitioners to reflect about their present or past ethical dilemmas; and Activity B2.2 with only the postcards with stories for engaging a group of practitioners in a focus group setup to discuss, share, and reflect about other practitioner's ethically uncomfortable stories and ethical dilemma. This destructuring allowed me to create smaller co-creation activities that I could evaluate with practitioners as a part of my pilot sessions.

I detailed Activity B2.1 further by speculating how practitioners can interact with the Ethical Dilemma cards. Given the affordance of the “cards” form, I designed a framework for them to *filter* these cards. I designed a “Dilemma Cards Categorization Worksheet” so that practitioners can filter the ethical dilemmas into three main buckets: “They usually face it,” “They have seen others face it,” and “They have had a conversation with others about these ethical dilemmas.” I built upon the empathy mapping template (“Empathy Mapping: The First Step in Design Thinking”, [n.d.](#)) used in UX design processes with a face in the middle saying “what they see?,” “What do they say?,” “What do they hear?,” etc. I iterated on this worksheet further based on some inputs I received from my pilot sessions where practitioners felt that they did not face some of the ethical dilemmas because of their professional experiences or professional role and a few practitioners mentioned that they faced some ethical dilemmas in the *past* professional experiences. This feedback prompted me to add two more sections in the worksheet to create the final version shown in Figure 5.17.

Overall, Activity B relied on me translating research insights “directly” into tangible forms, co-creation activities.

5.5.5 Activity B1: Engaging and Interacting with Ethical Dilemmas Probe Kit to become aware and communicate stories about everyday work by individual practitioners

Description

Activity B1 allows practitioners to become aware of stories of ethical responsibility, tensions, and dilemmas faced during decision making from different professional roles, organization types, projects, etc. In addition, it provides an asynchronous and anonymous space for practitioners to express their ethical dilemmas which can be shared with appropriate stakeholders for support.

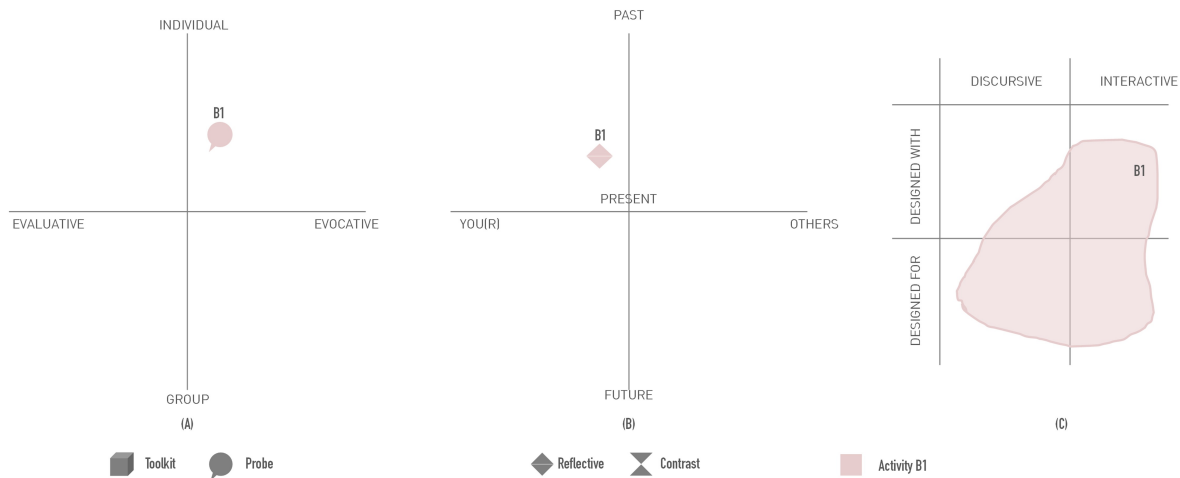


Figure 5.21. Schema describing Activity B1.

As described in Schema in Figure 5.21, Activity B1 consists of a *probe* to be *evocative* for practitioners to read and write about their ethical dilemmas and also be *evaluative* of other practitioner's stories (Schema A). With the probe kit designed for the practitioners to be *self-discursive* and *interactive* (Schema C), practitioners get to learn about and be *reflective* of their *own* and *other* practitioners' *past* or *current* stories (Schema B). Given the dense nature of the probe, it allows the practitioners to not only express their own ethical dilemmas but also engage with stories from other practitioners, leaving this activity partly evocative and evaluative, as well as reflective about themselves and other practitioners.

Table 5.5.
Session script for Activity B1.

Est. Time	Action	Description
<i>Probe Delivery</i>		
<i>4 days-1 week</i>	Post probe kit	Practitioners will be sent a probe kit to engage with.
	Engage and Interact	Practitioners will interact with the probe kit elements as instructed.
	Re-post/Upload	Practitioners send back their created artifacts to the researchers, to whomever they feel necessary, or digitally upload scans.
<i>Follow-up Interview</i>		
<i>30-45 mins</i>	Share and Reflect	Ask practitioners to share and reflect about their experience of engagement with the ethical dilemma probe kit.
<i>10-15 mins</i>	Speculate	Ask practitioners to speculate about this probe kit being launched in practitioner's everyday work and ways to improve the probe kit.

Session Script of B1: Engaging and Interacting with Ethical Dilemmas Probe Kit

As a part of activity B1, practitioners receive the probe kit consisting of an activity manual, Postcards set, Ethical Dilemma cards, Thought Process cards, and stationery (pens, paper clips, additional sheets of paper, etc). Practitioners engage and interact with this probe kit and share the created artifacts with the researchers in physical or digital format. There will be a 30-60 mins follow-up interview based on the created artifacts and to speculate about how this probe kit can help practitioners in their everyday work. The session script for this activity is presented in Table 5.5.

Potential Follow-up Interview questions:

- Ask them about the stories in the kit, their opinions, their reactions and takeaways.
- Ask them about postcards that they wanted to send to a particular practitioner. You can ask: "Why did you want to send this story to this role/ person? What were your expectations from them?"

- Ask them about the kinds of support they needed based on the shared stories. You can ask: “What kind of support did you need? Why could you not get it? Who do you think could have supported?”
- How do you imagine this probe kit can help a practitioner in their everyday work?
- What are a few ways this probe kit can be improved for practitioners?

5.5.6 Activity B2: Eliciting and Discussing stories based on Dilemma Cards or produced Dilemma Postcards with individual or group of practitioners

Description

Activity B2 engages practitioners to share their stories based on a list of ethical dilemmas provided to them or reflect and react to ethical dilemma stories shared by other practitioners.

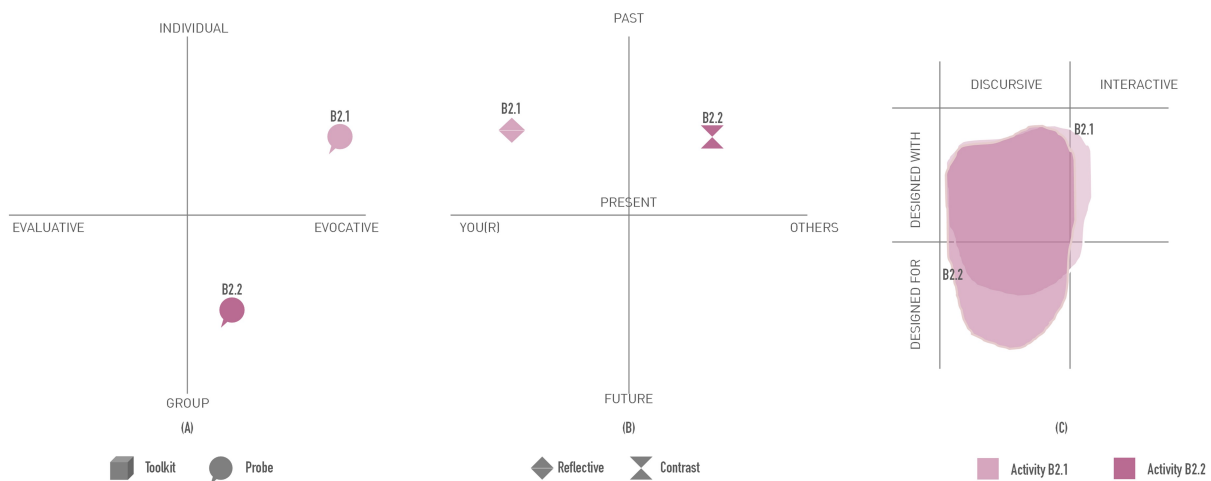


Figure 5.22. Schema describing Activity B2 and its variations (B2.1 and B2.2).

As described in Schema in Figure 5.22, Activity B2 provides a *probe* kit for practitioners to be *evocative* about their ethical dilemmas (Schema A), hence it is designed *by* the researcher (me) to be *discursive* in nature (Schema C). This activity has two variations:

- *Activity B2.1* sorts Ethical Dilemma cards using the Dilemma Cards Categorization Worksheet allowing *individual* practitioners (Schema A) to be *reflective* as they share stories about their *past and current* ethical dilemmas (Schema B).
- *Activity B2.2* shares and engages with Ethical Dilemma Postcards designed *by* practitioners from Activity B1, allowing a *group* of practitioners (Schema A) to compare and *contrast other* practitioners' stories (Schema B).

As shown in Figure 5.22, B2.1 is more interactive than B2.2 as practitioners use the Dilemma Cards Categorization Worksheet to sort the Dilemma cards before they begin to share their stories. Activity B2.2 is suggested to be conducted as a focus group (Schema A) with multiple practitioners to capture perceptions, possible supports, and reflections of different practitioners on one ethical dilemma story. Another difference between these two variations is that B2.1 is reflective about the practitioner's own ethical dilemmas, whereas B2.2 is focused on comparing and contrasting other practitioners' ethical dilemma stories.

Session Script of B2.1: Elicitation through dilemma cards and producing stories

As a part of activity B2.1, practitioners sort Ethical Dilemma cards using the Dilemma Cards Categorization Worksheet, using the sorted cards to talk more about instances or lived experiences related to those ethical dilemmas in their everyday work that they faced in the past, currently face, talked about with others, heard others talk about, or never faced. The session script for this activity is presented in Table 5.6.

Session Script of B2.2: Discussing and reflecting on Dilemma Postcards in a Focus-group

As a part of Activity B2.2, practitioners are introduced to stories produced (via Activity B1) or shared (via Activity B2.1) by other practitioners; using these stories as a probe. As a group, practitioners will reflect on the stories to identify instances of support that can be provided; describe similarities and differences with their professional experiences; and speculate about potential impacts through the shared story on product, practitioners, organization, and society. The session script for this activity is presented in Table 5.7.

Table 5.6.
Session script for Activity B2.1.

Est. time	Action	Description
5 mins	Introduction and Consent	Skim through provided materials. Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner’s role.
2-3 mins	Familiarize	Practitioners familiarize themselves with the list of ethical dilemmas.
10-15 mins	Categorize	Guide practitioners to go through each Ethical Dilemma card to sort using Dilemma Cards Categorization Worksheet. Ask practitioners to add any other ethical dilemmas to the list.
30 mins	Story-telling	Ask the practitioner to talk about instances from their previous or current experiences to elaborate and know the story behind the chosen dilemmas.
15 mins	Ideate	Ask the practitioner the kinds of support they needed or need to solve the dilemmas.
10 mins	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using “Reflection and Debrief probes.”
5 mins	Feedback	Practitioners provide feedback to improve the activity for other participants.

5.5.7 Future/ Potential Use Cases

These co-creation activities are designed to answer my research questions, but have potential to be used in other use cases or scenarios by HCI practitioners, researchers, and educators. Table 5.8 provides potential opportunities on how these activities can be used by different audiences, both the activity as is and the outcomes from the activities. I describe contents of Table 5.8 as follows:

- HCI practitioners: 1) Activity B1 provides a probe kit which acts as a *communicative tool* to share their ethically uncomfortable stories during evaluation cycles or during decision making; 2) Activity B2 as an *evocative activity* facilitates regular reflection on the ethical dilemmas they face in their work, project work, individually or as a team reflective activity; and 3) Outcomes from activities B1 and B2 can be used for *team*

Table 5.7.
Session script for Activity B2.2.

Est. Time	Action	Description
<i>Before Focus-group session</i>		
15-20 mins	Prepare	Practitioners will be sent a collection of Dilemma Post-cards produced by the researcher or other practitioners. Ask practitioners to read through the shared stories.
<i>Focus-group session</i>		
5 mins	Introduce	Skim through provided materials. Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner's role.
20 mins	Share/Select	Ask practitioners to select one or two stories that they closely relate to AND Ask practitioners to reflect on the shared stories.
15 mins	React	Ask practitioners to share their thoughts about if they have experienced themselves, heard from another practitioner, interested to talk about, etc.
5mins	Reply	Ask practitioners how they would react if someone sent them a postcard with an ethical dilemma story and they had to reply to it.
10-15 mins	Discuss and Ideate	Ask the practitioner what kinds of supports or methods are needed after reading these stories.
10 mins	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using "Reflection and Debrief probes."
5 mins	Feedback	Practitioners provide feedback to improve the activity for other participants.

building or orientation exercise to read through other practitioner's stories in order to prepare and strategize ethical dimensions of decision making in the team.

- HCI researchers: 1) Activity B1 for building communication channels between practitioners and researchers to share and ideate supports needed; 2) Activity B2 variants can be used as a data collection activity about practitioner's ethical dilemmas, and as an evocative and evaluative activity to see responses on other practitioner's ethical dilemma stories; and 3) Outcomes from the activities will allow for *case study analy-*

Table 5.8.

Future use cases of using the designed co-creation Activity B by various HCI audience.

Audience	Activity B1	Activity B2	Outcomes from the activity
Practitioners	Communicative tools among team or organization members	Team reflective exercise	Team building or orientation exercise
Researchers	Communicative channel with practitioners	Data collection activity to build case libraries	Case study analysis
Educators	Pedagogy guiding tool	In-Classroom reflective activity after project	Educational activity using case libraries of practitioner stories

sis or the construction of case libraries to document various ethically uncomfortable, questionable, successful, and opportunistic stories shared by a variety of technology and design practitioners.

- Educators: 1) Activity B1 can help educators to guide students for future dilemmas they could face; 2) Activity B2 variants can be used for a *reflective activity* of an individual’s ethical dilemmas while solving a project brief or experience after an internship; and 2) Outcomes can be used to prepare students to introduce on the ground examples and help navigate such dilemmas beyond classroom project learning.

5.6 Activity C: METHOD HEURISTICS

5.6.1 Overview

“Method Heuristics” is an evaluation-based activity where practitioners are provided with a set of heuristics to evaluate existing ethics-focused methods designed for design work. Given that methods have both a prescriptive and performative nature (Gray, 2016), the heuristics are designed to evaluate a method based on its prescription as an artefact (e.g., how accessible is the method to use?), performance of the method in relation to designer’s

conceptual repertoire (e.g., what is the function of the method in the design activity?), and performance of the method in an ecological context (e.g., if applied, how does the method resonate with practices in their organizational setting?). The activity should allow practitioners to interact with the method and a set of designed heuristics as they reflect and draw connections to the practicality, resonance, and application of the ethics-focused method in their everyday practice.

These are the following designed variations of “Method Heuristics” Activity:

C1 Evaluation of an ethics-focused method with an individual practitioner for its prescription and performance using Method Heuristics.

C2. Application and evaluation of an ethics-focused method in everyday design work by a team of practitioners to record through a Collective Diary Study.

Activity C Schema

Building on the A.E.I.O.YOU model, this activity seeks to evaluate ethics-focused supports at an artifact (A) level.



Figure 5.23. Schema describing Activity C and its variations.

As described in Schema in Figure 5.23, Activity C and its variations consist of a *toolkit* for an *evaluative* action (Schema A) that is designed for the practitioners *by* me to be *interactive* (Schema C) as they *reflect* about their *own present* design work and potential *future* ethical supports (Schema B).

Difference between the two variations based on the Schema. The primary differences between C1 and C2 are as follows: 1) C1 is designed to engage an individual practitioner and C2 is designed to engage a team of practitioners; 2) C1 is designed to be a toolkit to engage individual practitioners with a method as they speculate about their intentions of using the method and reflect about its resonance in their everyday design work; whereas C2 is designed to be a probe to implement an ethics-focused method by a team of practitioners and record the use and resonance of the method with their everyday work; and 3) C1 and C2 are designed to be different in terms of the amount of time the practitioner gets to engage with the ethics-focused method(s). In Activity C1, practitioner evaluates the method based on a first-sight basis and instantly looks at the method, whereas in Activity C2, the team of practitioners interacts and engages with the method over a period of one week in an ongoing project and discuss among themselves about the resonance of the method in their everyday work. Further details about the activities are provided under Sections 5.6.5 (for Activity C1) and 5.6.6 (for Activity C2).

5.6.2 What am I trying to achieve through this activity?

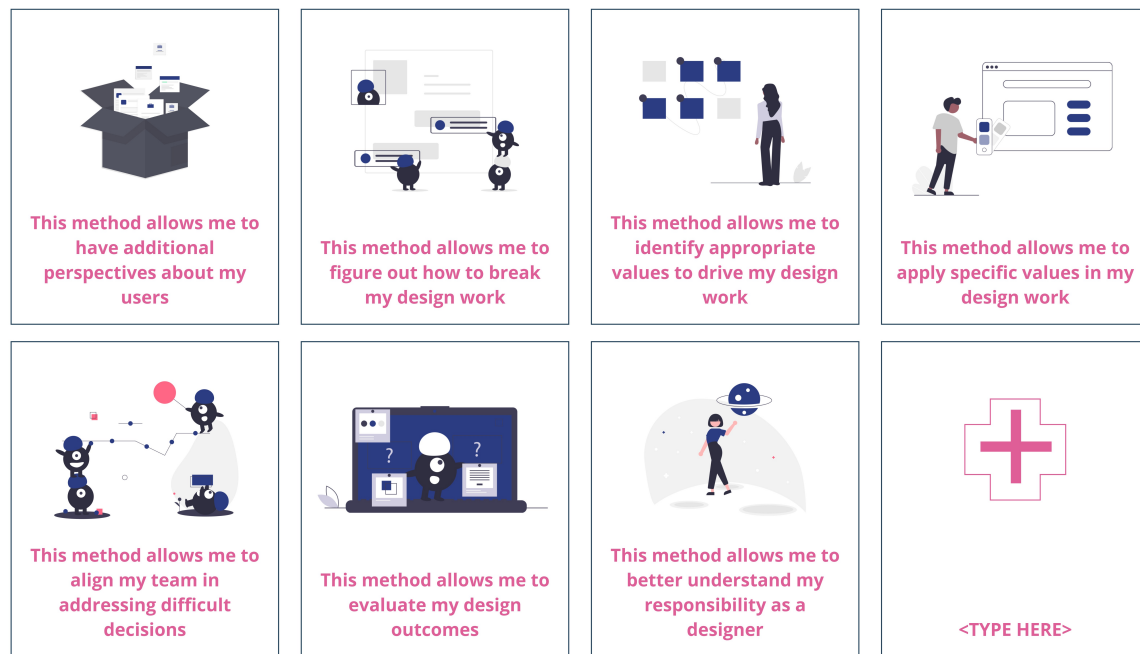
1. Guide practitioners to think, reflect, and select appropriate methods based on their intentions for ethical design work.
2. Support practitioners to reflect about methods and tool-based aspects of ethical awareness and action in their everyday design work.
3. Share resources with practitioners about existing ethics-focused methods designed for design work.

4. Encourage practitioners to think through the instrumental support they need (or needed in the past) that are more resonant with their everyday decision making.

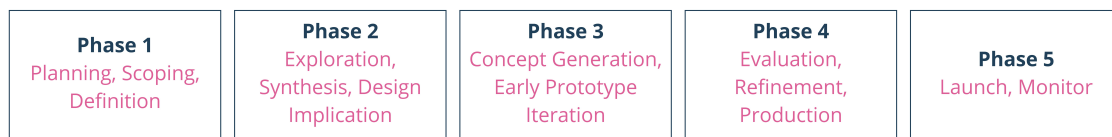
5.6.3 What does “Method Heuristics” Toolkit consist of?

“Method Heuristics” toolkit consists of the following components:

1. **Activity Manual** details the purpose of the evaluation activity or diary study, expectations, inventory of the toolkit, and steps to follow. This activity manual is designed for the facilitator of the activity. An example of activity manual for Activity C1 I provided in Figure [G.2](#).
2. **Method** acts as the artifact that has to be evaluated by the practitioners using Method Heuristics. For my particular project, attached in Appendix [H](#) Figure [H.1](#), I have used a method named “Ethical Contract” designed by Jet Gipsen as a part of the Ethics for Designers toolkit (Gipsen, [2017](#)).
3. **Method Heuristics** consists of evaluation heuristics in the form of cards and tags to evaluate an ethics-focused method. The method heuristics, as illustrated in Figures [5.24](#) and [5.25](#), consist of:
 - *Intention Cards* list practitioner’s (possible) intentions for using the method during ethical decision making; shown in Figure [5.24a](#).
 - *Phase Cards* provide various design phases practitioners plan to apply the method. The Phase Cards are matched with the Intention Cards to draw connections between practitioner’s intentions for the method at different phases of their work; shown in Figure [5.24b](#).
 - *Ecology Heuristics Tags* allow practitioners evaluate the method based on its resonance with their ecological setting; shown in Figure [5.25a](#).
 - *Artifact Heuristics Tags* aim to evaluate the method as a standalone artifact that practitioner can interact with, respond to, fill in components, etc.; shown in Figure [5.25b](#).



(a) Intention Cards.



(b) Phase Cards.

Figure 5.24. Method Heuristics Kit- Intention and Phase Cards.

4. **Collective Diary Study** documents practitioners' implementation of an ethics-focused method in their everyday work to record its use, evaluation, and iteration of the method in a design process. The Method Heuristics are embedded as a part of the diary study probes provided to the practitioners, without providing them a separate toolkit. The diary study structure is detailed in Section 5.6.6 and this is specific to Activity C2.
5. **Reflection and Feedback Form** provides a space to reflect on the activity and provide feedback and suggestions in improving the activity.



(a) Ecology Heuristics Tags.



(b) Artifact Heuristics Tags.

Figure 5.25. Method Heuristic Kit- Ecology and Artifact Heuristics.

5.6.4 Design of Activity C

Referring back to the overall design process in Figure 5.1, Activity C is the third affinity of ideas which builds on “Artifact” aspect in the A.E.I.O.YOU model. Figure 5.26 illustrates the design process of Activity C consisting of constant divergent and convergent steps of starting with A.E.I.O.YOU affinity of Activity C with artifact as a salient aspect, ideating variations under Activity C, discarding variations based on scope and schemas, and designing the Method Heuristics toolkit based on the final variations of the activities (i.e., C1 and C2).

The idea for Activity C started with my previous knowledge of conducting a content analysis of more than 80 ethics-focused methodologies, methods, frameworks, and approaches which were designed for practitioners and their design work (shared in Section 3.2.2). The

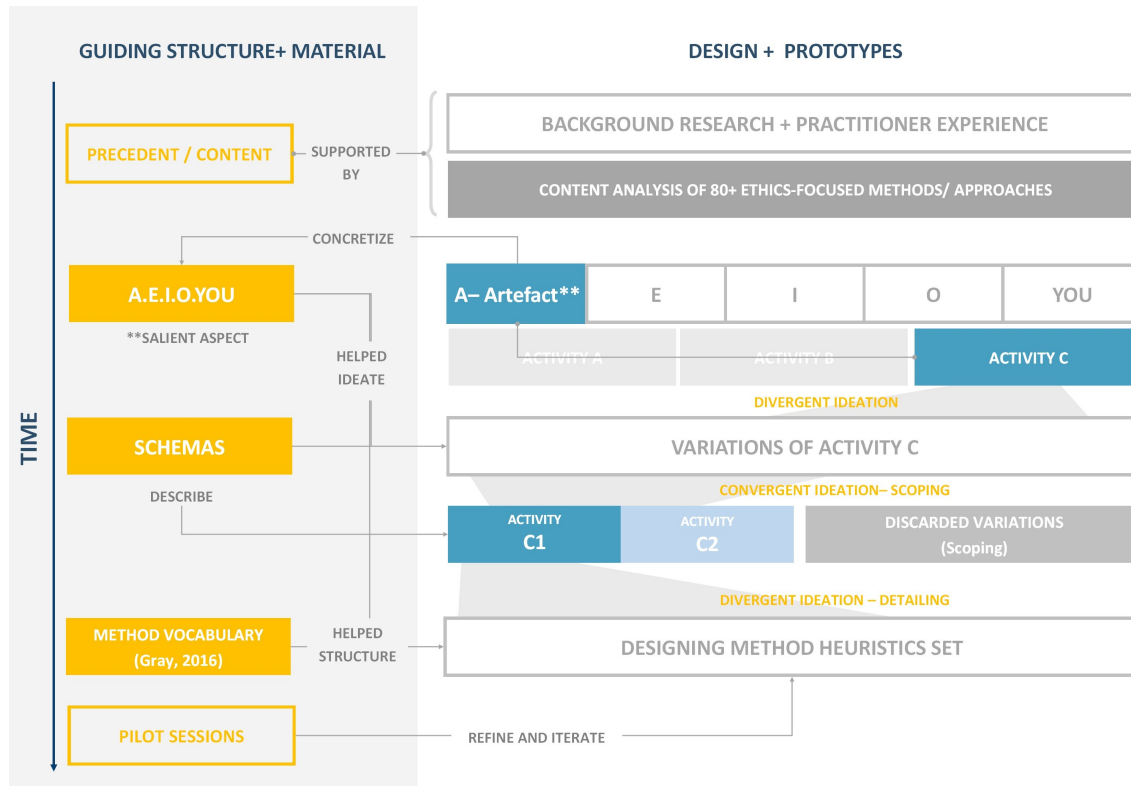


Figure 5.26. Design process of co-creation Activity C.

process of learning, engaging, and knowing the methods, and in a few cases, reading about or observing the process of their development, gave me an idea to use these methods for my activities. My idea started with using these existing ethics-focused methods, which I treated as artifacts, as potential “probes” to investigate and engage practitioners in talking about their everyday ethics. I used the Classifier schemas as *ideation tools* to come up with ideas such as evocation using a method as a probe to talk about practitioner’s present work, evaluate the method by implementing in their present work, select a method to investigate practitioner’s intentions, and create a new practice-resonant method to use as a evocation or evaluation in their present work.

Discarded Ideas. Given the timeline of my project and scoping based on the research question, I discarded two of these ideas. First, I considered engaging the practitioners in selecting a method from a collection of ten existing ethics-focused methods and using the filtering process to engage practitioners to ask about the other aspects of A.E.I.O.YOU model,

i.e., Ecological (E) and Individual (YOU) aspects. This might have been a very ambiguous activity as probes can take different forms depending on the filtered methods and there are a variety of method based on their intended outcome, context of use, and script. In addition, this activity did not allow me to engage with Others (O) and Interactions (I) aspects of the A.E.I.O.YOU model unless I indirectly asked how they would imagine using the filtered methods as a part of their current team in their organization. Second, I ideated about a checklist, a self-designed ethics-focused method, consisting of actionable heuristics to not incorporate dark patterns into their everyday design work. I designed the checklist to have one column with an action item and another column to record the response of practitioners from different professional roles who felt they are responsible/not for that action item. I decided not to newly create a practice-resonant method myself and instead leveraged existing ethics-focused methods.

In the process of convergent ideation, I used schemas as an ideation tool to identify an opportunity space that I did not explore as a part of Activities A and B. The part that I did not explore yet was the “evaluative” part of the spectrum in Classifier schema A (refer to Figure 5.23). The initial idea I had about implementing the method in everyday work to evaluate the method and understand practitioner’s ecological complexity became the *center* of ideation. In the current form of this idea, I had to engage the practitioners in a diary study for a long period of time which was not something I was ready to do given the study timeline. So, I created two variations, activities C1 and C2, that focused on evaluating an ethics-focused method instantly using a toolkit with an individual practitioner (C1) and over a period of time through a probe with a team of practitioners (C2). After finalizing these variants, I started the detailing stage to shape the Method Heuristics kit.

Designing the Method Heuristics Kit

After finalizing the core idea for Activity C, i.e., evaluating ethics-focused methods, I started to ideate the kinds of support or scaffolds I might have to provide the co-creation activity participant to accomplish evaluating that method. At this stage, I realized if I could

finalize Activity C1, changing its form into a diary study for Activity C2 could be suggested at a conceptual level. For C1, I wanted the form of the activity material to be cards and sticky notes that can be easily placed or re-placed on a sheet of paper. I replicated the same structure using digital forms on the Miro board by creating digital sticky notes, using shapes such as small tags or paper stubs that had evaluation criteria printed on them.

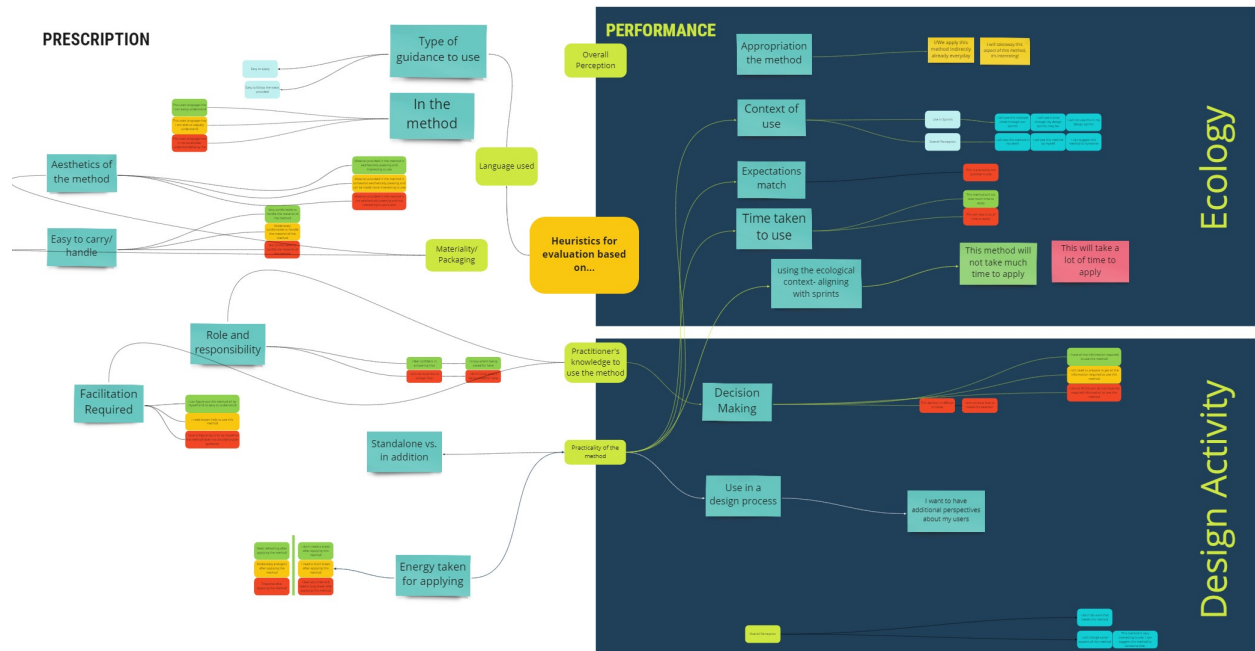


Figure 5.27. Mind-map of heuristics for evaluating methods.

Mind Mapping. I started an open-ended mind map about different aspects (which can later take the form of tags) a practitioner might use to evaluate an ethics-focused method. For this mind mapping stage, I referred to 5-10 existing ethics focused methods and started listing potential probes based on the A.E.I.O.YOU model aspects to map possible evaluation factors. A few initial themes of evaluating factors identified included: overall perception, language used, materiality of the method, practitioner’s knowledge to use the method, ethics-focused or value-centered characteristics, and practicality of the method in relation to design process and ecology. Under these high level themes, there were multiple sub-themes, as illustrated in the final version on the map in Figure 5.27. For example, “practicality of the method” included context of use, expectations match/mismatch, appropriation of the

method (current/ future), time taken to use the method, energy taken for implementing the method, and compatibility of the method with organizational structure or practices. For each of the sub themes, I created “tags” (represented in green, yellow, and red colors in the mind map) that the practitioner can select to paste on the method while evaluating it. For example, for evaluating the language used in the method, the tags provided read “This uses language that I can easily understand,” “This is easy to understand what steps to follow as a part of the method,” etc. The map soon started to turn messy and I needed a guiding framework for categorizing all the evaluation heuristics.

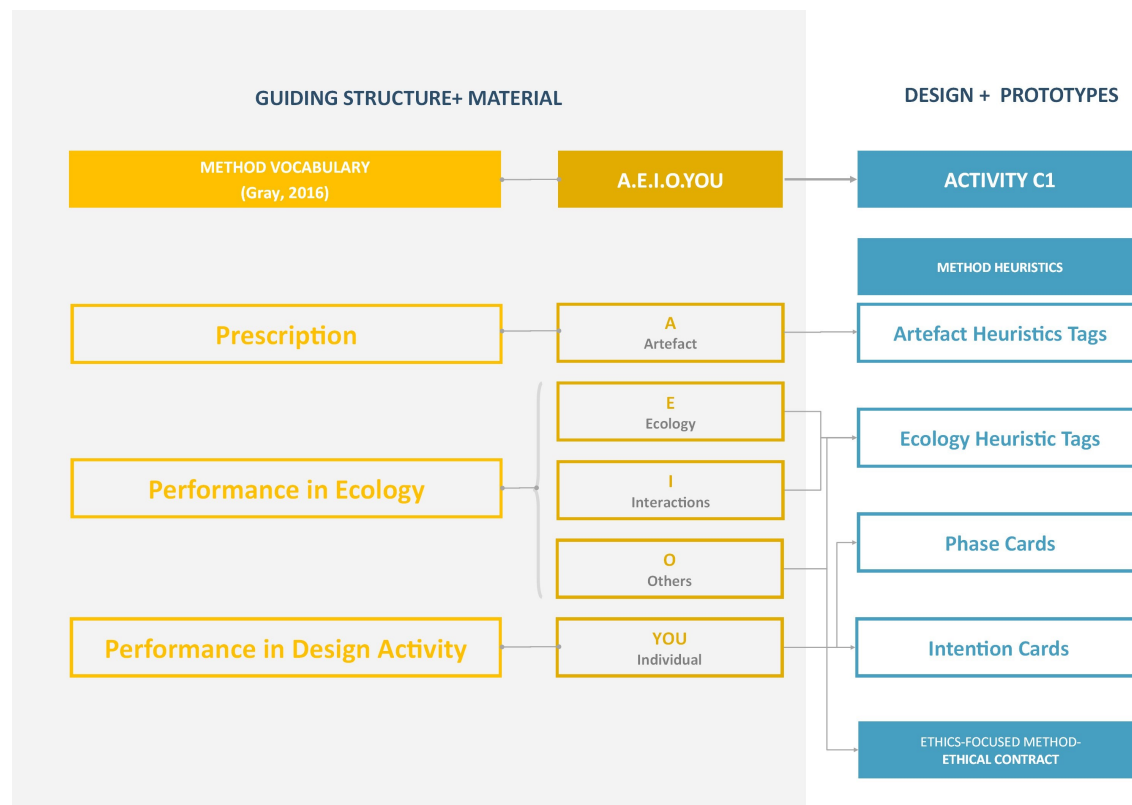


Figure 5.28. Guiding structures and material used to structure mind mapping and design Activity C1 components- method heuristics and ethics-focused method selection.

Structuring the Map. The themes, sub-themes, and respective tags had a lot of variety and were focused on different dimensions of evaluating a method. I represented the structuring process in Figure 5.28 where I talk about using two main guiding structures

and how that shaped the Methods Heuristics kit. First, I referred to Gray's work (2016) to consider vocabulary around design methods, their nature, and function in a design activity. This paper talks about prescription vs. performance of a method. For my context, I was dividing the *performance* aspect in two ways: being performed in a design activity, and being performed in an ecological space. I mapped direct connections between Gray's three-part method function and the A.E.I.O.YOU model, as illustrated in Figure 5.28. Being performed in a design activity will tap into a practitioner's awareness (YOU) of knowing, applying, and continuing the search for ethics-focused methods; being performed in an ecological space (E) will tap into concerns of resonance with organizational culture and interactions (I) with other professional roles; and prescription of the method directly taps into the artifact (A) aspect. This restructuring dictated the progression of the activity across two phases: 1) evaluating method as an artefact (*prescription*); and 2) evaluating method as an actionable item (*performance*).

To package the Method Heuristics, I created three different sets of tags or cards: 1) To evaluate the performance of the method in a design activity—*Intention Cards* and *Phase Cards*; 2) To evaluate the performance of the method in an ecological context—*Ecology Heuristics tags*; and 3) To evaluate the prescription of the method—*Artifact Heuristics tags*. The *Intention Cards* were indirectly embedded in my mind map, but I borrowed the final set from an ongoing collaborative project to build a practitioner-resonant website for easy selection of ethics-focused methods. We created “Designer Intentions” to frame particular kinds of expected engagement with ethics-focused methods emerging from the content analysis of the 80 ethics-focused methods/ approaches. For example, the designer intention “I want to identify appropriate values to drive my design work” describes methods that aid designers in discovering values to implement in their design frame or solution. I added the Phase Cards, drawn from design phases listed in Universal Methods for Design (UMOD) (Hanington & Martin, 2012). Phase Cards were used to link the Intention Cards to particular design phases as felt appropriate by the practitioner. The ecology and Artifact Heuristics tags emerged directly from the mind map. Ideally, these heuristics could be applied to any design method despite the ethics-focused or generic nature of the method.

Selection of a method

For my study, I had to select an existing ethics-focused method to conduct Activity C1. I chose a method named “Ethical Contract” (Gipsen, 2017) designed by Jet Gipsen as a part of the “Ethics for Designers” toolkit (Gipsen, 2017). The method, attached in Appendix H, consists of a template to list *ethical themes* that a team wants to follow while building a product, *divide responsibilities* among the team members, frame *ethical objectives*, state the *design goal*, and finally, place *signatures* of all the members bearing responsibilities to consider the ethical themes and objectives drafted as a part of the contract. This method is designed for HCI practitioners and represents a rare example of a method that would explicitly probe the practitioners about “others” (O) involved in the process of ethical decision making, as it encourages practitioners to list and “divide responsibilities.”

5.6.5 Activity C1: Evaluation of an ethics-focused method with an individual practitioner for its prescription and performance using Method Heuristics

Description

Activity C1 introduces practitioners to an existing ethics-focused method to evaluate it based on its *performance*, i.e., how does the method enable ethical decision making in practitioners’ everyday work; and *prescription*, i.e., how does the method guide through decision making. It guides practitioners to evaluate the appropriateness of the tools or supports for ethical aspects of their everyday design work.

As described in Schema in Figure 5.29, Activity C1 consists of a *toolkit* for *evaluative* action by *individual* practitioners (Schema A). With the toolkit designed *for* the practitioners to be *interactive* (Schema C), practitioners evaluate the method in an interactive manner as they *reflect* about their *own* design activity and how the tool can be re-designed or appropriated in their *future* design work (Schema B).

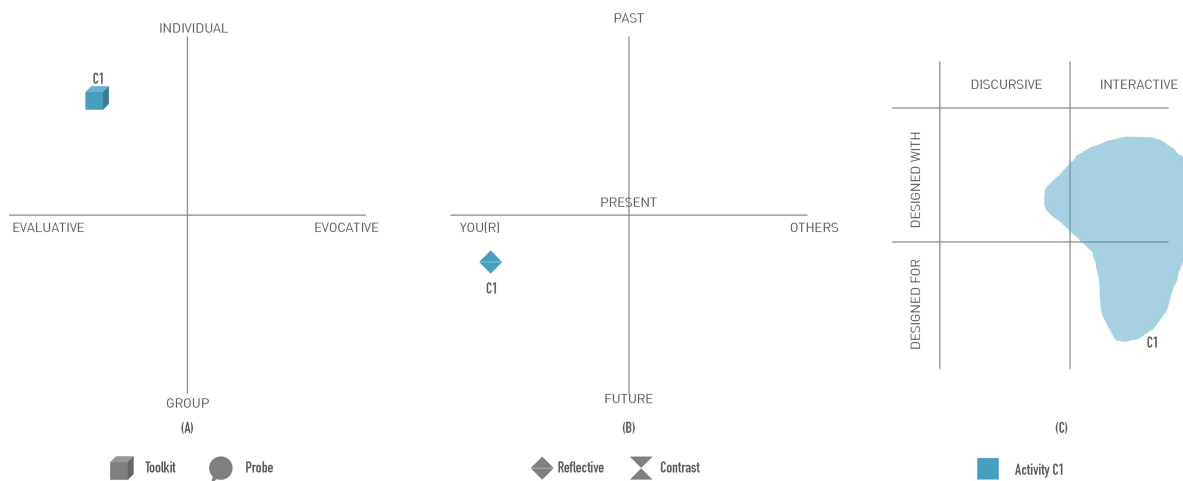


Figure 5.29. Schema describing Activity C1.

Session Script for C1: Evaluating an ethics-focused method using Method Heuristic kit

As a part of Activity C1, practitioners are introduced to a new ethics-focused method and are given 2-3 minutes to familiarize themselves. The facilitator then guides the practitioner to evaluate the method in three steps, using: 1) Intention and Phase cards; 2) Ecology Heuristics tags; and 3) Artifact Heuristics tags. The facilitator probes the practitioners for the reason they selected the tags and elaborate on their evaluation process. The session script for this activity is presented in Table 5.9.

5.6.6 Activity C2: Application and evaluation of an ethics-focused method in everyday work by a team of practitioners, recorded through a Collective Diary Study

Description

Activity C2 engages a team of practitioners in implementing an ethics-focused method in their everyday work and records the outcomes of evaluation and usage of the method through a diary study. It guides practitioners to evaluate the appropriateness of the tools or supports for ethics in their everyday design work over a one or two week period of time.

Table 5.9.
Session script for Activity C1.

Est. Time	Action	Description
5 mins	Introduce	Skim through provided materials. Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner's role.
2-3 mins	Familiarize	Practitioners familiarize themselves with the ethics-focused method
20-30 mins	Conduct Evaluation	Ask practitioners to evaluate the method in three steps (Intention and Phase cards; Ecology Heuristics tags; and Artefact Heuristics tags) as guided by the facilitator.
+5mins	Probe	Facilitator will ask them to think out loud on various tags applied while evaluating the method. Facilitator will ask practitioners to elaborate based on practitioner responses
10 mins	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using "Reflection and Debrief probes."
5 mins	Feedback	Practitioners provide feedback to improve the activity for other participants.

As described in Schema in Figure 5.30, Activity C2 consists of a *probe* for *evaluative* action by a *team* of practitioners in the form of a Collective Diary Study (Schema A). With the probe designed *for* the practitioners to be *interactive and discursive* (Schema C), the team evaluates the method in an interactive manner as individual practitioners in the team *reflect* about their *own* and *others* design activity. The diary study encourages the team to identify opportunities for re-designing the method to appropriate it for their *future* design work (Schema B).

Collective Diary Study Structure

The probe shared with the team is a collective diary study with one representative of a team facilitating the evaluation process. This representative facilitates using the method, discussing results from using the method, and records observations and responses of the whole team regarding how they would like to change their practices in the future based on their

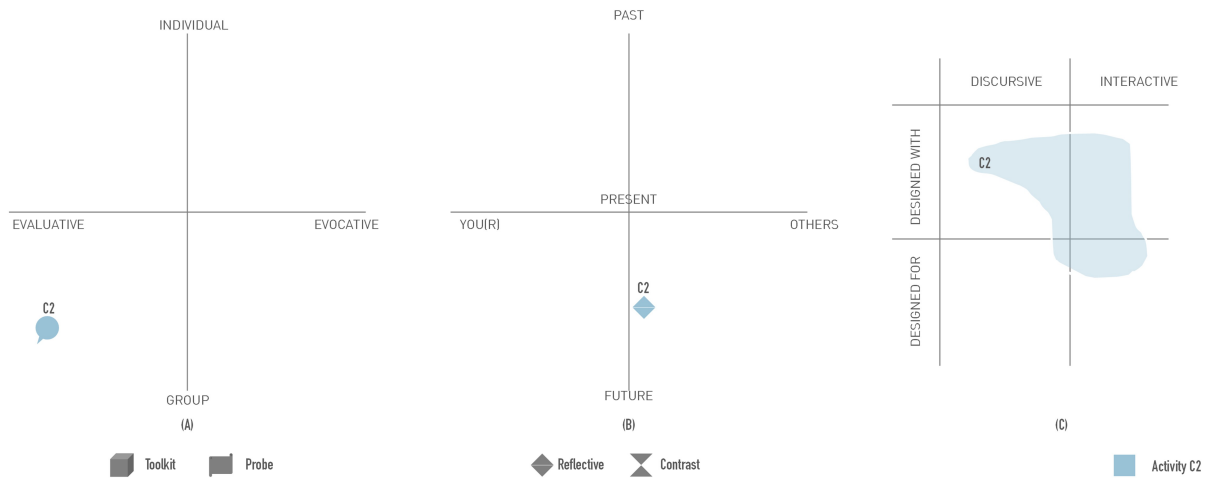


Figure 5.30. Schema to describe Activity C2.

engagement with new ethics-focused method(s). This activity is designed at a conceptual level and the Collective Diary Study is imagined to work as follows:

1. *Introduction:* A team of practitioners will be introduced to an ethics focused method.
2. *Set-up:* A representative will be chosen as a scribe to record their actions and facilitate based on the diary study instructions.
3. *Application:* A team of practitioners will interact and use the method in an ongoing project and document their results. This can continue for 2-3 days depending on the chosen ethics-focused method and team's way of using the method.
4. *Re-Application:* The team of practitioners consider other potential ways to use the method using *Intention Cards* and *Phase Cards*.
5. *Reflection:* Different practitioners will note one new change they observed or felt after using the method.
6. *Re-design:* The team of practitioners will identify current ethical tensions, supports, barriers, and opportunities through the method. Based on a group discussion, they will draw some future practices they would change or continue some existing practices to build ethical products.

5.6.7 Future/ Potential Use Cases

Table 5.10.

Future use cases of using the designed co-creation Activity C by various HCI audience.

Audience	Activity C1	Activity C2
Practitioners	Reflective activity to select methods	Team exercise for new practices
Researchers	Co-design activity for new methods	Co-design activity for new methods
Educators	In-class activity to teach about methods	Prepare students for method selection

These co-creation activities are designed for answering my research questions, but have potential to be used in other use cases or scenarios by HCI practitioners, researchers, and educators. Table 5.10 provides potential opportunities on how these activities can be used by different audiences. I describe contents of Table 5.10 as follows:

- HCI practitioners: 1) Activity C1 provides a toolkit for practitioners to select their methods; and 2) Activity C2 as a team exercise to refresh their current tools and identify new methods for ethics in design work.
- HCI researchers can use both activity C1 and C2 to build a co-design space for the practitioners to ideate news ways of using existing ethics-focused methods.
- Educators can use both activities C1 and C2 for building design ability in students to select and evaluate ethics-focused methods for their design work.

5.7 Summary of Co-Creation Activities

As a summary, Table 5.11 includes a list of all the designed activities detailed above. I have designed three co-creation activities based on the salient dimensions they target: *Activity A* seeks to describe the ethical responsibility of practitioners at ecological (E) level; *Activity B* seeks to describe and create awareness of ethical dilemmas and tensions faced by practitioners (Individual, YOU), as they perceive others (O) and during interactions (I)

among the practitioners, at the practitioner level; and *Activity C* seeks to evaluate ethics-focused supports at an artefact (A) level.

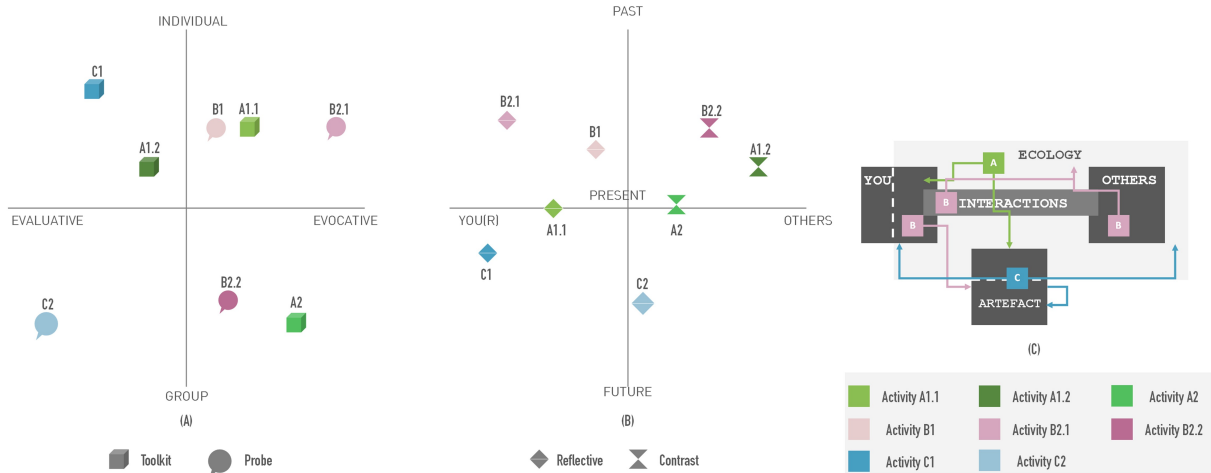


Figure 5.31. Schema to describe comparison of all designed co-creation activities.

As visualized in Figure 5.31, all the designed activities listed in Table 5.11 are plotted using three guided schemas: 1) *Schema A*: Designed to engage individual or group of practitioners and intended the activity to be evocative or evaluative; 2) *Schema B*: Designed to engage practitioner in their own other other practitioners' past, present or future professional experience; and 3) *Schema C*: Designed to emphasize particular aspects of the A.E.I.O.YOU model.

5.8 Sequencing Co-Creation Activities

5.8.1 Drawing Combinations

Let's rewind to the stage where I first introduced the A.E.I.O.YOU model and indicated how each activity A, B, and C highlight one part of the model in more concentration than the other. By this stage in my design process, I have consolidated three activities based on the various salient dimensions they target: Activity A (Tracing the Complexity Toolkit), Activity B (Dilemma Postcards Probe), and Activity C (Method Heuristics Toolkit). As a researcher, I was wondering how to engage practitioners across these various aspects of the

Table 5.11.

Summary of the designed co-creation activities.

Activity A	TRACING THE COMPLEXITY Toolkit
A1	Mapping Ecological Model to Identify Felt Ethical Complexities and Tracing Activity to Pinpoint Needs for Ethical Support with Individual Practitioners.
A1.1	Building Practitioner's Own Ecological Complexity Model.
A1.2	Building and Contrasting Practitioner's Ecological Complexity Model based on Case Study.
A2	Tracing Activity to Identify Felt Ethical Complexities and Needs for Ethical Support with a Group of Practitioners.
Activity B	DILEMMA POSTCARDS Probe
B1	Elicitation and Communication with Individual Practitioners through a Probe and a Follow-up Interview.
B2	Elicitation with an Individual or Group of Same or Different Professional Roles based on Listed Dilemma Cards (B2.1) or Produced Dilemma Postcards (B2.2).
B2.1	Elicitation through Dilemma Cards and Producing Stories.
B2.2	Discussing and Reflecting on Dilemma Postcards in a Focus-group.
Activity C	METHOD HEURISTICS Toolkit
C1	Evaluation of an Ethics-focused Method with an Individual Practitioner for its Prescription and Performance using Designed Method Heuristics.
C2	Application and Evaluation of an Ethics-focused Method in Everyday Work by a Team of Practitioners to Record through a Collective Diary Study.

A.E.I.O.YOU model through these one-off co-creation activities detailed above. Based on a debrief session with my advisor, I decided to experiment with what combinations of the one-offs would work to dig deeper and more fully engage the practitioners in story-telling. It was just like how a chef would have ideated and detailed various recipes of individual dishes, but then it was the time to think about the menu for the main course to actually serve and do a taste testing to see which dish would go with what sides to leave a long-lasting memory of that meal. Basically, I did not want one-off activities to be expendable, but rather be viewed as building blocks to reflect and imagine ethics in practice.

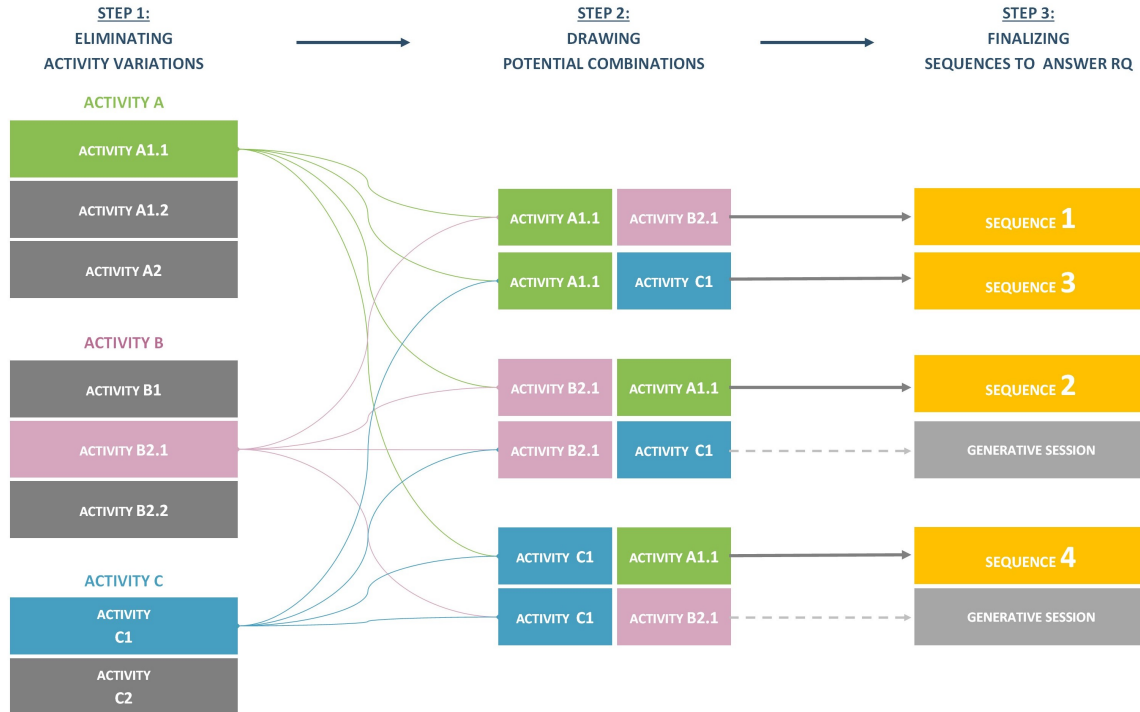


Figure 5.32. Process diagram of drawing the combinations.

As shown in Figure 5.32, the ideation of drawing possible sequences was conducted in three steps: 1) Step 1: Eliminating one-off co-creation activity variations under Activity A, B, and C; 2) Step 2: Drawing potential combinations and sequences with the selected one-off activities; and 3) Step 3: Finalizing and detailing the sequences that will allow me to answer Research Question 2 and fall under the scope of my dissertation. I detail my ideation process and rationale for my design decisions under each of these steps below.

Step 1: Eliminating Activity Variations

The ideation process for mapping sequences of the one-off activities started with listing all the variations and eliminating the activities, represented in grey as shown in Figure 5.32, based on the following criteria:

- **Intensity of the activity:** I have eliminated activities that were intense as one-offs in terms of time taken and the required efforts of the practitioner. For example, activities

B1 and C2 expect practitioners to engage with a probe in the form of postcards kit and diary study respectively. In both these activities, the practitioners engage with the probe for over a week and having to do another activity may be stressful for the practitioner. I decided these two activities are better conducted as their own activities. Additionally, the other variations, such as activity B2.1 or C1, already consider aspects of these two eliminated activities through engagement with the practitioners in a smaller amount of time.

- **Ambiguity of the one-off activity:** I have eliminated activities which involve elements that will make the entire activity successful only if they are relevant, customized, or appropriate to an individual practitioner. For example, activity A1.2 which is designed for practitioners to map the ecological complexity based on a case study to compare with their current ecological model. The case study had to be appropriate for the practitioner's current ecological model. Otherwise, the mapping activity based on any case study is too "meta" and more complex than other combinations that were easier to grasp for the practitioner and for me to facilitate.
- **Scope of engaging with individual practitioners and their own complexity:** I have eliminated, for the time being and considering research logistics, any activities that were designed to engage a group of practitioners instead of individual practitioners. I have also decided to engage practitioners with their own complexity rather than other practitioner's stories. For example, activity B2.2—designed to engage a group of practitioners with postcards with stories of other practitioner's stories—was not considered for pilot sessions under the scope of my research. The same applies to activities A2 and C2.

At the end of step 1, I had three activities, Activity A1.1, B2.1, and C1, to further my ideation of sequencing and drawing potential combinations to conduct pilot sessions with practitioners.

Step 2: Drawing Potential Combinations

With the three activities from Step 1, I had six combinations as shown in Figure 5.32. For each combination, I detailed the functions of the combinations, their sequences, and intended impacts on practitioners to answer research question 2. This process of sequencing allowed me to explore the activities further in relation to each other and ways I need to tweak them to make the sequence seamless and well connected with each other. I used the following set of questions to think through each of the six sequences:

1. **My designer and practitioner voice asked: What ways can I leverage and dig deeper by combining the activities?** I mapped how adding an activity to another in a sequence will strengthen and engage practitioners through multiple aspects of the A.E.I.O.YOU model and directional qualities in Schemas. For example, overlapping the dilemma cards (from activity B2.1) over practitioner's ecological model (from activity A1.1) will help position their dilemmas and see where they need more support for ethical decision making. Although the dilemma cards are about a product, positioning them on the model will be helpful to realize who can solve the issue, who is involved, etc.
2. **My designer voice asked: How do some behaviors of these activities change as a part of the sequence?** I listed how the one-off activity changed its behavior and function as a part of the sequence. For example, in the sequence Activity B2.1 followed by Activity A1.1, the mapping activity A1.1 behaves as a visual-interactive tool for practitioners to map their story based on the filtered ethical dilemmas in Activity B2.1. In other sequences, activity A1.1 engages practitioners to map their current ecological complexity model.
3. **My researcher and practitioner voices asked: How are the sequences tapping into the “professional role or professionalization of their discipline” angle of investigating ethics in practice?** I anticipated how the listed sequences may allow me to understand and describe ethics as seen by different professional roles. This allowed me to prepare myself as a facilitator to have conversations and navigate

through the biases I had towards different professional roles, primarily being an UX designer by training and experience.

4. **My facilitator voice asked: What new designs are required for making the combination work better?** I checked additional facilitating scaffolds I would need as a part of the sequences which I did not design as a part of the one-off activities. For all the sequences, I needed defined session scripts for the combination to see how I could make the transition between the activities seamless or how I could engage the practitioners in overlapping both the activities in the sequence.
5. **My designer and researcher voices asked: What combinations will work best for future “generative” sessions?** I scoped which of the six sequences felt best suited for future generative sessions to engage the practitioners in actually designing ethics-related practice resonant methods. My current scope is more evocative and evaluative, per Schema A, and generative aspects of these co-creation activities transform them into co-design spaces. This was an important heuristic to stay in my scope. For example, the sequence between Activities B2.1 and C1 can engage practitioners with dilemmas and related stories as knowledge about the practitioners need for support, through which we can categorize, evaluate, and tweak the current methods to grade the resonance. Additionally, heuristics from C1 can be used while creating supports or the shared stories.

In the process of Step 2, my ideation aligned with Blythe’s concept of “Imaginary abstracts” which are defined as “prototypes that do exist and report findings from studies that did not take place” (Blythe, 2014). I was only imagining the kinds of prototypes that will result from the co-creation activities in my pilot sessions without actually conducting them and sketching how the final “real” outcomes might look like. This helped me with detailing the descriptions and session scripts for the final sequences. For example, I imagined how sequences from A1.1 to B2.1 could engage a practitioner using an interview transcript from preliminary interviews. In Figure 5.33, I created an ecological complexity model of SP07 and placed some ethical dilemma cards on the model (green tags). This prepared me visually to identify the potential artefacts that could result from the pilot sessions. The marking

activity as a part of A1.1 and overlapping of dilemma cards filtered as a part of Activity B2.1 helped me to visually describe the kinds of support needed by the practitioner, at the individual, organizational, or policy level (beyond the organization).

Step 3: Finalizing Sequences to Answer RQ 2

Based on the criteria developed in Step 2, I finalized four sequences to conduct pilot sessions with practitioners. As shown in Step 3 in Figure 5.32, these sequences are:

1. **Sequence 1: A1.1 \rightarrow B2.1:** Overlapping dilemma cards to strengthen and represent ethical complexity through the practitioner's current ecological complexity model
2. **Sequence 2: B2.1 \rightarrow A1.1:** Building and tracing complexity based on the Dilemmas Cards to reconstruct and reflect on their experience

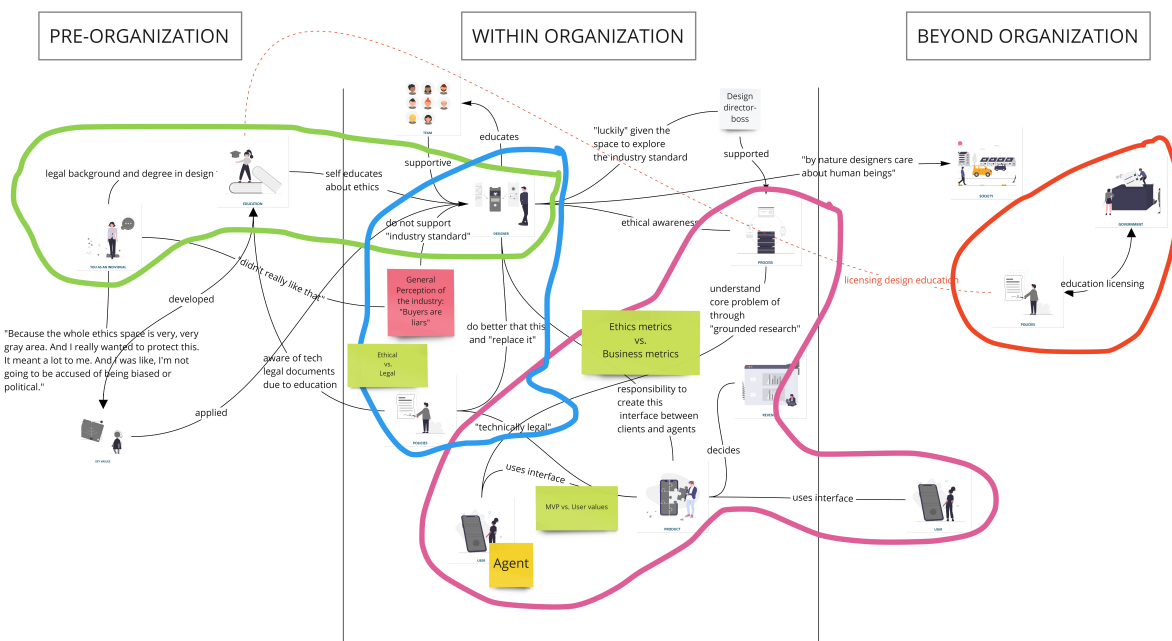


Figure 5.33. Imagining outcomes from Sequence 1: A1.1 \rightarrow B2.1 based on preliminary interview of practitioner SP07.

3. **Sequence 3: A1.1 → C1:** Evaluating a method to draw connections and resonance with ethical complexity through their current ecological model
4. **Sequence 4: C1 → A1.1:** Building an ecological model to represent and visualize supporters or tensions of using ethics-focused methods

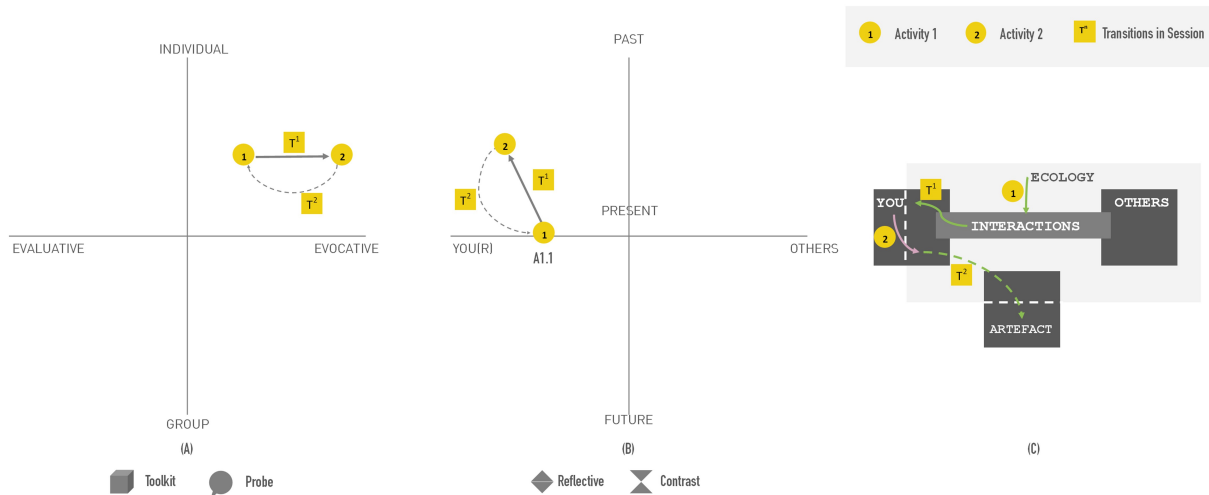


Figure 5.34. Schema to describe combinations of one-Off co-creation Activities A, B, and C.

Overall, these sequences allowed me to explore different perspectives of the A.E.I.O.YOU model. For example, Sequence 3 and 4 play with ecology to method and method to ecology aspects of everyday design work. My intention is not to evaluate which of the combinations are successful. Instead, I wanted to explore how the designed affordances engage practitioners in communicating about and participating in talking about their ethical awareness and action. The four sequences cover possible combinations covering all three activities A, B, and C with activity A—“Tracing the Complexity” mapping activity—common across them. In the following sections I detail my designer intentions for the affordances created through these sequences using Schemas illustrated in Figure 5.34 and session scripts. These schemas describe the transition of activities (indicated by arrows and yellow shapes) along the axis of evocative to evaluative (in Schema A), past to present professional experiences (in Schema B), and transition across various aspects of the A.E.I.O.YOU model (in Schema C).

I conducted 90-120 minutes co-creation sessions using these sequences with three practitioners from different professional roles per sequence. The participant table is provided in Table 3.3 (in Chapter 3).

5.8.2 Sequence 1: A1.1 → B2.1: Overlapping dilemma cards to strengthen and represent ethical complexity through practitioner’s current ecological complexity model

Description

Sequence 1 begins with mapping the practitioner’s own ecological complexity model (Activity A1.1) followed by filtering the ethical dilemmas they face in their everyday work (Activity B2.1). As shown in Schema A and B in Figure 5.35, this sequence is designed to engage individual practitioners in the evocative space in relation to their past and present ecological complexity. As marked in Schema C in Figure 5.35, this sequence starts with practitioners reflecting on their understanding of their ecology (E) and potential interactions (I) that come to mind when they engage in that ecological space to describe everyday ethics on a broad level, then, at an individual (YOU, O, I) level about ethical dilemmas they face that point towards their notion of decision making for designing ethically-sound products.

In this sequence, Activity A1.1 and B2.1 have an additive nature which I expected to strengthen the mapped ecological complexity model not only with practitioner’s potential interactions in the ecology, but also mapping what kinds of ethical dilemmas practitioners generally or contextually face through those interactions and pin-pointing where practitioners need more support for ethical decision making. The participants’ wholistic description of their ecological complexity model results in capturing the kinds of support the practitioners need in a holistic way as they visualize the various ecological factors to be considered to create practice-resonant ethics-focused methods as well as practitioner’s ethical dilemmas (as illustrated by the dotted green line in Schema C in Figure 5.35).

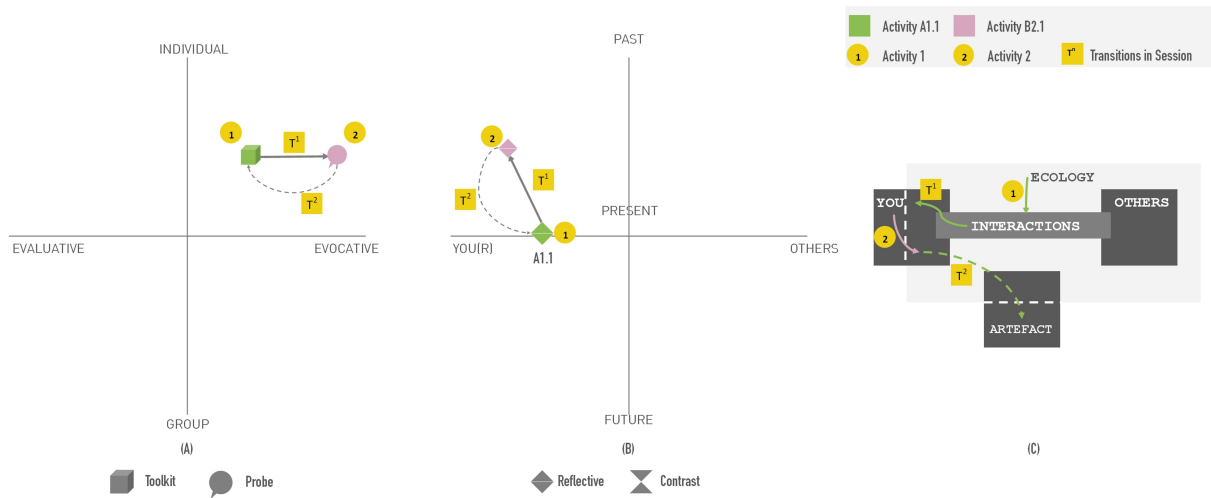


Figure 5.35. Schema to describe **Sequence A1.1 → B2.1**: Overlapping dilemma cards to strengthen and represent ethical complexity through practitioner’s current ecological complexity model.

Session Script

As described in the schema in Figure 5.35, Sequence 1 follows the following actions: **[Mapping (1)–Dilemma Cards Filtering (2)–Overlapping (O)–Marking (1)]**.

As a part of this sequence, practitioners will do the mapping activity to represent their current ecological complexity model using the “tracing the complexity” toolkit designed as a part of Activity A1.1 (marked in Green and as (1); detailed in Section 5.4.6). Before conducting the marking activity designed as a part of Activity A1.1, practitioners filter Dilemma Cards using the Dilemma Cards Categorization Worksheet, designed as Activity B2 (marked in Pink and as (2), and detailed in Section 5.5.6). The currently faced Dilemma Cards are placed on the ecological complexity model created, indicated by the (O) in the schemas in Figure 5.35. After this stage, the marking activity will help the practitioner register the kinds of support they need to solve or deal with the dilemmas as identified as a part of the their ecological complexity model. The session script for this activity is presented in Table 5.12.

5.8.3 Sequence 2: B2.1 → A1.1: Building and tracing complexity based on Dilemmas Cards to reconstruct and reflect on their experience

Description

Sequence 2 begins with filtering the practitioner's ethical dilemmas and elaborating on instances of felt dilemmas (Activity B2.1) which are then visualized to create an ecological complexity model with the support of the mapping toolkit from Activity A1.1. As shown in Schema A and B in Figure 5.36, this sequence is designed to first engage individual practitioners in an evocative space about their past or present felt ethical dilemmas and share the stories using mapping toolkit (marked by T1); then, it continues to move into an evaluative space to contrast and speculate on this past experience to see how it could be different given appropriate supports which can be used for future practice (this transition is marked as T2 in Figure 5.36). As marked in Schema C in Figure 5.36, this sequence starts from the individual's felt dilemmas, which is expanded to visualize the ecological factors, others involved, and interactions.

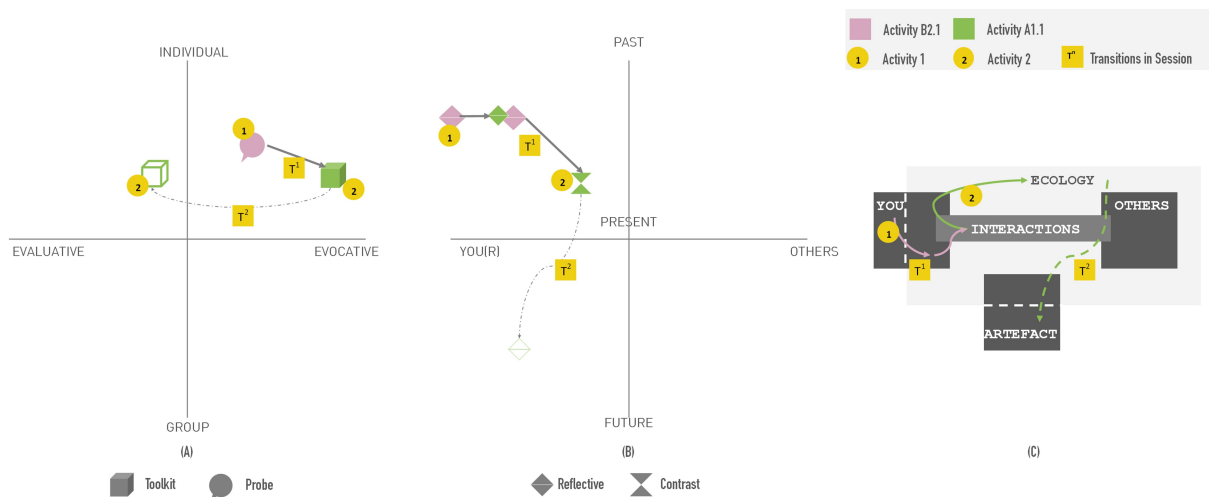


Figure 5.36. Schema to describe **Sequence 2: B2.1 → A1.1**: Building and tracing complexity based on Dilemmas Cards to reconstruct and reflect on their experience.

In this sequence, Activity A1.1 has a transformative nature by providing a toolkit to elaborate the ethical dilemma stories built from Activity B2.1, blurring the differences between Activity A1.1 and A1.2 which is building an ecological complexity model based on a case study; here, the case study being the practitioner's itself. This sequence is designed to reconstruct their past experiences and I anticipate that activity may expand the practitioner's view about the faced dilemmas to seek what kinds of support might have helped to prepare the practitioners for similar situations in the future (as illustrated by dotted green line in Schema A,B, and C in Figure 5.36).

Session Script

As described in the schema in Figure 5.36, Sequence 1 follows the following actions: **[Filtering (1)–Storytelling (1)+ Mapping(2)–Contemplating (T)–Mapping (2)]**.

As a part of this sequence, practitioners begin by filtering the ethical dilemma cards using the Dilemma Cards Categorization Worksheet designed as a part of Activity B2.1 (marked in Pink and as (1); detailed in Section 5.5.6). To discuss lived experiences where practitioners faced one or more of those ethical dilemmas, the “tracing the complexity” toolkit designed as a part of Activity A1.1 (marked in Green and as (2); detailed in Section 5.4.6) will be used. As practitioners and facilitators map the ecological situation of the past experience, the facilitator probes to encourage the practitioner to expand upon their experiences and contemplate the model, indicated by the (T) in Schemas in Figure 5.36. This (T) stage will include further elements that could be added to support or change the situation to solve that dilemma and towards a more ethical decision making process. The same process will be repeated to create a model for another story using a different set of ethical dilemma cards sorted initially. The session script for this activity is presented in Table 5.13.

5.8.4 Sequence 3: A1.1 → C1: Evaluating a method to draw connections and resonance with ethical complexity through their current ecological model

Description

Sequence 3 begins with mapping the practitioner's own ecological complexity model (Activity A1.1) followed by evaluating an ethics-focused method that is designed to help practitioners through ethical decision making (Activity C1). As shown in Schema A and B in Figure 5.37, this sequence is designed to engage individual practitioners to reflect—first, in an evocative space about their present ecological through the first activity (Activity A1.1 in Green) and then (T1), in an evaluative space to evaluate an ethics-focused method and be reflective about their design intentions and ecological space (Activity C1 in Blue). As marked in Schema C in Figure 5.37, this sequence is planned to begin with practitioners reflecting on a broad level about their ecology and related interactions, and then, at an artefact level to reflect about the kind of supports available and reflect about the method's resonance with the ecology for implementing the method in the practitioner's everyday work.



Figure 5.37. Schema to describe **Sequence 3: A1.1 → C1**: Evaluating a method to draw connections and resonance with ethical complexity through their current ecological model.

In this sequence, Activity A1.1 and C1 have a complimentary nature as I intended this sequence to provide a space to evaluate the resonance of an ethics-focused method in relation

to the practitioner’s current ecological model and also provide an affordance through the designed activity for the practitioner to reflect about their ecological model through the process of evaluating the method. I anticipate this sequence to work as an informative session for the practitioner about new ethics-focused methods and indirectly give them ideas on how they might change their current practices. The results from this sequence are expected to capture the kinds of support the practitioners need in a holistic way as they visualize the various ecological factors to be considered to create practice-resonant ethics-focused methods, qualities for an ecological-resonant method, as well as the kinds of support to be provided for practitioners to choose and select appropriate tools for ethical decision making (as illustrated by dotted green line in Schema C in Figure 5.37).

Session Script

As described in Schema in Figure 5.37, Sequence 3 follows the following actions: [**Mapping (1)–Marking(1)–Evaluating (2)–Connecting (T)**].

As a part of this sequence, practitioners will do the mapping activity to represent their current ecological complexity model using the “tracing the complexity” toolkit designed as a part of Activity A1.1 and finish the marking activity to identify areas of ethical decision making, knowledge, tensions, and need for support (marked in Green and as (1), detailed in Section 5.4.6). Then, practitioners will evaluate an ethics-focused method using the “method heuristics” toolkit designed as a part of Activity C1 (marked in Blue and as (2); detailed in Section 5.6.5). The mapped ecological complexity model is then readdressed to see where the evaluated method fits the places of decision making, tensions or support needed, indicated by the (T) in Schemas in Figure 5.37. The session script for this activity is presented in Table 5.14.

5.8.5 Sequence 4: C1 → A1.1: Building an ecological model to represent and visualize supporters or tensions of using ethics-focused methods

Description

Sequence 4 begins by evaluating an ethics-focused method that is designed to help practitioners in ethical decision making (Activity C1) and then, mapping the practitioner's own ecological complexity model (Activity A1.1). As seen in Schema A and B in Figure 5.38, this sequence is designed to move from an evaluative space towards a more evocative space to aid the practitioner in reflecting on how the method (which is already evaluated) can help solve some of the identified tensions marked in the ecological model (in Activity A1.1 in Green) and how their need for support might be accomplished through the evaluated method in their future practice. As marked in Schema C in Figure 5.38, this sequence starts at an artefact level revealing practitioner's intentions of using the ethics-focused method and resonance with ecology, and then, practitioners reflect on a broad level about their ecology and related interactions.



Figure 5.38. Schema to describe **Sequence 4: C1 → A1.1**: Building an ecological model to represent and visualize supporters or tensions of using ethics-focused methods.

Sequence 3 and 4 have the same intended outcomes, except for the order in which the activities are conducted. The design of this sequence is, on a meta-level, to investigate if

the practitioner is going to have a more expansive or streamlined view about their ecological model. For example, in Sequence 3, I have been asking myself if they will be able to evaluate the method rigorously now that they have mapped their ecological model or, in the case of Sequence 4, whether they will be able to easily draw tensions and interactions in their ecological model now that they have evaluated the ecological resonance of an ethics-focused method. My internal goal, although not evaluating the functioning of these sequences, is to see if there is a meaning to the directionality of these activities, with less focus on how or whether the practitioners will connect these two activities.

Session Script

As described in Schema in Figure 5.38, Sequence 3 follows the following actions: **[Evaluating (1)–Mapping (2)–Marking (2)–Connecting (T)]**.

As a part of this sequence, practitioners will evaluate an ethics-focused method using the “method heuristics” toolkit designed as a part of Activity C1 (marked in Blue and as (1), detailed in Section 5.6.5). Then, practitioners will do the mapping activity to represent their current ecological complexity model using the “tracing the complexity” toolkit designed as a part of Activity A1.1 and finish the marking activity to identify areas of ethical decision making, knowledge, tensions, and need for support (marked in Green and as (2); detailed in Section 5.4.6). The evaluated method is readdressed to see where it fits instances of decision making, tensions, or support needed in the mapped ecological complexity model, indicated by the (T) in Schemas in Figure 5.38. The session script for this activity is presented in Table 5.15

5.9 Next Steps

After designing the sequences, I planned pilot sessions to engage three practitioners from different professional roles per sequence as a part of Study 2.2. The details of the study design, data collection, and analysis is provided in Section 3.3.3, and findings from the pilot sessions are in Chapter 6. In the next chapter, I have provided the *practitioner’s story*, reporting how they engaged in the co-creation activities.

Table 5.12.
Session script for Sequence 1: A1.1 → B2.1.

Est. Time	Action	Description
<i>Before Activity</i>		
<i>T-1 Day</i>	Prepare the practitioner	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features.
<i>During the Activity</i>		
<i>5 mins</i>	Introduce	Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner's role.
<i>30-40 mins</i>	Conduct Activity A1.1	Follow Activity A1.1 Session Script in Section 5.4.6 for Mapping ecological model to identify felt ethical complexities and tracing activity to pinpoint needs for ethical support with individual practitioners: Building Practitioner's Own Ecological Complexity Model. Note: DO NOT do the Marking Activity defined as a part of this session script yet. Marked in Green and as (1) in Schema in Figure 5.35.
<i>20-30 mins</i>	Conduct Activity B2.1	Follow Activity B2.1 Session Script in Section 5.5.6 for Elicitation with an Individual or Group of same or different professional roles based On Listed Dilemma Cards. Marked in Pink and as (2) in Schema in Figure 5.35.
<i>5-10 mins</i>	Overlap	Loop back the practitioners to position some of the dilemma cards on the model. Marked in dotted lines and as (T) in Schema in Figure 5.35.
<i>5 mins</i>	Add	Ask the practitioners if there are any other dilemmas that they would like to add to the list or the model mapped.
<i>5 mins</i>	Mark/Trace	Place the tracing sheet [hand-on] or select colored pen tool [virtual] to draw using "Marking Probes" from Activity A1.1. listed in Section 5.4.4
<i>Follow-up at the end of the Activity</i>		
<i>10 mins</i>	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using "Reflection and Debrief probes."
<i>5 mins</i>	Feedback	Practitioners provide feedback to improve the activity for other participants.

Table 5.13.
Session script for Sequence 2: B2.1 → A1.1.

Est. Time	Action	Description
<i>Before Activity</i>		
<i>T-1 Day</i>	Prepare	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features.
<i>During the Activity</i>		
<i>5 mins</i>	Introduce	Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner's role.
<i>10-15 mins</i>	Conduct Activity B2.1	Follow Activity B2.1 Session Script in Section 5.6 for Elicitation with an Individual or Group of same or different professional roles based On Listed Dilemma Cards. Marked in Pink and as (1) in Schema in Figure 5.36. Note: Do not yet discuss the “Seen others face” and “Talked with others” part yet.
<i>20-30 mins</i>	In Parallel, Model Shared Stories	Ask the practitioner to use the toolkit from Activity A1.1 to map the shared stories and how various components played while explaining how they faced the ethical dilemmas. Marked in Green and as (2) in Schema in Figure 5.36. Note: DO NOT do the Marking Activity defined as a part of Activity A1.1. That is not applicable here.
<i>2-3 mins</i>	Pinpoint	Ask practitioners to overlay the exact position where they could have thought about placing the dilemma cards.
<i>10 mins</i>	Contemplate and Elaborate	Ask practitioners about how “LEFT OUT” components would have interacted or helped them in that case. Marked in dotted lines and as (T) in Schema in Figure 5.36.
Repeat Above Steps To Map Another Story		
<i>10-15 mins</i>	Continue Activity B2.1	Follow the Activity B2.1 Session Script in Section 5.5.6 for Elicitation with an Individual or Group of Same or Different Professional Roles Based On Listed Dilemma Cards. Note: Address “Seen others face” and “Talked with others” part.
<i>Follow-up at the end of the Activity</i>		
<i>10 mins</i>	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using “Reflection and Debrief probes.”
<i>5 mins</i>	Feedback	Practitioners provide feedback to improve the activity for other participants.

Table 5.14.
Session script for Sequence 3: A1.1 → C1.

Est. Time	Action	Description
<i>Before Activity</i>		
<i>T-1 Day</i>	Prepare	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features.
<i>During the Activity</i>		
<i>5 mins</i>	Introduction and Consent	Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner's role.
<i>30-40 mins</i>	Conduct Activity A1.1	Follow Activity A1.1 Session Script in Section 5.4.6 for Mapping ecological model to identify felt ethical complexities and tracing activity to pinpoint needs for ethical support with individual practitioners: Building Practitioner's Own Ecological Complexity Model. Marked in Green and as (1) in Schema in Figure 5.37.
<i>30-40 mins</i>	Conduct Activity C1	Follow the Activity C1 Session Script in Section 5.6.5 for Evaluation of an ethics-focused method with individual practitioners for its prescription and Performativity using designed method heuristics. Marked in Blue and as (2) in Schema in Figure 5.37.
<i>10 mins</i>	Overlap or Connect	Loop back to see how the practitioner would use this method in their ecological model. Marked as (T) in Schema in Figure 5.37.
<i>Follow-up at the end of the Activity</i>		
<i>10 mins</i>	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using "Reflection and Debrief probes."
<i>5 mins</i>	Feedback	Practitioners provide feedback to improve the activity for other participants.

Table 5.15.
Session script for Sequence 4: C1 → A1.1.

Est. Time	Action	Description
<i>Before Activity</i>		
	Prepare	Practitioners will be given a link to the MIRO board with an activity manual, toolkit, and MIRO features.
<i>During the Activity</i>		
5 mins	Introduce	Introduce the activity to the practitioner. Detail the expectations of the activity and the practitioner’s role.
30-40 mins	Conduct Activity C1	Follow the Activity C1 Session Script in Section 5.6.5 for Evaluation of an ethics-focused method with individual practitioners for its prescription and performativity using designed method heuristics. Marked in Blue and as (1) in Schema in Figure 5.38.
30-40 mins	Conduct Activity A1.1	Follow Activity A1.1 Session Script in Section 5.4.6 for Mapping ecological model to identify felt ethical complexities and tracing activity to pinpoint needs for ethical support with individual practitioners: Building Practitioner’s Own Ecological Complexity Model. Marked in Green and as (2) in Schema in Figure 5.38.
5-10 mins	Connect or Overlap	Ask practitioners about how some identified tensions and need for support can be accomplished through the evaluated method in their future practice. Marked as (T) in Schema in Figure 5.38.
<i>Follow-up at the end of the Activity</i>		
10 mins	Reflect and Debrief	Debrief with the practitioner about their process of the activity to find out their main takeaways using “Reflection and Debrief probes.”
5 mins	Feedback	Practitioners provide feedback to improve the activity for other participants.

6. PRACTITIONERS' STORY: ENGAGEMENT IN CO-CREATION ACTIVITIES

What did practitioners articulate, reflect, and express about their professional experiences, their ethical responsibility, and kinds of ethical practices they seek to be better supported in their everyday work through the provided supports?

Research Question 2b

6.1 Introduction

In this chapter, I answer research question 2b in two sections: In Section 6.2, I present a thematic analysis of the de-brief session with the practitioners about their takeaways from the co-creation activities to capture what the practitioners articulated about their professional experiences and their ethical responsibility. In Section 6.3, I present artifact analysis of outcomes from each of Activities A, B, and C to list the kinds of supports practitioners identified to be better supported in their everyday work. The detailed analysis procedure for both thematic and artifact analysis can be found in Section 3.3.3. The practitioner identifiers provided in Table 3.3 represent the sequence of activities they participated in. For example, 1P1 is a practitioner involved in Sequence 1 which is doing Activity A and then Activity B. 3P1 is a practitioner involved in Sequence 3 which is doing Activity A and then Activity C.

6.2 Practitioners' Takeaways

Practitioners articulated that the co-creation activities helped them reflect on their current practice in multiple ways: 1) expanding their ethical horizons through self awareness; 2) learning new approaches to ethical vocabulary; 3) becoming (re-)aware of some tacit ethical aspects in their current practice; and moving forward, 4) imagining ways they could change their current practice. These takeaways expressed by the practitioners mostly point towards identifying avenues they could change themselves, but also address instances where

they need a change in the organization, or identification of practices they seek to be better supported (listed in Section 6.3).

6.2.1 Expanding their Ethical Horizons through Self-Awareness

Engagement in co-creation activities helped practitioners expand their ethical awareness, perception, and experience (“horizon”) by becoming self-aware of their current practice, beyond what they already consider as a part of their design work. The co-creation activities allowed practitioners to: enhance their understanding of ethics in relation to their design work through *new lenses and avenues*, identify *new approaches and possibilities* towards ethics in their everyday work, aggregate or distinguish *new identities* in relation to self and themselves as a part of a profession, and become *self-aware* of their ethical position and responsibility.

Practitioners realized new lenses and avenues for ethical engagement in their current practice that they were not actively thinking about before their participation in the activities, mainly with a goal to enhance their current decision making. Practitioner 1P2 reflected back on activity B where he sorted various ethical dilemmas saying “*I was surprised “Okay, these many ethical dilemma(s) I face.” I have never acknowledged these [ethical dilemmas], and this activity has given me very good reflection about the dilemmas.*” Practitioner 4P1 reflected back looking at the ecological complexity map created in activity A where she started thinking “*I have no idea how I’m going to fill up this whole page,*” but realized after creating a map that “*everything does really have a place here. And I wasn’t expecting that.*” The process of mapping all the in-house and third-party actors, factors influencing her design process, values such accessibility, “the aspects and the bodies,” and her role to deliver user interfaces “*and seeing how everything connects with the policies*” and helped her look at the bigger picture. She mentioned: “*I guess I tend to not be a big picture thinker. I’m very much in the weeds. I am not always thinking about this kind of stuff*” and “*I think it maybe points out an area that I could think more about and be more intentional with.*” Here, 4P1 realized potential avenues of interventions and areas she could be “more intentional” through her

decision making by including new practices, for example, listing particular ethical values as a team through their design process. Practitioner 2P3 filtered and contemplated based on the provided ethical dilemmas in activity B and realized that although she discussed “*those issues*” with other people—mainly software engineers—she never related the impact of these dilemmas with “*process or the quality of it [solutions], we don’t even think of it as an ethical problem.*” In this case, 2P3 expanded her understanding of what constitutes an ethical problem and she feels “distant” from ethical decisions in the current situation of developing APIs for other software developers which might not impact their “daily life” scenarios.

Practitioners identified new approaches they can take towards ethics that are already embedded, but not considered previously, in their everyday practice. Practitioner 3P2, who recently shifted his role from being a software engineer into becoming a product manager, expressed his perception of his new role: “*product management is a role that touches upon a lot of phases of the product development anyway, beyond that, the launch. So there are always interactions with a lot of entities responsible within and outside the organization.*” The ecological map created in activity A provided a comprehensive “*document like this, where everything is connected makes a lot more sense to me.*” In this transition from a software engineer who was building an app and not responsible for “regulatory considerations” to a product manager, 3P2 mentioned “*I need to think about the policies that have been laid down, the regulations, and see if we are breaking any of those.*” Looking at the map he created, he identified various stakeholders who can help him in the process (e.g., legal counsel) of considering ethics and realized “*I don’t think I have even asked for support.*” Engagement with a new method, the Ethical Contract (Gispen, 2017), through activity C allowed 3P2 to use the method as a “*way to bring everyone on board and making sure that you have everyone’s [identified in activity A] wisdom and also not being solely responsible for doing something unethical.*” Through the entire sequence 3, activity A to C, practitioner 3P2 learnt a collective approach towards ethics from different stakeholders, especially given the transition in his professional role and responsibilities. Practitioner 1P1 mentioned “*when I think about ethics and stuff, there’s like a few examples I think about*” such as misogynistic attitudes in the workplace, advocating for user user needs, company and team culture to resolve ethical

conflicts, etc. 1P1 expressed that filtering and learning ethical dilemmas through activity B made her “*think there’s like a lot more language here for me to discuss it now. That was interesting.*” Through activity B, 1P1 felt she has expanded her vocabulary to talk and discuss ethics in her everyday work using the language of ethical dilemmas (detailed more in Section 6.2.2).

Practitioners identified multiplicity in identity, as an individual and a member of a profession, that can influence ethical decision making through personal and professional role-focused values they hold “*almost like a subset of this person*” (3P2). After engaging in activity A with the practitioner play-board, separating their complexity mapping as an “individual” and their professional role “within organization,” 3P2 mentioned that “Initially I was not doing that as individual” and then he realized “there is a translation of that individually within the organization. So that was also a little interesting to me.” This separation of identity was intentionally incorporated in the design of activity A to capture personal to professional role-focused values tensions or translation. In this particular case, 3P2 identified the difference which led him to “*start almost defining these links [in the ecological map] accordingly*” and “*modify my persona within the organization.*” 3P2 identified how he “tailors” himself to “mould into the organization” saying “*because I am constrained by this organization, I will not be comfortable enough to randomly start out asking leadership or randomly start asking product managers.*” He added saying that if his organization had a flatter structure where opinions and feedback is well received, he will be “*more comfortable in broadening my designer [self] within an organization. Which I wasn’t looking at it that way, but almost like a dual person.*”

Practitioners expressed becoming self-aware about their ethical responsibility or position through the co-creation activities. Practitioner 2P2 mentioned “*I think now that I’m more aware of some of these ethical problems. I think I’m probably gonna, be more aware of how my own decision making may impact*” after filtering the ethical dilemmas in activity B and mapping stories to see impacts individually, within her organization, and implications through the products created beyond the organization in activity A. Similarly, practitioner

1P3 felt the process of filtering her ethical dilemmas in activity B “was the most making me conscious about what I do and stuff like that.” Practitioners 1P3, 2P3, and 3P3, all software engineers, explicitly mentioned the co-creation activities provided them opportunities to “reflect” about ethics in their work. For instance, 1P3 felt the activities allowed her to become “more aware” of her daily routine and the entire session was “*a self-reflecting activity and what I should be doing and what I shouldn’t be doing altogether. So it was very helpful, refreshing and enjoyable.*” Practitioner 1P1 looked back at the ecological complexity model mapped through activity A to see that the bigger picture is “*much more complex than I realize. And then you can, it’s easy to see kind of like what sources have an impact on you and how you’re also having an impact based on your education and history and how you’re making decisions.*” She became self aware about all the various forces towards her and the impact she is creating based on her “history” and experience. Practitioner 4P3 referred to her outcome from activity A, “*the general diagram of how my company operates,*” and reflected on the importance of communication among different people. The mapping allowed her to become “more aware” and prepare herself regarding whom she should be “*communicating with when some specifications might come up. So it was also helpful.*”

Extending their knowledge and experience of co-creation activities, at the end of their sessions, multiple practitioners (1P2, 2P2, 2P3, 3P2, 4P2) explicitly asked if they could save the artifacts created and share their knowledge with their team members. 1P2 asked if he could keep the copy of the ethical dilemmas he filtered as a part of activity B as “*it will help me with my own thought process and my thinking. I would like to share it with my team members as well.*” Practitioner 2P3 wanted to share her filtered ethical dilemmas worksheet with “my coworker friends who are doing the same thing as me. Do they feel the same way or not.” Also, practitioner 3P2 mentioned that he signed up for the study as he is “*fairly new to product management, so I want to understand how can I be more ethical in designing these features and solutions.*”

6.2.2 Learning New Approaches to Ethics Vocabulary

Engagement in co-creation activities helped practitioners learn new vocabulary and methods to discuss, implement, and reflect regarding ethics in their design work. Activities B and C were intentionally designed to engage practitioners to reflect about their own ethical dilemmas and evaluate ethics-focused method(s). This aspect resonated with multiple practitioners where they expanded their current ethics vocabulary by filtering ethical dilemmas and ideated new and practically possible ways of implementing the ethics-focused method, the Ethical Contract.

Practitioners who engaged in activity B, especially 1P1, 1P2, 2P1, and 2P2, mentioned that “I think there’s like a lot more language here for me to discuss it [ethics]” (1P1) and “I learned about some different ethical dilemmas from this process that I wasn’t maybe aware of” (2P1). Practitioner 1P2 shared an interesting revelation he had after filtering the ethical dilemma cards (activity B) post mapping his ecological complexity model (activity A). The ethical dilemmas made him realize his biases saying: *“I’m more biased on the user perspective, I have presented the business side as a little bit in a negative contrast or light.”* The language of ethical “dilemmas” pushed him to highlight his biases as he progressed through sequence 1.

Practitioner 4P2 talked about the language used in the Ethical Contract as he was evaluating it in activity C. The method asks practitioners to list “ethical themes” and draw “ethical objectives” to set their design goal. Practitioner 4P2 pointed out *“interesting when we don’t call this ethics, we call this regulation.”* He added saying the change of perspective from regulation to ethics, *“everyone would be more bought into it.”* On the other hand, he was appropriating the method to change the vocabulary used to “regulatory themes,” “regulatory objectives,” and “regulatory contracts” to fit his context. From my observation during facilitating activity C, practitioners (e.g., 3P2, 3P3, and 4P1) were constantly questioning what “ethical themes” and “ethical objectives” might look like. As much as we tried to untangle some of those questions through our discussion using co-creation material, using the “ethical contract” method in activity C enabled practitioners to gather this vocabulary

for their design work. To talk more broadly about activity C, these findings might be specific to the use of the Ethical Contract but I anticipate having similar results through any new ethics-focused method.

6.2.3 Becoming (Re-)Aware about Their Current Practice

Engagement in co-creation activities helped practitioners become re-aware, contemplate, and evaluate their ethical action, interactions during ethical decision making, and organizational attitudes in their practice. The co-creation activities allowed the practitioners to compare and contrast their path of ethical awareness and action across multiple professional experiences; visualize and position tangible ethical aspects of their everyday practice such as their processes, interactions, and influencing factors in the creation of a technological solution; foreground certain discrete or implicit ethical actions practiced as a part of their everyday work; and point and realize ethical practices that are not practiced/ followed. Overall, the activities allowed the practitioners to “*evaluate the work that we do in terms of ethics*” (3P3) and felt it was “*pretty interesting to reflect upon our own decision making and the things that we’ve done*” (2P2). This was an obvious result expected from the co-creation activities given the initial design goals, but the variety in practitioners’ reflection through the affordances provided through the co-creation material is interesting to consider.

Practitioners compared and reflected on ethical actions across multiple professional experiences they had in the past in relation to their current organization through their engagement with the activities. Practitioner 2P1 mentioned it is “*a good memory jog*” as she was sorting the ethical dilemmas and narrating stories on when she faced those dilemmas strongly. Reflecting on a “worst ethical dilemma I’ve [2P1] ever faced,” driven by revenue versus driven by user needs, practitioner 2P1 shared a story about a past company she worked for where “*the CEO was really reckless and over promised, kind of just tried to take money from people really. So I felt like I was always putting out fires or cleaning up a mess or trying to deliver something in an ethical way.*” Through the engaged activities, she compared working in such a circumstance with her current workplace, saying “*it also made me really happy that I’m*

not working at the other company anymore. And that I'm really grateful for the company. I do work for being mindful and supportive of having these conversations and making sure we're doing good work. I'm grateful for that."

Practitioners reflected and visually represented their daily interactions during ethical decision making and their position in relation to their ecological structure. Practitioners 1P1, 3P3, 4P1, and 4P3 mentioned how the ecological map created at the end of activity A allowed them to see how *"all the pieces [the aspects and the bodies] come together"* (4P1), get a *"general idea of reflecting and knowing how the hierarchy flow and the chain of command works in my day to day life as a software engineer"* (3P3), and draw the *"general diagram of how my company operates—it made me more aware of who I should be communicating with when some specifications might come up. So it was also helpful"* (4P3). Practitioner 1P1 reflected on how she could visualize and see at a "high level" about *"the relationships I have with the different people and values in my organization"* working both ways on *"how I'm influencing and how I'm being influenced."*

Practitioners mentioned they could foreground and make explicit various implicit, habitual, or embedded ethical actions, design processes, ethics-focused conversations, and interactions in their past or current professional experiences. The impacts of foregrounding these instances ended with different outcomes for different practitioners. For instance, practitioners who engaged in sequence 2, i.e., filtering ethical dilemmas (Activity B) and mapping some past experiences (Activity A), felt *"it's pretty interesting to reflect upon our own decision making and the things that we've done"* (2P2), whereas, another practitioner mentioned that *"it made me feel like moderately retrospectively feel guilty that maybe I didn't do enough to bring up ethical considerations in my product teams in the past"* (2P1). Practitioner 4P3 reflected on her engagement in the everyday design process in her team as a software engineer using the *Intention cards* and *Phase cards* in activity C. She shared that she thought she "was well aware" of the *"goal based distinct steps that different members of the teams take"* but the activity *"made me think more deeply about how I am applying these steps in my everyday working process"* and *"it was an eye opening experience because it made me more*

observant of how I should be.” On the other hand, practitioners signed up to engage in the co-creation activities to reflect or seek answers about their ethical action and responsibility in their everyday work. Practitioner 2P3 mentioned she signed up for the activity saying: *“why I am keenly interested in this is that most of the times I feel that my work is very low level. That it’s hard for me to see the ethical consequences of it.”* Practitioner 3P2, who is changing his professional role from a software engineer to product manager, mentioned he signed up to participate in the activity *“to understand how I can be more ethical in designing these features and solutions. And that’s what I want, so I’ll be asking you [facilitator] questions also.”* These instances show how practitioners treated the co-creation session as a space to find answers and discuss their ethical obligations, commitments, responsibilities, or dilemmas.

Practitioners identified discrete instances related to ethical action, influencing factors, and responsibilities that they usually do not think about or follow in their everyday work. Practitioner 1P1 shared that she could clearly identify her boundaries of work and influence while mapping the ecological model through activity A saying *“I think like beyond the organization, I don’t think about that [policy] component as much, even though it’s there and it like affects us quite a bit.”* Practitioner 3P1 mentioned that an important takeaway from mapping his ecological model was identifying the difference between individual identity and his organizational identity. He said he could not have thought about *education “as part of an organizational entity that we probably would have just thought of that being always part of the individual to take that onus”* even if he was *“given infinite time.”* For practitioner 3P1, this instance also expanded his ethical awareness and need for support to build his ethics knowledge through identifying multiplicity through the components provided in activity A toolkit. After finishing sequence 3 (activity A to C), practitioner 3P1 reflected on how his team thinks about ethics *“at superficial level”* given the kind of organization (Enterprise B2B) he works for.

Becoming re-aware of their current practice, practitioners 2P3 and 3P1 imagined how their reflection through the co-creation activities might change, prepare, or influence them

to think about their new job position. Practitioner 3P1 is a product designer who is currently working in enterprise (B2B) set-up and was soon changing his job into enterprise (B2C) setup. Practitioner 2P3 is a software engineer who builds API models for other software developers who are users similar to her and is soon changing her job into a design context where her users are going to use what she is creating as a part of their daily life. The co-creation activities allowed them to see potential differences and speculate how their practice might change in terms of ethical decision making. For instance, when asked to mark where he faces tensions during ethical decision making using the marking activity as a part of activity A, practitioner 3P1 mentioned that he does not face any such tensions in his current ecological model because products in the Enterprise B2B setup does not usually use “manipulation or consumer tricks.” This moment made him reflect on how things might be different in his next job where he as a designer might have to use such tricks for building consumer base through the app. This brings to the next theme about what practitioners articulated about what they learned through the co-creation activities, i.e., imagining trajectories of change in their practice.

6.2.4 Imagining Trajectories of Change in Their Current Practice

Engagement in co-creation activities influenced practitioners to imagine, speculate, and prepare practical ways to change their current practices related to ethical action, awareness, and responsibility in their everyday work. The co-creation activities allowed practitioners to ideate *new avenues* to improve ethics in their current practice, identify *extensions* to their existing processes and practices, and engage in *improvisation* or *changes* to existing interactions that practitioners engage in during ethical decision making or ethical responsibilities they represent.

Practitioners identified new avenues to incorporate, re-think, and expand in their current ethical action, processes, and decision making. Practitioner 1P1 identified a particular portion of the ecological map generated at the end of activity A that she focuses on while

“mostly doing my [her] job,” which particularly includes drawing research insights to support design decisions. After engaging in the co-creation activity, she mentioned she finds more opportunities to think about her impact in a more holistic way saying: *“I could be thinking about the whole thing a little bit more as a whole. I tend to think very low level and I could be thinking more high level more often”* beyond her job responsibility of drawing insights from user research to policy decisions. Practitioner 3P2 identified new supporting stakeholders, e.g. legal counsel, after he mapped his ecological model (activity A) that he could bring together through the Ethical Contract (method shared in activity C) to *“have everyone’s wisdom and also not being solely responsible for doing something unethical,”* especially his anticipated new way is: *“the legal counsel can be a regular feature in this [ethical contract].”* Practitioners 1P1 and 4P3 felt the need to bring in some new changes to their team by introducing ethics experts *“who are proficient in these [ethical] issues and have more deeper understanding”*(4P3). In extension to adding an ethics expert to the team, practitioner 4P3 felt a need for change at the organizational level. She mentioned activity C provided her a space to look back at her design steps and she started to think that *“the company should pay a lot more attention than just focusing on one specific core value. So I would say expanding the working process in terms of ethical issues would be beneficial for both client side and the component side. That is something that is a new revelation for me.”* Practitioner 4P3 identified how activity A can be *“beneficial to be implemented in like a so-called working process of different projects and the type of companies.”* She felt having activity A as a general practice during project planning can give “some new insights” in their general workflow, bring everyone on the same page, and clarify assumptions of “product specific knowledge that I might not have.”

Practitioners expressed their interest in extending their current practices and processes as a result of their engagement in the co-creation activities. Practitioners who engaged in activity C, where they were introduced to a new ethics-focused method, expressed how they would use and appropriate the method for their context. Practitioner 4P1 mentioned that her team considers accessibility issues as *“a big picture thing that we keep in mind.”* After going through activity C to list “ethical themes” and “divide responsibilities,” she wanted

to be more “intentional” and “*have a checklist of five key values that we [design team] can go down and say “does this fit all of these before doing something”.*” Similarly, practitioners 3P1, 3P2, 3P3, and 4P2 ideated ways of appropriating and expanding their current processes by using the Ethical Contract method introduced in activity C. For instance, practitioners felt they could use the method in their everyday practice as a “communicative method” (4P2), “checkpoint” (3P1), method to “*sit down together and think about personal values and corporate values*” (3P3), and as a tool for “*identifying who are responsible and then the objectives can be to make an ethical decision*” (3P2). Practitioner 2P1 reflected on how she is going put more effort into making value-based decisions and conversations more explicit in her team. She reflected on her past experience and future goals: “*I haven’t done a good enough job of making those explicit for sharing across product teams or that might be working on the product or working with the product. So that’s like something that I want to do in the future of my work that came out of this activity [sequence 2].*”

I think one thing that I realized is that sometimes if your product manager is less concerned about the security and things like that, it might be good to actually maybe hold a short meeting or voice out initially. We’ve might do that activity too. I feel like more confident in voicing out because sometimes we, software engineers, might be neglecting the possible consequences that might happen in the future. And we might be the only one knowing that there is such a check for the future. So having these method, because this is the first time I encountered such a method. Having to know this method does increase the confidence to probably voice out more.

3P3, Software Engineer

Practitioners identified specific practices that they would like to change or improve in their current ways of ethical action, decision making, and taking ethical responsibility. Practitioner 3P3 mentioned he feels “more confident in voicing out” to the product managers about possible consequences of the designed solutions using methods like the Ethical Contract, introduced through activity C [see quote by 3P3 above]. Practitioner 1P3 reflects on her ethical dilemmas through activity B about how she “*got convinced by my manager*” about her professional role-focused responsibility while sharing a design idea and re-evaluated

how she “*should have stood up with my point of view and what I did give into his authority. [...] But I think I should develop this consciousness of letting others agree to my point of view.*” One common thread between practitioners 1P3 and 3P3 is that both of them had less than two years of professional experience. 1P3 and 3P3 were engaged in different activities, mainly activity B and C respectively. Even through different activities, both of these (newer) practitioners reflected on agency and their role to “voice out” their personal values and ethical decisions. Practitioner 4P3 talked about her realization on the “*importance of communication between the different groups*” as she mapped the ecological model in activity A and became more aware after the activities on who she should be communicating depending on the ethical design specifications.

Co-creation activities provided practitioners a space for *imagining* the ways they would change and re-think their ethical responsibilities and processes in everyday work. In the scope of this research, my intentions were not to evaluate and follow-up on if they actually implemented these goals for change, but rather to provide practitioners with the tools to create their own practice-resonant tools.

One thing that I forgot to mention was that, so the reason I agreed to participate in this is also because I want to, since I’m also fairly new to product management, so I want to understand how can I be more ethical in designing these features and solutions. And that’s what I want to, so I’ll be asking you questions also in that,

3P2, Software Engineer becoming a Product Manager

6.3 Identifying the Kinds of Support for Ethics

I conducted artifact analysis of the artifacts created by practitioners in their engagement with activities A, B, and C. This analysis provided a range of examples of support practitioners identified to (potentially) strengthen ethical engagement in their everyday design work. I would like to note that this list is not exhaustive, but is derived from the activities I designed

and engaged practitioners in. The analysis of the artifacts included direct and indirect ways of asking for these supports. For instance, practitioners who engaged in activity A (i.e. all twelve practitioners) were directly asked to mark in “*RED where you feel you would like to be supported through these interactions in your everyday work.*” Whereas, practitioners who engaged in activities B and C (i.e. six each) created artifacts which were inferred to draw some kinds of support they might need to either solve their ethical dilemmas (in activity B) or to use ethics-focused methods in their practice (in activity C). The details of my artifact analysis approach is provided in Section 3.3.3.

Practitioners needed support with a range of aspects related to their ethical action and decision making in their processes and ethical engagement in their ecological setting. These included: methods/ frameworks/ processes and scaffolds for using these methods for ethical decision making; leadership support and agency to take ethical decisions; ethics education to improve their understanding of ethical dimensions of their decision making, and resources to support any required action for incorporating ethics in their design process. The details of these supports are as follows:

6.3.1 Methods/Tools, Performance Support, and Scaffolds for Ethical Decision Making

Practitioners identified they need *instrumental support* to build ethical products which includes methods, frameworks, or tools that they can implement as a part of their design process; *process-based support* for performing ethical decision making; and *scaffolds* to use existing methods/tools.

I find that it [Ethical Contract Method via Activity C] is interesting. Yeah. It it's really interesting. Like I said, I think in certain working scenarios and sometime in the future, maybe I think this type of thing will be really when we don't have the watching over us telling us what our ethics should be and you know, what we have to do when it's actually more obscure and we need frameworks to identify that might be really, really useful and a good bit of learning.

4P2, User Researcher

Practitioners identified a need for more “insightful frameworks” (4P2) that can help them in their decision making, both individually and as a part of their **team**. Practitioner 4P2’s engagement with the Ethical Contract as a part of activity C and its relation to his ecological model mapped in activity A helped him identify the need for “insightful framework solutions” that he can use for “*team exercises in workshops, especially when you’re working with people in different disciplines.*” He mentioned that the Ethical Contract shared with him “*is genuinely valuable when you’re in a team.*” As mentioned in the “Imagining trajectories of Change in their current practice” in Section 6.2.4, practitioners imagined how they would use the new method Ethical Contract in their context. It received a positive response from the practitioners in how having such methods will be like someone “*watching over us telling us what our ethics should be and what we have to do when it’s actually more obscure and we need frameworks to identify that might be really, really useful and a good bit of learning*” (4P2). The method could also work as “proof of consensus” for ethics (3P3) or a collaborative PRD (3P2).

Practitioners identified the need for support in various aspects of their ethical **awareness, action, and responsible performance**. They needed support to plan for unintended consequences while conceptualizing their product (2P1 via Activity A), to improve the “trust factor” through all the processes and with different professional roles during user research (3P2 via Activity A), to personally derive a framework to make a “decision in terms of business versus user journeys” (2P2 via Activity B), to navigate through the dilemma of “User Persuasion vs. Economic Benefit” (1P2 via activity A), and to support users by conducting appropriate user research (4P1 via activity A). For instance, practitioner 3P2

So basically I need to trust the user researcher that it's an ethical feedback from them. I don't know how to do that as of now. Maybe if there's some certification or some sort, or how do we know that? So basically the biggest support would be to improve the trust factor in every process, basically. So if everyone involved is doing the right thing, so the legal counsel is offering the right advice, the user researchers are creating the right personas; they are asking the right questions and they are not asking leading questions to the users; and even in the user research part.

3P2, Software Engineer becoming a Product Manager

Practitioners needed *scaffolds* for using methods for resonance with their practice. Practitioners engaged in activity C often used the tags “I am not sure how to answer that,” “I don’t know what’s being asked for here,” and “I need expert help to use this method” for specific parts of the Ethical Contract method. I inferred through the extensive usage of these tags, as shown in Figure 6.2, that they needed scaffolds to define “Important Ethical themes,” derive “Our Main Ethical objectives are...,” and develop “Our design goal is...” In this particular case, practitioners needed scaffolds to use the method as “This vocabulary is not usually used in everyday work” (identified by 3P1, 3P2, 3P3, 4P1, 4P2). The inference of the need of scaffolds of using this particular method in Activity C can be extended to question the resonance of the existing ethics-focused methods with technology and design practice.

6.3.2 Leadership Support and Granting Agency

Practitioners identified they needed support from leadership to advocate for ethics in their decision making, promote ethics education, and create a space for communicating “openly” about ethics.

Practitioners need support to have conversations and advocate for ethics and with the established hierarchical structures without repercussions. Practitioner 3P3 mapped different interactions in his ecological complexity with designers, data scientists, clients, and others *through* his product manager. The product manager “sits on top”

Ethical contract

Designing is never a solitary act. Therefore it is important that everyone is on the same page. This technique guides you in a mutual negotiation with all stakeholders involved in order to find common ethical ground.

PROCESS

- 1 Explain your disclaimer to all involved stakeholders.
- 2 Go through the unethical situations and collect important ethical themes. Collectively define these themes for this project.
- 3 Discuss who is responsible for each situation. Write everyone's responsibility down.
- 4 Formulate three main ethical objectives everyone agrees on. Make sure everyone knows what they mean.
- 5 Write down (an updated version of) the design goal as agreed upon by all stakeholders.
- 6 Place your signatures to commit to the design goal and ethical objectives.

SPECS

Suggested Time
30 - 45 minutes

Materials needed
An ethical disclaimer, this template, pens

Participants
Design team, stakeholders

Process phase
Planning, validating

For more tools check out: www.ethicalfordesigners.com

1. EXPLAIN YOUR ETHICAL DISCLAIMER TO THE STAKEHOLDERS

2. DEFINE IMPORTANT ETHICAL THEMES:

THEME	DEFINITION
	I am not sure how to answer that
	This vocabulary is not usually used in everyday work
	This uses language that is not accessible, understandable by all designers, only by software engineers and managers
	This uses language that I am able to vaguely understand
	I don't know what's being asked for here
	I need expert help to use this method

3. DIVIDE THE RESPONSIBILITIES:

NAME	RESPONSIBILITIES
	Who defines who owns what
	I am not sure how to answer that
	This (should) have made I make certain aspects of our decision making easy for me/us
	I cannot fill this as I do not have the required information
	I need expert help to use this method

4. OUR MAIN ETHICAL OBJECTIVES ARE...

1	I am not sure how to answer that	This vocabulary is not usually used in everyday work
2	I don't know what's being asked for here	
3	I/We usually do not have time and space to accomplish this method	

5. OUR DESIGN GOAL IS...

I am not sure how to answer that	This uses language that I am able to vaguely understand	This makes certain aspects of our decision making easy for me/us
----------------------------------	---	--

6. PLACE SIGNATURES:

Toolkit Ethics for Designers

Figure 6.2. Artifact analysis synthesis of Activity C: Presenting the need for scaffolds to use ethics-focused methods in practice.

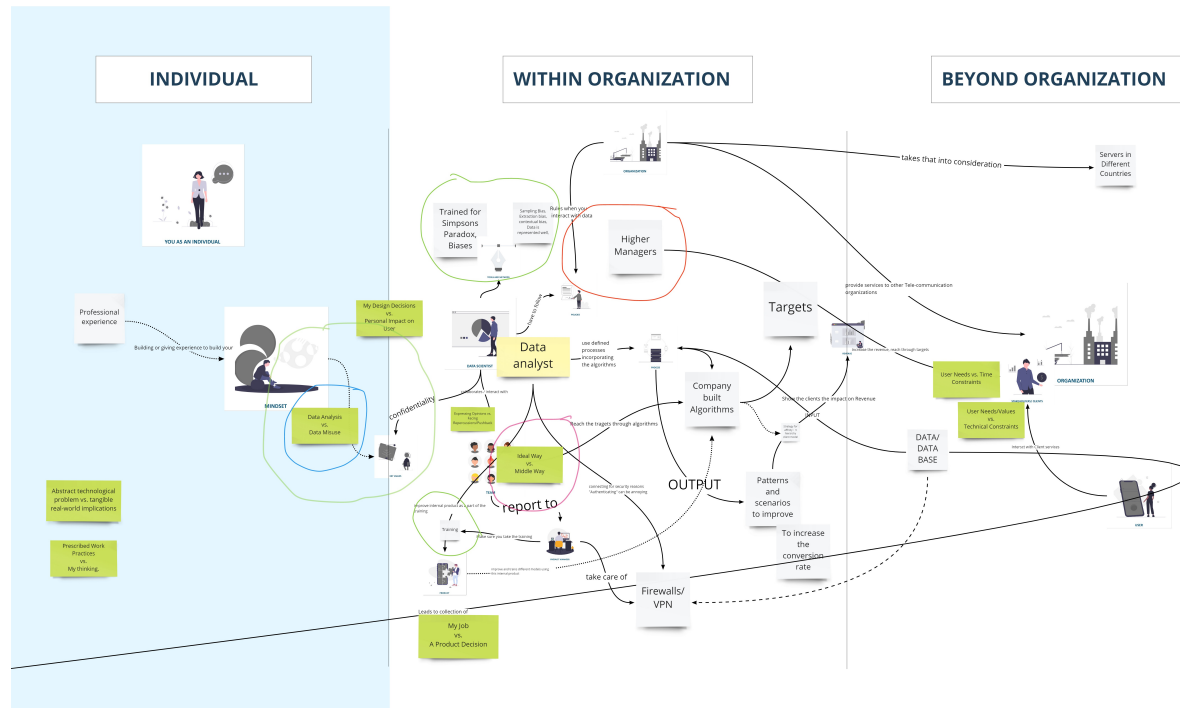
to provide guidance or any instructions regarding the product's direction. When asked to circle where he would like to have more support, 3P3 circled his interaction as a software engineer with the product manager for the need of “more transparency and more openness.” He wanted more transparency to discuss where the product manager puts aside aspects like revenue and asks if 3P3 is willing to take certain decisions that he might otherwise not be willing to take. Practitioner 4P3 mentioned how “some company members assume that I know more than I do in terms of like simplicity or ethical understanding. So sometimes not everything is stated explicitly. I would say communicating more would help with that.” Being at the entry-level, 4P3 needed support in “actively” communicating about goals, ethics, and responsibilities as a part of the team and product development process.

So like sometimes taking a step back and observing the general workflow from, as an outsider might provide us with some new insights. So these types of activities will probably be beneficial to be implemented in like a so-called working process of different projects and the type of companies. So that is something that came to my mind while we were working on this playboard—Like the last one. I was thinking that like doing this activity as a part of a project planning might be beneficial. For instance, when I mentioned that I might have some communication problems with the manager, because they might assume that I have some specific product specific knowledge that I might not have. These kinds of activities would make sure that everyone is on the same page in terms of what the like general ideas inside the members are. So I think that is something that is kind of the new from the sectors.

4P3, Software Engineer

Practitioners need support from leadership to assure the need of ethics education by all practitioners, which will then automatically trickle down through the entire organization. Practitioner 3P1 mapped his ecological complexity, identifying the role of stakeholders/client within his organization (a model component in Activity A toolkit), i.e., “leadership/ hierarchy” to be dictating targets for revenue and influence as well as review the Product Review/Requirement Documents (PRDs). PRDs are the main ethical guidance 3P1 and his team use for decision making. In this interaction, when asked to circle which aspect he needs more support for ethical decision making, he circled “leadership.” In his opinion, “*if it’s [ethics] coming from that highest level, I’m almost rest assured.*” He adds that he needs leadership to guide him or be supportive saying “Hey, you guys should invest on this one, we’ll take up these kinds of courses that will help you understand things more, or why don’t you have a better lens on most.” Otherwise, everybody will not take intentional efforts towards ethics and leadership can make sure it’s unanimously cared for in the organization.

Practitioners needed a space (more like a “sandbox”) granted by higher authority to explore ethics and related responsibilities in their design work. As shown in her ecological model in Figure 6.4, practitioner 1P3 identified her project respon-



to mark where practitioner 3P1 needed more support in his mapped ecological model in Activity A, he reflected on how the “know-how” about ethical practices is very limited. He added that there is an education process to become a designer, but “*that educational value I would say is not that much. At least when I was going through undergrad or master’s that element [ethics related education] was kind of missing for sure.*” He circled “education” (in Red, Figure 6.3) that he needed as an individual which usually influences his “methods” and “processes” he uses as a designer within the organization. In my opinion, this caters to a change in HCI design curriculum and accreditation relating to ‘beyond the organization’ which neither the individual themselves nor the industry can normalize.

Practitioners need resources for learning about other identified ethical angles beyond their design work and decision making. For example, at the end of sequence 1 where practitioners overlap the filtered ethical dilemmas on a mapped ecological model, practitioner 1P1 shared two identified instances she needed support with as marked in red

circled in Figure 6.5. First, pointing at the interaction she mapped beyond the organization on the “government creates policies,” she felt “I don’t know about this and like always, probably less support there.” She felt the need to learn about policies and “lawmakers” who not only regulate organizations based on their products, but also “*how workers are treated. Many people are just now starting to unionize and that’s very unheard of in the tech industry. The government has kind of allowed that to happen and they aren’t able to break up these monopolies either.*” Adding to this thought, she circled the ethical dilemma, “Diversity Representation vs. Misogynistic Corporate Attitudes,” she overlaid in her ecological model that she would like to learn more about the policies related to this dilemma as fitting “within the organization.”

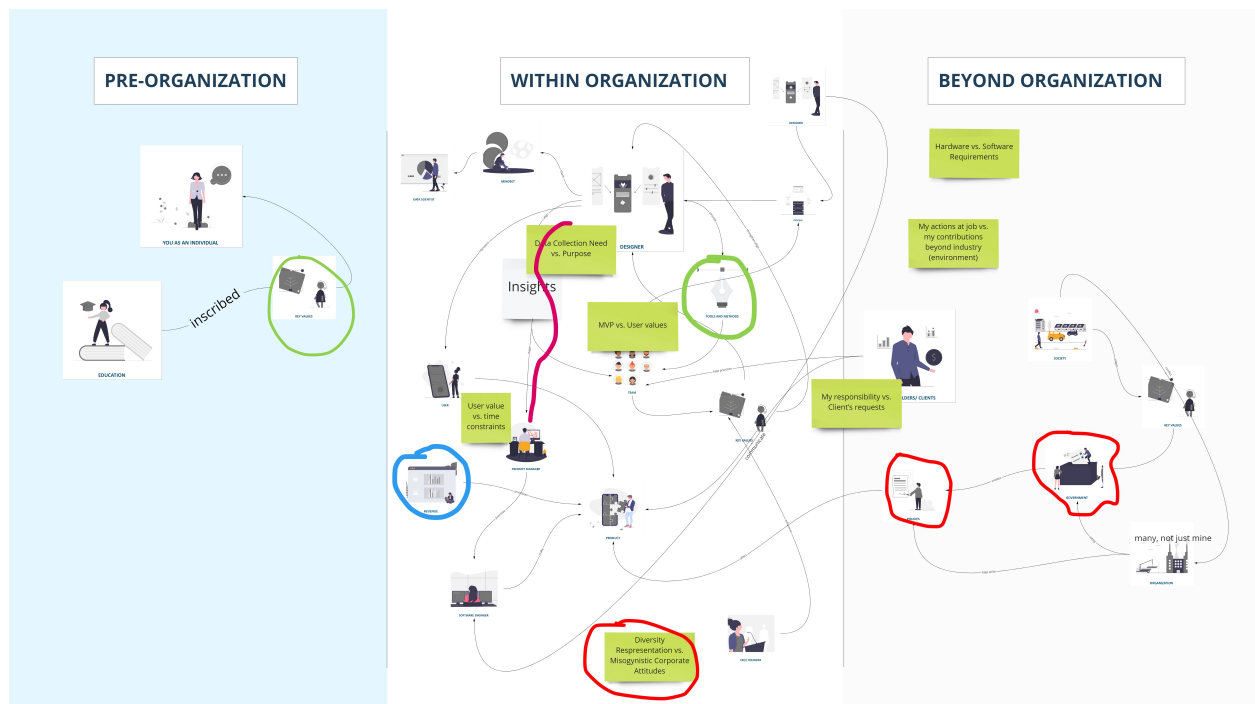


Figure 6.5. Ecological complexity model mapped by practitioner 1P1 and marked the need of support for ethics education in red circle.

6.3.4 Resources: Time & Budget

Practitioners identified they needed support with appropriate resources such as time, budget, etc. allocated for ethical action, as it suits the practitioners' professional role in ethical decision making.

So I say this part is practically not possible to accomplish. It definitely will be in certain scenarios where the ethical considerations are really core part of the brand. This makes sense. Some of other settings as a method, less value versus time, which is very sparkling because I know this is 30 to 45 minutes, but I can see myself in certain situations getting together PMs and stuff, doing a workshop for some products and people being a bit like, "why are we doing this?" You know, there's so many frameworks, there's so many methods. And actually sometimes as a practitioner, you can spot some people sometimes when they're a bit new, they've done. I don't know like that interaction, design foundation, design thinking stuffs. And that's all they do. You know, they applied the same thing to every single thing. Sometimes that's a bit naive. So there's a time and a place for different things based on the value of the outcomes.

4P2, UX Researcher

Practitioners talked about "time" as a major factor in either using ethics-focused methods or catering to user needs through their design work. Practitioners 3P1, 3P2, 4P2, and 4P3 engaged in activity C to evaluate the Ethical Contract used the "I/We usually do not have time and space to accomplish this method" tag as seen in Figure 6.2. Practitioners talked about how time is a constraint in relation to their deployment process (4P3), MVP for Phase 1- Exploration and Phase 2- Research (3P2), and if ethical considerations are not a core part of the brand (4P2). These practitioners engaged with the method through its evaluation and given the prescribed time is 30-45 minutes, found it challenging to spend that much time with their team members in relation to the product development deadlines and deliverable priorities. Practitioner 4P2 elaborated and outweighed time over the value of using the method being and if used this method with the PMs in a workshop they would say "why are we doing this?" Practitioner 4P3 identified "restricted time to complete the method" as a constraint because it "might be challenging to get feedback

and refine the product continuously because something might come up and it might not be possible to go through all of those steps, one or more before the next deployment. So I think time restriction might become issue in several cases.” Along the same lines, practitioners 1P1, 1P2, 1P3, 2P1, and 2P3 who engaged in activity B identified that they often face the ethical dilemma “User Needs vs. Time Constraints.” For example, practitioner 1P1 talks about prioritization of the value of a solution and time saying: *“Like you prioritize, what’s going to have the most value because if one thing is going to take a really long time and provide some value and another thing will provide maybe like slightly less value, but it’ll take way less time, invest in that.”*

Practitioners identified the need for a budget allocated to conduct processes or steps to build ethical products or ethical decision making. Practitioners 2P1 and 2P3, who engaged in activity B, picked the ethical dilemma “Budget vs. Process” compromise. Practitioner 2P1 narrates her experience with a client where they asked for “the end design” whereas she felt the need for *“budget for conducting research because it took it to your end design.”* She felt it was her responsibility to have engaged in user research rather than market research and build products based on consumer needs. Practitioner 2P3 shared her opinion on how there is always a choice saying: *“Oh, this is all we have to do for like ethical concerns. Like probably for example, we might have to like do this thing because otherwise the data might not be secure, but versus that we don’t have budget for investing that much amount of time. So there is like this compromise happening because of the budget.”*

6.4 The Other Side of the Story

In the previous two sections, I have presented results on: 1) various impacts of the co-creation activities on the practitioners as articulated or reflected by them about their own ethical awareness, action, and responsibility; and 2) the kinds of support practitioners need in their everyday design work. I have detailed which activity (i.e., A,B, or C) activated such reflections in the practitioners. This was all the successful side of the story. In this

section, I would like to share some instances shared by the practitioners where the activities either were not as successful as they were intended to be or were not preferred as much in comparison to the paired activity in the sequence.

6.4.1 Activity A and its Density

Activity A was designed to be a facilitated activity, i.e., a facilitator will help the practitioners to map their ecological complexity. The facilitator's role was defined to ask practitioners about different interactions, aspects, and connections to the practitioner; and in the process, learn about their general procedures. As much as it was supposed to be a warm-up exercise, a facilitated activity and generic overview prep, practitioners did not connect to activity A as much as they connected to the paired activity B (sequence 1 & 2) or C (sequence 3 & 4). Practitioner 4P1 found the activity a "bit confusing." He said: *"Initially it took a little bit, well to get warmed up because well, as you can see, I don't know whether this is a hundred percent accurate, but the model, if we call this something like standard operating procedure, there are teams working and this is bloody confusing, all the different parties involved. So just getting my head around that was a bit overwhelming. We could do this 10 times and actually I think it might look slightly different from these types. So that was a bit more cognitively taxing in terms of getting my head around."* I anticipated such a comment from the practitioners due to its density and ambiguity.

In a sequence, Activity A can be framed as a warm-up activity for the facilitator to get the bigger picture of the practitioners' everyday work model. Practitioner 2P1 expressed similar feelings on how it could have been an *"overwhelming activity to be talking about it and building it on my own, even though I do these kinds of things [as a designer]."* She appreciated that *"it was really helpful for you [facilitator] to do the mapping and then I could watch and make sure that felt accurate."* Based on my notes taken during the facilitation, I have observed that different practitioners were approaching activity A mapping differently and it was not an easy activity for practitioners to start by themselves.

6.4.2 Activity B and Defining Ethical Dilemmas

Overall, the most successful activity was Activity B: “Dilemma Cards” filtering. The dilemma cards provided to the practitioners acted as probes and allowed practitioners to reflect on the ethical dilemmas based on their own professional experiences. It was not as structured and definitive for the practitioners. The activity was designed to focus on the individual (YOU from the A.E.I.O.YOU model), making it easy for practitioners to use the ethical dilemmas as a lens into their own ethical decision making. I assume this was successful because the focus on the individual without the salient aspects being the ecology (Activity A) or artifacts (Activity C). However, not all dilemmas were easily understood by the practitioner and some needed further explanation. For example, “Disciplinary Values vs. Organizational Values” or “Disciplinary Responsibilities vs. Job Responsibilities” were difficult for most of the practitioners to describe as a dilemma. In the future, these dilemmas should be given a one line description for the co-creation material to be used by other co-creation researchers.

6.4.3 Activity C and Difficulty in Speculation

Activity C was designed for practitioners to become aware of the method Ethical Contract in 30-45 seconds and evaluate it using the “Method Heuristics” kit. As a part of this evaluation, practitioners were to imagine how this method would fit their ecology using *Ecology Heuristics Tags*. Practitioners found it difficult to imagine how this method would fit their everyday work practices despite my facilitation and illustration of a potential use case. I anticipate this issue not occurring with the variant activity C2 (Section 5.6.6) as it allows practitioners to engage with a new ethics-focused method over a period of one week. One of the practitioners said “*There needs to be a re-clustering [of the ecology heuristics tags] based on scenarios. What do you want to get out of? It is probably because if this is not even being followed [after this session], how does some of these tags make sense? I can literally use two tags and ‘I’m like, I’m done. This is not even something we do’ so well, how can I provide inputs? as opposed to almost doing that speculation exercise. It almost needs that level of breakdown*” (3P1).

Practitioner 3P2, 4P1, and 4P3 took a while to understand the aspect of “evaluation of a method.” When asked to reflect on the co-creation activities, practitioner 4P1 said so about Activity C: *“The first exercise [activity C] was just difficult for me. I think it took me a bit to figure out what exactly we’re talking about when it comes to ethics and like what exactly we’re looking at there. So, it was just hard for me to jump into initially. I dunno if that would just be like maybe more of an introduction or some sort of example upfront.”* I anticipated a certain sense of discomfort or disturbance for practitioners to kick start activity C for the following reasons: 1) Difference in the definition or perception of something called a “method”; 2) Learning curve involved in understanding a method as an artefact and evaluating it; and 3) (Probable) lack of previously evaluating methods or tools one uses for their design work.

6.4.4 Order of the Sequences

Sequence 3 and 4 are similar to each other except for the order of activities A and C. Although my main goal was not the evaluation of these sequences, practitioners felt that sequence 3, i.e., conducting activity A first and then activity C, helped them become re-aware about their ecological model and then easily tap into evaluating the method based on their reflection of the model. Practitioner 4P1 expressed that she was unable to jump in quickly into activity C, the first activity in sequence 4, and when asked if she reversed the order to conduct activity A first, she said: *“I think that would have helped because when we went back to it [activity C] at the end [after activity A], that was a lot easier for me to figure out what goes together.”* In conclusion, Activity A should be a warm up exercise for the practitioners to reflect broadly about their ecological complexity and then move forward to either activity B or C.

7. DISCUSSION AND IMPLICATIONS

In this chapter, I synthesize the results from my studies and my experience as a designer of co-creation activities to discuss: 1) as a designer, extending co-creation activities as methods for other co-creation researchers, formulating a codified framework to use, customize, and replicate the co-creation material I designed to investigate ethics in practice by engaging different professional roles; 2) as a facilitator, providing a reflective account of factors to consider how to use co-creation as a *space* for representation of different professional roles, notions of ethics, ethical concerns, and stories; and 3) for researchers, a need to take a trans-disciplinary approach towards investigating ethics in HCI practice, research, and education.

7.1 Co-creation activities as Methods

In this section, I formulate a framework based on my design process of the co-creation activities to transform these activities as methods for other co-creation researchers. I am using my designer voice to communicate with other co-creation researchers who intend to investigate ethical aspects of technology practice. I want to address the following questions: How to “socialize” these co-creation activities? Can these conversations happen without me (the designer of the co-creation material)? If yes, What more reflective or descriptive accounts are needed from me (the designer) to make that happen? How to prepare other co-creation researchers regarding the facilitation support required to engage the practitioners?

Traditionally **co-creation activities** are taken as “any act of collective creativity that is creativity that is shared by two or more people” (E. Sanders & Stappers, 2008). Drawing from participatory design methodology, co-creation aims at engaging users or customers as experts of their own experience along with designers and researchers working in a design context. The designers and researchers create co-creation material to facilitate workshops with other stakeholders. So, traditionally, the co-creation process is always defined by this dynamic between the researcher (R), the user (U), and the designer (D) as a part of a workshop using co-creation material (probes, toolkits, etc.) designed (as shown in Figure 7.1) . In my case, I have designed three co-creation activities A, B, and C with the intention

of me facilitating these activities with a range of technology and design practitioners who are treated as the experts of their own professional experience as a means of sharing ethical aspects of their professional experiences.

On the other hand, the conventional or traditional definition of **methods** is associated with the design activity and design production for shaping the end product. Lowgren (1999) defines methods as supports and their function to advance a designer's capability in the design process. Gray (2016) defines design methods as "tool[s] that allow designers to support thinking, reflecting and acting upon design activities." In an interaction design context, Stolterman (2008) defines design methods as "tools, techniques, and approaches that support design activity in [a] way that is appreciated by practicing interaction designers." Chivukula et.al (2021) defines an ethics-focused method as containing knowledge for ethical impacts where the "function of the method revealed through this *embedded knowledge* allows designers to convert ethics-focused discovery into design outcomes." So, in this dynamic of a designer building a product, the method acts as a catalyst or an influencing factor that supports the designer as they engage in design activity.

Based on my design work (Chapter 5) and the results of the impacts of these co-creation activities on the practitioners (Chapter 6), I propose the potential for these **co-creation activities to become methods** for other co-creation researchers with intended outcomes pointing towards the activities' ability to impact the practitioners themselves, and not just as an enabling tool for design activity which is conventionally seen as the performance of the method. As shown in Figure 7.1, these co-creation activities can be used by an individual or by a group of co-creation researchers, with substantial opportunities to customize the proposed material in my work. *Ethics* as a construct can be applied or considered across multiple stages of a design process, incorporating a wide array of sensitizing concepts, media, and structures. It can be applied to the designer, artifact, knowledge, process, or impacts. The co-creation activities A, B, and C allowed practitioners to expand their ethical horizons, learn new approaches to ethics, become re-aware of ethical aspects in their current practice, imagine trajectories of change to become more ethically responsible, and identify the kinds of support they need for ethical engagement (detailed in Section 6.2); all defining the *facets* of the individual practitioner's personal performative characteristics that can later be translated

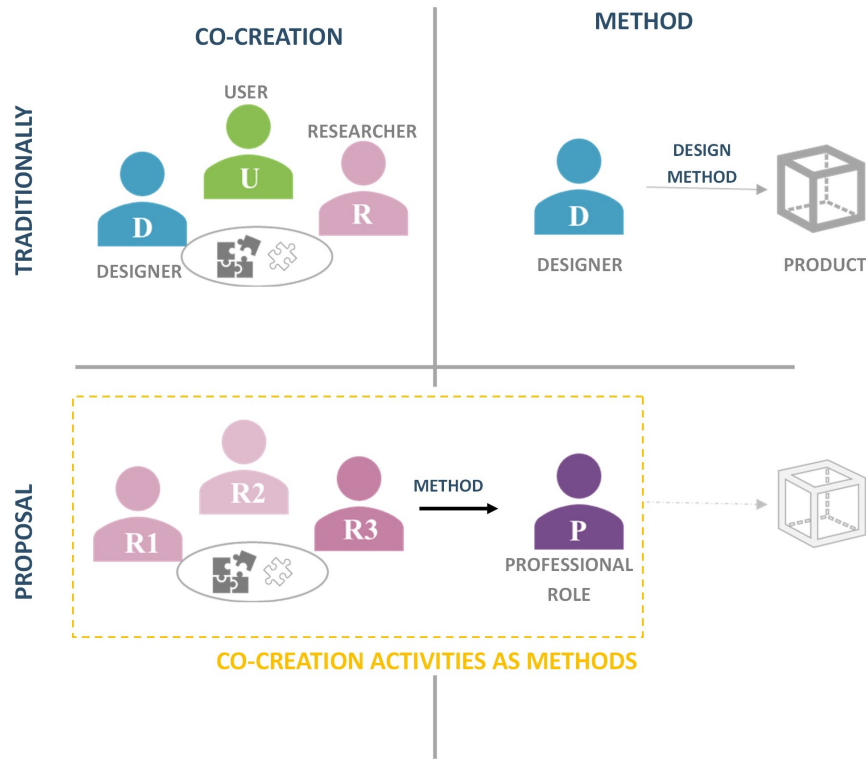


Figure 7.1. Defining co-creation activities as methods for practitioner’s ethical responsibility and awareness.

into their design action. These facets demonstrate how the co-creation activities can act as methods for a practitioner’s “way of being,” bringing together commitments towards their ethical responsibility, ethical action while building products, and normative, subjective, and empirical manifestations of their notion of ethics shaped by their professional role. I do not argue for the lack of critical reflective tools to focus on the practitioner’s ethical way of being, but rather the potential for translation or extension of these co-creation activities beyond a 90-120 minute session with a facilitator.

7.1.1 Codified Framework for using Activities A, B, and C as Methods

The nature of these co-creation activities allow the material to behave as methods for practitioner’s awareness, re-discovery, and intentional change in ways that point towards ethically-focused practice. The design prototypes and guiding structures used to design these

activities, detailed in Chapter 5, can act as agile foundations for co-creation researchers to customize the activities A, B, and C for their context. I provide a framework for practitioners to use these co-creation activities as methods using the guiding structures, A.E.I.O.YOU model (Section 5.3.2) and Classifier (Section 5.3.3) Schemas, that helped shape the purposes and variants of these co-creation activities. I illustrate the conceptual framework using Activity A (Figure 7.2) as follows:



Figure 7.2. Illustrating co-creation Activity A as a method.

- **Define your audience:** Identify who is going to be represented while using the method (refer to my reflection on co-creation activity as a space of representation in Section 7.2 to see a range of practitioners who can engage). For example, a practitioner who is new to industry, a practitioner who has changed teams or company, a team of practitioners who wants to build their ethics-focused agenda together, a team of different professional roles aligning their ethical objectives, etc.
- **Set a goal/ intention:** Using the A.E.I.O.YOU model, define the goal if the practitioner(s) would like to investigate, build, state, and/or re-evaluate their ethical responsibility, identity, or philosophy from: 1) ecological perspective (E): then choose Activity A; 2) individual and interactions perspective (I.O.YOU): then choose Activity B; and 3) artifact perspective: then choose Activity C. Now, after choosing the

particular activity, choose your goal. For example, as shown in Figure 7.2, activity A's salient feature is focusing on the ecological mapping. The possible goals can include mapping an ecological model to see how "YOU" as a practitioner fit in the ecological complexity (Ga) or how artefacts can be re-designed or introduced to solve ecological complexity (Gb) or how "OTHERS" in the ecological complexity are influencing or being influenced ethical decision making (Gc).

- Set-up the co-creation space:** Bringing the audience and goal together, it is time to set up the co-creation space using the Classifier schemas. As shown in Figure 7.2, Classifier Schemas B and C can help create the following spaces (S1, S2, and S3): 1) For a practitioner who just joined industry, S1 through activity A provides a space to map the whole ecological complexity to self-prepare about their position, potential ethical tensions, and supports need to better support ethical practices; 2) For a practitioner who changed their job position to a new team or company, S2 through activity A creates a space for the team (Schema B) to orient the new addition and themselves to be reflective of their current practice and changes to be done in the future (Schema C). In an individual set-up, S3 can be a space where the practitioner can use activity A as an evaluative step (Schema B) to contrast (Schema C) their past and present ecological context.
- Document takeaways for (personal or team) identity and responsibility:** Wrapping up use of the activities, list the following facets: new aspects you identified about yourself, your role, and ecology; aspects, attitudes, and practices to change in the current practice; and support needed from others in the team or ecology. For example, the ecological complexity maps created through activity A can help the practitioner identify influencing factors in ethical decision making and supporters or barriers for ethical engagement.
- Assemblages of activities as extending the method (*Optional*):** Extending the outcomes from one method, in this case activity A, B, or C, as inputs into another method. This method can be another activity that is not chosen during goal setting or

another design method used by the practitioner or her team. Plugging outcomes from one activity into another method was illustrated through the sequences I designed in Section 5.8. I piloted four sequences with twelve practitioners, illustrating and exemplifying transitional qualities to show how two or more of the designed one-off activities can be easily plugged in and out to promote them as methods.

The framework, as illustrated through activity A above, provides flexibility for the co-creation researchers to explore multiple aspects of ethical dimensions in their everyday work. A similar set-up can be ideated for activities B and C. As a designer, I have used the schemas as heuristics, ideation tools, and evaluation tools to explore the potential aspects of co-creation work (as detailed in Section 5.3.4). Although presented as a “framework” here, these schema point towards a methodology, given its agile structures, the flexibility of various tools that can be used by the co-creation researchers, and the potential for it to cover the landscape to investigate ethics in practice using the A.E.I.O.YOU model. This methodology has two potential translations moving forwards: one that privileges the industry practitioner voice and the other that privileges the researcher voice. These foundations provide a codified language for practitioners to build their own method, showing the agile nature of the designed co-creation activities. Using the same framework, researchers can re-create or customize the co-creation activities to be used as *research methods*. Other use cases include using the activities as *education material and activities* for educators, and *generative supports* for method developers. The future use case scenarios drawn for activity A in Table 5.4, activity B in Table 5.8, and activity C in Table 5.10 provide a conceptualized vision of using the co-creation activities as methods for other audience than technology and design practitioners. As much as my intention was not to design these co-creation activities as methods, their form and evaluation has given me an idea to propose these as methods, alongside potential packaging as a methodology to support researchers, practitioners, and educators. In this study, I have seen co-creation material being translated into a method. But, can any co-creation activity or material be turned into a method? What other mindsets and attitudes have to be embedded into the co-creation material to make it a method? What does this translation work look like in the future?

7.2 Co-creation activities as a *Space* for Representation

In the previous section, I have provided a preliminary framework for co-creation researchers to design sessions to engage practitioners, drawing from my design process. In this section, my designer voice talks about imagining co-creation activities as a *space* (using the metaphor of a physical space) for practitioners to represent themselves; drawing from insights and reflective accounts of my facilitator self. This reflection can provide insights and prepare co-creation researchers who can build on my work in the future.

In the literature, co-creation is represented as a collective activity that treats the users or customers as the “experts” and the designer as the facilitator. As the designer of these co-creation activities, I have created a set of activities to provide practitioners with a “space” where practitioners from different tiers of professional experience, employed in different professional roles, working in different project domains, and situated in different ecological systems with different cultures can be brought together to talk about ethics in their everyday design work. I imagine this co-creation space as a *sandbox*, a *vessel*, or a *physical room* that is designed to welcome, rejoice, and rebound any voice. In the next couple of paragraphs, I use the word “space” to represent these co-creation activities I designed, specifically imagining them as a physical space that provided a room for practitioners to talk and reflect about their own understanding of ethics in their everyday work. As depicted in Figure 7.3, I created the basic structure (framing, foundation, and some tools to paint) of the co-creation space and the practitioner could occupy the room as they share their expertise about ethical awareness and action (paint on the walls and put up picture frames using the available tools). Typically, I assumed practitioners have workshops and training sessions as a whole in their organizations which aim at improving their skill-set and content knowledge related to their professional role and responsibilities towards product developments. For example, training sessions about security measures in data centers, privacy concerns in technological interactions, inclusion and diversity in customers characterized, etc. Disrupting this idea, I want to reflect on the designed co-creation activities as a *space* where practitioners could *represent* themselves as a member of their profession and as individuals, as they navigate through all their ethical dilemmas (Activity B), identify their position and interactions within the

ecological models (Activity A), or reinvent their own intentions to use a certain method (Activity C).

These co-creation activities were designed intentionally for engaging technology and design practitioners in reflecting, re-inventing, and re-imagining their everyday practices. The results provided in the previous chapter talk to these aspects of the co-creation activities and some of these were intentionally inscribed into the activities. While designing these co-creation activities, I did not prepare for all the variety that I had to handle and navigate through *during* those sessions, except for the complexity or variety that comes with the professional roles of the practitioners. I designed the co-creation activities in a way that it did not restrict technology and design practitioners to engage with the co-creation material based on their role, discipline (UX design, software development), domain of work (AI, health, privacy), or product types (web, mobile, XR). But, after engaging twelve practitioners in the co-creation sessions, I discovered a lot more about the interactions with the practitioner and my role as a facilitator during the co-creation activities. In this discussion section, I want to reflect as a designer about these designed co-creation activities from the lens of “representation.” This aspect of representation was not in my mind when I was designing these co-creation activities. So, I want to reflect on the following questions: *Who was represented in this space? What was represented? What representations were shared in this created space?*; from the perspective of the facilitator of this space. I situate these reflections based on the co-creation material I created and facilitated in this study.

Who was represented? The space was well-occupied by practitioners as it was focused on themselves, their thinking, and expertise in the bigger picture, rather than the other way around where organizational requirements (or chaos) is highlighted with traditional workshops and training sessions. I depicted this in Figure 7.3 where the practitioner could be anywhere and everywhere in this space. While designing the co-creation activities, my main intention was to engage practitioners from different professional roles. This was one of the constraints that helped me design the activities in a way that members of all professional

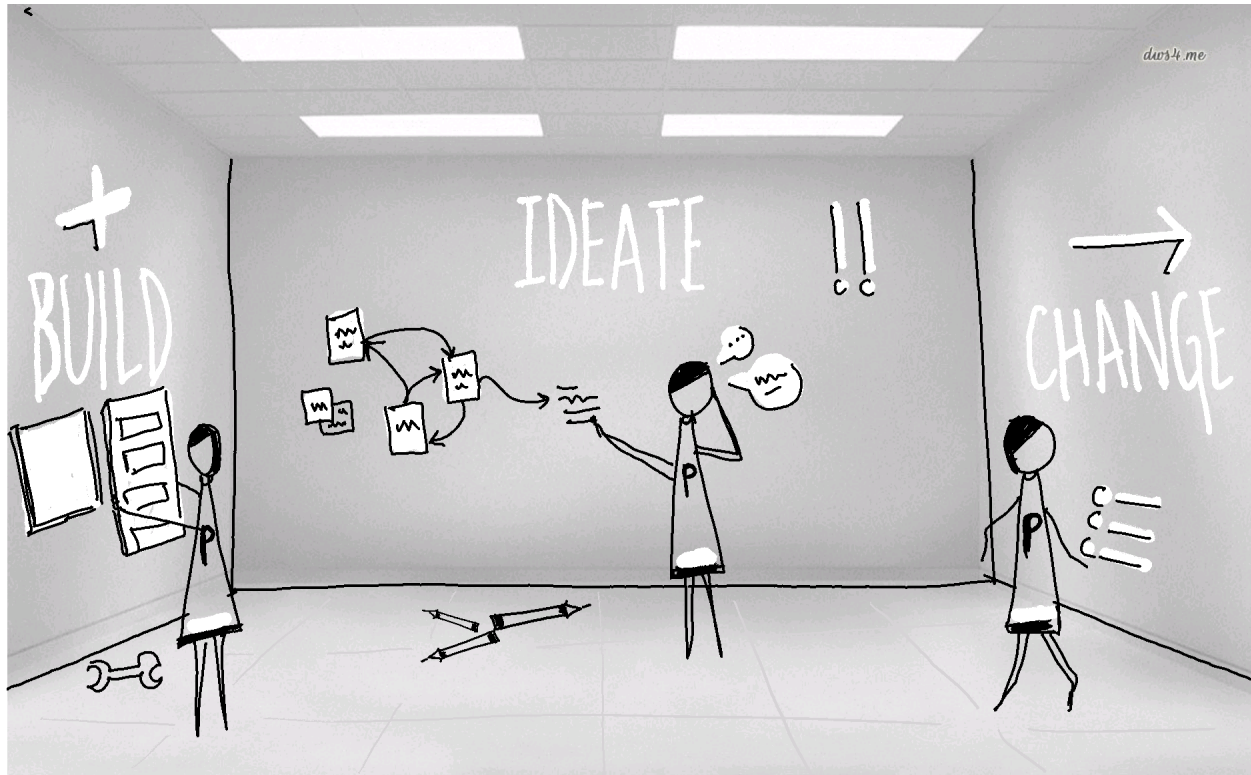


Figure 7.3. Practitioner represented and "occupying" the co-creation SPACE.

roles can interact with the co-creation material and prepared me as a facilitator to engage all of them similarly.

The pilot sessions helped add many more participant descriptors that can be represented in this designed co-creation space. After the pilot sessions, the space could represent a wide range of practitioners. First, definitely practitioners with different disciplinary and professional expertise, roles, and responsibilities, all within different organizational contexts. For example, designer 4P1 working in the government, 1P1 & 3P1 working in Enterprise B2B, and 2P1 working in a consultancy. Second, practitioners from different tiers and years of experience. For example, 1P3 and 3P3 are just starting their professional careers versus practitioners 3P2 and 2P1 who have had more than 5 years of professional experience. Third, practitioners who are changing their jobs across different product domains or organization types. For example, practitioners 3P1 and 2P3 were changing their jobs right after engaging in the co-creation space which helped them reflect and prepare for ethics in their practice (detailed in Section 6.2.3). Fourth, practitioners who were changing their long term profes-

sional roles. For example, practitioner 3P2 has been a software engineer for eight years and has recently taken the role of a full-time product manager. Fifth, although not the focus of the study, practitioners from different cultural backgrounds and geographical locations were also represented as they talked about ethics using different vocabulary. For example, it was interesting to see how 1P2, 4P2, 3P3, and 1P3 shared their knowledge about ethics depending on their uptakes of design education and work in their cultural and geographical contexts. Sixth, practitioners who intend to interact with practitioners from other professional roles that they have not worked with before in order to prepare themselves to align their values towards the design work. For example, practitioner 3P2 changing his role from a software engineer to a product manager identified a new responsibility to have to interact with UX researchers, designers, and legal counsel. The complexity beyond profession acted a major role as it define the practitioner's goal to engage in the co-creation activity. As a facilitator, it was important to encourage for all these different practitioner goals along with my own agenda for the co-creation sessions.

What was represented?Practitioners shared a range of stories, artifacts, and perceptions of ethics. I would like to present what different representations the practitioners shared during their engagement in the space, especially to note the kinds of representations I as a facilitator had to handle. There were two kinds of representations: 1) predictable and 2) non-predictable. The predictable representations included those that I already inscribed into the activities and prepared before-hand. These instances included facilitating the activities A, B, and C based on the session scripts, probing for details in the shared stories, providing support and giving definitions and clarity on the co-creation material, navigating and reacting to the stories shared by members of different professional roles, and handling discussions about ethical awareness and responsibility at personal, theoretical, and ontological levels.

The non-predictable representations included those that I could not prepare before-hand and had to deal with in the moment. The activities were not designed to make the practitioners learn a certain ethical framework, principles, or content knowledge as contextualized in a particular domain. The kinds of conversations were not based on a design frame or a design constraint or a context but it was more focused on the practitioner who inscribes

these values and ethics into the products that they design. So, the kinds of conversations with the practitioners during engagement depended completely on what the practitioners want to share from their past and current practice, product decisions they take, and their expectations of the co-creation activity, which was not so easy to predict. There were some unpredictable instances during the pilot sessions that I had to handle in the moment such as setting the expectations of the co-creation activities right with the practitioners, encouraging practitioners to think through certain situations in their future practice without my own bias, and building on different languages used to define “ethics” by different practitioners. For example, practitioners often felt the purpose of the co-creation activities was to get answers and solve their ethical concerns. Practitioners asked me a question on how to be “ethical” as a member of their profession. They treated me as an “expert” in the space and assumed that engaging with the co-creation material would solve a particular ethical issue, conscience, or tension in their professional experience. As a facilitator, I had to communicate the goals of our conversation where the practitioner was the “expert” of their own ethical action, knowledge, awareness, and responsibility, and my task was to facilitate their movement in this co-creation space. I consider these as practitioner representations because they had a certain representation of a co-creation activity and it is not always the same as what the facilitator would imagine it to be.

What other representations did they engage/interact with? This space allowed practitioners to interact with other practitioner’s representations of ethics in their everyday design work, either through the activities I designed or me sharing similar/ contrasting experiences from my knowledge. Here, I talk about “representations” in the form of stories and methods. Although not piloted, I have designed some activities that cater to reflecting or contrasting about “other” practitioners (Schema B in Section 5.3.3). These activities include: Activity A1.2 where practitioners map ecological models based on a case study or other practitioner’s story; Activity B1 where practitioners interact with a probe consisting of Dilemma Postcards with stories from other practitioners about ethical dilemmas in their design work; Activity B2.2 where practitioners interact with the Dilemma Postcards as a group to reflect, contrast, and ideate based on these shared stories; and Activity C2

where practitioners in a team get exposed to new ethics-focused methods to configure them for their everyday practice. These activities were strategically designed to not only allow practitioners to reflect about their standpoint but also to allow them to know these *other* stories in this focused space. As a facilitator, it is important to represent these without bias and at appropriate times so that it does not prime the practitioners to not share their stories.

This reflection provides insight into the different characteristics (in addition to already considered factors in Chapter 5) that have to be considered while designing a co-creation space. Even if the use cases are extended for practitioners or co-creation researchers to facilitate their own co-creation space, it is important to acknowledge these different practitioner descriptors to make the space inclusive, successful, and informative. There is no “one size fits all” when it comes to ethics. But, after my reflection on how the co-creation activities I have designed represent many practitioners, scenarios, and everyday practices, I am sensing positive outcomes for HCI practitioners and ethics researchers in leveraging on co-creation principles and practices. From an opportunity standpoint, this is a point to debate and I am open for discussion on how to create co-creation spaces for technology and design practitioners to build their own ethics-related philosophy and represent themselves within everyday ethics.

Imagining this space expand. My reflection until this point focuses on how the space accommodated individual practitioners with a facilitator who was the designer of this space (myself). Foreseeing the potential of this space to scale-up, there is still a lot to figure out about how this space can accommodate a team of practitioners consisting of different practitioners who have to be represented, different representations to tackle, and different perspectives of engagement and interaction with the offered representations. The questions I have to expand this space include: How should the space be re-designed to accommodate a team of practitioners from similar or different professional roles? What contextual factors can be leveraged, tweaked, changed, and discarded to support activities in the space? What are the goals for such a space and how to decide the goals? How should the co-creation material be designed to accommodate multiple perspectives at once? What are the rules of this space to make sure everyone is well-represented? What are the governance structures

to support, expand, and extend this space? How will this space be made practice-resonant or built in everyday practice contexts? What does it mean to facilitate in such a space?

7.3 Translational and Transdisciplinary Approach to Ethics

In the above two sections, I proposed a framework and my reflection on building a co-creation space to engage practitioners from different professional roles and with differing responsibilities, primarily talking to other co-creation researchers. In this section, I want to discuss the value of this work for a broader audience.

Looking back at the various findings from this study, let me first establish the results using professionalization in relation to an academic discipline or professional roles as an analytic lens. The survey results, in Section 4.5, provide a summary on how practitioners from different professional roles reported that their professional roles cared about different human values. UX designers engage with privacy of the users, software engineers engage with usability of the products, product managers envision environmental sustainability, data scientists think about right to information, and hardware engineers care about advocacy. These results do not imply that the notion of ethics drawn from professional roles is definitive, but taking human values as a language for notions of ethics, these results established that different professional roles have different ethical valence.

Similar results surfaced while engaging different professional roles in the co-creation activities. Practitioners were explicitly marking the boundaries of their ethical responsibility drawing from their professional role-focused notions of ethics. For example, practitioner 3P3 identified how, as a software engineer, the focus is always about the feasibility of the code and user intentions are mostly the “designer’s” job. He defined his responsibility as a software engineer as “follow[ing] the instructions” of a product manager on what the stakeholder goals are for the product. Another interesting example that was thought-provoking was my interaction with practitioner 3P2. Practitioner 3P2 transitioned from his role as a software engineer to a product manager. While talking about policy regulations as an instance of implementing ethics in everyday work, 3P2 mentioned that as a software engi-

neer: “*I have worked **as a software engineer** for products like, I was building an app for airline industries. But my role does not allow me to think about that [policy]. Like it was not my problem, but **as a PM**, what I can say is that I need to think about the policies that have been laid down the regulations and see if we are breaking any of those.*” This example illustrates the boundaries in how the practitioners define their role-based responsibility towards the products. I found similar patterns in the survey results and in Section 4.5, I talk about how the survey results provide descriptive accounts to define *value archetypes* based on different professional roles. These archetypes are engaged in the process of product development, sometimes at different stages often leading to various tensions regarding ethical aspects considered while building a product. Building on these examples, I argue for the need of *transdisciplinary approach to ethics* research, practice, and education.

What does having a transdisciplinary approach mean for different audiences? Having a transdisciplinary approach does not mean to engage in multiple professional role-based notions of ethics to build a holistic approach, but instead to question what it looks like when bringing all of these perspectives together. It is important to engage in questions such as: What are the advantages for such an approach? Where are some potential tensions that might arise? What mindset and knowledge do we need for a transdisciplinary approach to ethics? How volatile or rigid is that space? I am not providing a solution for ethics in practice, but presenting my initial ideas on how this approach can be taken forward by different audience. I would like to present my initial thoughts on how translational efforts using the results of this research study (i.e., survey results and the co-creation material) may be taken up by HCI researchers and the practitioner community. I build on the Trickle-Down and Bubble-Up translational model proposed by Gray, Stolterman, & Siegel (2014) (see Figure 7.4) to illustrate how the materials I have created may bridge the research-practice gap and encourage translation. As shown in Figure 7.4, there are five proposed types of information flow: **A**-Trickle-Down where knowledge is used in practice; **B**- Bubble-Up (researcher led) where practice is investigated to produce research knowledge; **C**- Bubble-Up (practitioner led) where practices and knowledge from practice is shared with other research and practice communities; **D** and **E**- Cycle-around for knowledge from research to research and practice to

practice communities. I propose three opportunities to support translation capacity building on my work: ideating the need for a transdisciplinary approach to ethics, (potentially) bridging research-practice gaps, and leveraging on the co-creation material designed as a tool for this translation work to happen. Below, I discuss the question: How can the potential translational work for transdisciplinary approach to ethics be done?

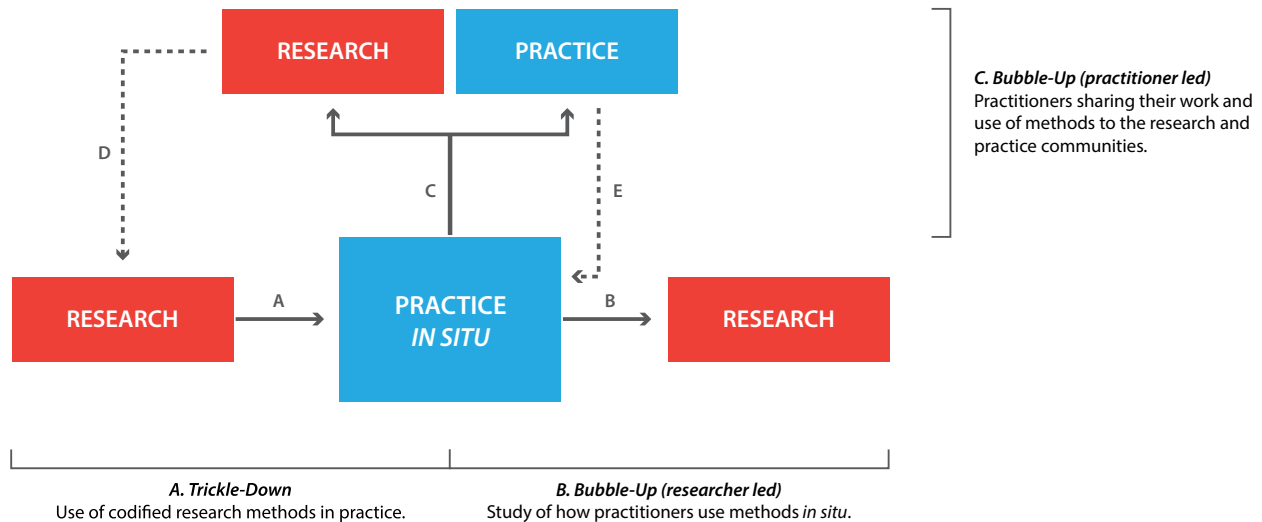


Figure 7.4. Translational model bridging the research-practice gap using proposed Trickle-Down and Bubble-Up information flows (reproduced from (Gray et al., 2014)).

There is potential for the co-creation material I designed to bridge communication gaps across research and practice communities in a way that is resonant for both the communities. I provide some initial examples below:

A (Trickle-Down): For knowledge to be adapted from research to practice, the methods, resources, and supports have to be practice-resonant. Directing this towards ethics-focused methods designers, there is a need to leverage a transdisciplinary approach to build practice-resonant methods for ethical engagement. The complexity of practice has to be embedded into the tools or knowledge, taking into account disciplinary, organizational, and professional role-oriented notions of ethics. This goal of resonance encourages methods developers to ask questions such as: Is acknowledging transdisciplinarity a quality of a practice-resonant method? How can ethics-focused

methods be designed to be practice-resonant? The codified framework (Section 7.1.1) proposed may allow practice communities to use the co-creation activities as practice-resonant methods considering the various dimensions of ethics it incorporates based on the A.E.I.O.YOU model. The A.E.I.O.YOU model can be used as an evaluation framework, ideation tool, or lens to identify various practice-resonant elements in the everyday work of different professional roles.

B (Bubble-Up-research led): To build anything that is practice-resonant, there is a constant need to describe what is happening on the ground in practice. Directing this towards HCI and ethics researchers, research agendas should be framed to reinterpret or translate ethics in one discipline from the viewpoint of another, thereby encouraging alignment. Building on this bubbling-up of practice complexity, researchers should acknowledge multiple assumptions across different viewpoints relating to professional roles in relation to ethics. The outcomes of this work could establish descriptive accounts of the meaning of ethics and related conversations in inter-disciplinary teams. For instance, in the context of my research outcomes, the fact that the co-creation activities were successful and showed potential to be codified as methods, reveals the potential role of these tools to extend transdisciplinary research approaches when used by design researchers, promoting research-led Bubble Up translation with practitioners.

D and E (Cycling-around): To engage deeply with knowledge relating to ethics in research and practice communities, there is a need to question current educational practices. Directing this goal of cycling-around towards HCI educators, the role of ethics in curricula should be critically reflected upon in relation to particular design contexts (e.g., designing for security, designing for user experience), with the goal of making these contexts expandable to incorporate multiple disciplinary perspectives on ethics. This pluralistic approach to ethics could equip practitioners across different ethical perspectives to build and extend their own notion of ethics while interacting with practitioners from other professional roles. The co-creation materials I have designed may be used as education material or scaffolding for inter-disciplinary knowl-

edge building and sharing as a proactive attempt to support practice-resonant work and cycle-around of ethics-focused knowledge.

7.4 Limitations

I have presented the scoping for data analysis from the large amounts of data I collected (in Chapter 3); instances of failure, “scattered emotion,” and constraints in my process of designing the co-creation activities (in Sections 5.4.5, 5.5.4, 5.6.4 and 5.8); and negative cases while engaging practitioners with the co-creation activities (in Section 6.4). Here are some other limitations I present as a researcher:

- The survey received more than 1000 responses in a span of 6 hours from its distribution. As much as I came up with strategies to filter “valid” data points (detailed in Section 3.3.1), I still assume the incentive provided for survey respondents influenced the participants. Also, there could have been demand for the survey given the topic of “ethics” and a possibility of priming the participants to prove they are ethical through the responses.
- The professional role labels offered to the survey and co-creation session participants may not be precise in the sense of pointing towards agreed upon job functions or job titles. Building on the established fact about the volatility of various professional roles (in Section 2.2), the groups may not have been very homogeneous. For example, some UX designers might relate to disciplinary notions of ethics that are similar to software engineers (particularly if they had formal training in computer science), representing less diversity across professional roles than how software engineers may relate to each other within a single professional role. Additionally, analysis was conducted based on the professional roles identified by participants themselves without any derived correlation to their academic discipline, educational background, and career trajectory.
- In Section 4 of the survey (more details in Section 3.3.1), I asked participants to rate what their discipline cares about using the language of human values. There is a possibility of participants reported what they could *do about* the values listed being in

their professional role rather than reporting what values are *at the core* of being the member of that profession. I primarily focused on the first interpretation, which could be a limitation of survey data collection.

- The results from the survey in Study 2.1 and findings from co-creation sessions in Study 2.2 provide descriptive accounts of practitioners' ethical engagement from different professional roles. I have not presented any triangulation of these findings from different data sources. The major influence of these results has been on my designer mindset as I designed the various co-creation material and facilitation probes to engage with different disciplinary notions of ethics shared by the practitioners.
- The co-creation activities produced extensive data that include descriptive accounts of practitioners' ethical engagement, both personally and as members of their discipline. I have chosen particular instances in the transcripts, i.e., debrief sessions, and artifacts created. There were many interesting instances that influenced me as a facilitator and provided insights to the practitioners. All those narratives were not fully represented in the findings section.
- Practitioners shared a range of examples on how engagement with the co-creation activities helped them imagine new ways of ethical engagement for their practice (Section 6.2.4). As a researcher and facilitator, I constantly had the dilemma of them mentioning vs. engaging in ethics in their everyday work. The scope of this study does not include following up on the reality of their practice situation.
- The pilot sessions were focused on engaging and facilitating individual practitioners, which although pointing towards potential use cases, does not completely resonate with or replicate “on the ground” practice settings. Additionally, the A.E.I.O.YOU model does not yet consider how to customize these activities based on the kind of product designed by the practitioner.
- As a facilitator, I felt the limitations of conducting these co-creation activities all by myself. There were instances of fatigue or saturation in the conversations. I believe co-creation is always fun, interactive, and evolving when there are multiple people to

facilitate and participate. The freedom and comfort around facilitating alone should not be undermined though.

- A threat in a co-creation activity scenario is that it “raises serious invasion of privacy concerns and effectively limits the kinds of topics that the researcher can pursue” (Morgan, [1996](#)), especially when the topic is about ethical awareness and action. There is a huge risk with the facilitator’s bias and practitioner’s notion of ethics. In this study, this limitation was addressed partially by carefully crafting the prompts in the form of activities designed and facilitation during such group conversations.

As much as these limitations are valid given the nature of dissertation research, this provides me a range of future work possible to improve these limitations into opportunities for my research trajectory beyond this study.

8. CONCLUSION

In this dissertation, I have documented practitioners' felt ethical awareness, action, and responsibility in technology practice, primarily engaging with practitioners from different professional roles and describing their role-based notions of ethics.

Research Question #1. I provide results from a survey study to report how practitioners from different professional roles: 1) have valence towards different human values as described by responsibilities that relate to their professional role, showcasing value archetypes of designers of a technological product (Section 4.2); 2) have varied levels of commitments towards users, stakeholders, discipline, and society (Section 4.3); and 3) in most cases, have reported alignment of their values with other professional roles (Section 4.4). The variation in the professional role-based notions of ethics reported by the practitioners highlights the need for transdisciplinary approach to ethics in HCI research, practice, and education contexts.

Research Question #2a. To engage practitioners to express, communicate, and participate in sharing their felt ethical concerns and responsibility in their everyday work, I have leveraged a co-creation methodology and principles consistent with a participatory approach. The intersection of practice-led approach and co-creation methodology has enabled me to design, iterate, and prototype three co-creation activities to engage practitioners from different professional roles. The intention of these co-creation activities was to capture professional role-focused differences and provide a space for practitioners to reflect about ethical aspects of technology practice. Taking a research through design approach, I have formulated guiding structures, in the form of *schemas*, that helped me design co-creation material to engage practitioners about ethics from an ecological interactions perspective, individual dilemmas perspective, and method evaluation perspective. This is a methodological contribution for design and co-creation researchers where I have extended the guiding structures to formulate a codified framework to use co-creation activities as methods by other co-creation researchers.

Research Question #2b. I facilitated sequences of co-creation activities with twelve practitioners from different professional roles which included UX designers & researchers,

software engineers, product managers, and data scientists. For this study, I focused the analysis of the engagement of practitioners in the co-creation activities to *describe* the influence of the activities on their ethical awareness, action, and responsibility. Practitioners expressed and articulated that the co-creation allowed to expand their current ethical horizons; learn new approaches to ethics, especially vocabulary and methods-wise; become re-aware of their own ecological complexities, processes, and knowledge; and imagine trajectories of change in current and future practices. This experience of engaging different professional roles helped me reflect on my facilitator self from a design perspective to frame co-creation as a *space for representation*—a space that could represent practitioner’s voice and own representations of felt ethical concerns, perceptions, and limits. This reflective account can help other co-creation researchers to build on and extend this space based on my experiences. Practitioners also identified a set of supports they need for their ethical action in everyday work ranging from instrumental supports for their design process, leadership support for agency, ethics education, and resources. This set of supports can point towards a potential set of practice-resonant methods as identified by the practitioners which can be co-designed with the practitioners.

8.1 Future Work

Based on the results of this study, there are multiple directions of future work with uptakes for HCI practitioners, the HCI and ethics researcher community, for co-creation researchers, and for ethics researchers.

8.1.1 Extending and Scaling Up Co-Creation Work

The co-creation design, material, and activities can be scaled up beyond this dissertation work.

First, I have designed these co-creation activities and provided examples of possible variants using the formulated schemas. If co-creation researchers were to take up this work and use the framework proposed in Section 7.1, dissemination of these co-creation activities and material as methods may be a space to extend this research in multiple contexts such

as other research contexts, practitioner settings, and educational contexts. This can also lead to co-creation researchers expanding on the A.E.I.O.YOU model to incorporate more contextual components to engage practitioners, for example, looking into the product that is being designed (Artifact (A) aspect) or team of practitioners (Others (O) aspect) and internal interactions (Interactions (I) aspect).

Second, I have engaged individual practitioners in the co-creation activities to primarily focus on the evaluation of these activities and individual's sense of ethical responsibility and identity. There is a potential for extending engagement with a group or team of practitioners to record their discussions using co-creation material and document how multiple practitioners express, articulate, and speculate about ethics in a shared co-creation space. The group setting could include multiple practitioners from the same professional role, different roles, a team of practitioners from an industry setting, or multiple practitioners from different hierarchy level from an organization.

Third, Not just for co-creation researchers, what if practitioners themselves were to take up these co-creation material? An extended use case may be to train practitioners to use these co-creation material as methods. Design-wise: How do you train practitioners to gain a similar mindset as the designer of these co-creation activities as they use the co-creation material as methods in their everyday work context? Based on these designs, an evaluation could be conducted on how practitioners use the co-creation materials as methods in their everyday work.

8.1.2 Co-creation Outcomes Leading to Co-design Work

In this study, I have engaged in the spectrum of evocation to evaluation using the co-creation material (Schema A in Figure 5.4). The main intentions through the co-creation activities was to encourage practitioners to express and share stories of their professional role-based notions of ethics and how that influences their everyday design work. An extension to this co-creation could include the creation of generative goals from the activities. The co-creation space can be extended for generative sessions based on identified needs, by co-designing methods with practitioners and evaluating those needs in comparison to the ex-

isting ethics-focused methods. This work can then define and formulate set of specifications for designing of practice-resonant ethics-focused methods.

8.1.3 Descriptive Accounts

A direct extension of the work done in this study is to provide descriptive accounts of the stories shared by the twelve practitioners from different professional roles. I presented analysis of the debrief sessions and artifact analysis to identify the supports needed by practitioners for ethical decision making. There is much more to uncover in terms of the professional role-based differences of ethical responsibilities, boundaries, perceptions, awareness, tensions, and dilemmas. For example, questions that can be investigated further include: What are some evolutionary aspects of practitioner's ethical awareness throughout the time of the co-creation session? How are practitioners languaging their meaning of ethics? In Table 8.1, I draft some questions that can be explored further per activity.

Table 8.1.

Questions for future analysis based on co-creation data and professional role as an analytic lens.

Activity A

- What are the influencing factors (supporters, barriers, influencers, etc.) in the ecological model that impact ethical decision making?
- How do practitioners from different professional roles mark their ethical responsibility? Extended question: Where does practitioners' ethics-focused knowledge, ethics-related decision making, and ethical tensions lie?
- How do practitioners define their ethical responsibility boundaries? How does this define professional role-based valence of ethics?

Activity B

- Comparison of filtered ethical dilemmas based on professional roles: What filtered ethical dilemmas are peculiar to the professional roles? How do practitioners define the provided ethical dilemmas?
- How do ethical dilemmas differ based on the biases practitioners have?
- What ethical dilemmas do practitioners identify to have faced in the past and not anymore? What are the reasons that they no more face them?
- Why do practitioners mention that they do not face some ethical dilemmas?

Activity C

- What are evaluation results of the Ethical Contract by different professional roles?
 - How do practitioners mention that they will apply this method in their everyday work?
 - How do practitioners' intentions of using the method differ from the original purpose of the method?
 - What does method evaluation tell about the ecology of the practitioners?
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A. PRELIMINARY STUDY: INTERVIEW PROTOCOL

The interview protocol used to conduct semi-structured interviews with practitioners represented under the Preliminary Study is attached below:

A.1 Introduction

Hello [Participant Name]! Thank you for agreeing to participate in this research study. To provide a brief introduction to this study, our goal is to identify how the ways in which design and technology practitioners engage with ethical concerns in their everyday activities. Our ultimate goal is to identify the ethical considerations, experiences, and knowledge that guide your everyday work.

We would like to clarify that you are not speaking on behalf of your employer, but your personal experiences and values in your professional experiences. We'd love to hear about "the good, the bad, and the ugly" from your own perspective. After the interview is complete, your statements will be anonymized and we may share these anonymized stories in future publications. You are welcome to indicate any part of our conversation today as "off the record," and we will then delete these portions as part of our analysis process. You are also welcome to share any stories you have heard from your colleagues about items of interest to us, or suggest other practitioners that will be suitable for our study which we will talk in more detail at the end. You have already completed the online consent form. Do we have your permission to voice record our conversation today for research purposes?

Thank you. Let's begin the interview.

A.2 Topic 1: Individual practitioners personal values

- *Lead-off Question:* Tell me about a time when you made a project decision in the past that made you feel uncomfortable.
- *Back-up Question:* Tell me about an instance where a project decision was made that you thought was ethically questionable.

- *Emergency Question:* (If the participant narrates the experience as a user)-Have you ever faced similar situations when you were responsible for designing such technological artifacts or systems?

Follow-up Questions:

- ***Designer- Designer***

1. Why did the decision make you uncomfortable?
2. Were there specific aspects of this decision that conflicted with your personal beliefs? [Note: Use their terms to build on constructs such as values, ethics, personal beliefs. For example, if they say “immoral”, build on asking, “why do you think this is immoral”?]
3. How did you tackle this situation?
4. What did you feel like your role was in this situation?
5. Was it appropriate or inappropriate?
6. Were you seeking to advocate for users? Prevent poor outcomes?

- ***Designer- Artifact***

1. Construct Question: Were only certain aspects of the design/decision/product [Note: Use their terms here too] problematic?
2. What factors did you consider when you were making that decision?
3. How did these factors shape your decision?
4. Did you value some factors more than others? Can you elaborate?
5. Why is it important for your role to be aware of the impacts of the artifact?

- ***Artifact- Artifact***

1. What is your criteria to evaluate a decision/(design) outcome as good or bad?
2. What is your take on a good/bad (design/development/...) decision while building a product?

3. What makes a product good/ bad?

- ***Artifact- Context / Users***

1. How do you think this decision/outcome would play in a social context?
2. Construct Question: Based on your previous quote on personal beliefs or values, it looks like it aligns/is in tension. How do you consider such aspects during your decision making process?

- ***In teams (Practitioner- practitioner)***

1. How were team members or colleagues from other disciplines involved in this decision making process?
2. What role did these other team members have?
3. Did you ever discuss the limitations or focus of each of these roles?
4. How did these team members affect your decisions?
 - (a) (only if triggered) Did you experience tensions in these collaborative discussions? Can you elaborate?
 - (b) (back-up question: Based on your values and morals (from the previous section on designer-designer), this looks like violating it. Can you elaborate more about it?
5. Why did this situation feel tense to you?
6. Was the conflict resolved? How?
7. What was your role in mitigating this tension?
8. What was the result of this discussion?

Covert Categories: *Individual-* Perceived role of ethics in design (conflict/ support) — Awareness of ethical role — Drivers of ethical sensitivity/awareness — Personal design values or philosophy — *In teams/ collaboration-* Influencing factors in Ethical Design Complexity — Interactions that inform or prevent ethical action — Different ethical expectations or levels of sensitivity by role or discipline.

A.3 Topic 2: Reflection of ethical decision making

Follow Questions:

- *Lead-Off Question:* Reflecting back on this situation, what do you wish you could have done?
- *Back-up Question:* (if they ask “what terms”) what could be done differently to handle this situation?
- *Conditional Question:* For participants with more years of experience- Looking back at all the experiences over the years, are there decisions that you would not take the way they were taken?

Construct Questions:

- Who might you have needed help from, or what evidence would have been valuable in guiding a better path of decision-making?
- Who would you need to convince?
- What might be the outcome if you knew what you needed to focus on?
- What did you think was the alternative?
- Where do you anticipate or hope for the need for more support in your decision making process ?
- What is your opinion on the role of methods in such situations? (Might be a good lead in to Topic 3)

Covert Categories: Ethical archetypes — Actors in ethical action — Drivers for ethical awareness — Means of foregrounding personal or disciplinary values — Sources of knowledge (and the power of these sources) that relate to ethical awareness or action.

A.4 Topic 3: Need for ethics-focused tools/methods/techniques

- *Lead-off Question:* What methods, tools, strategies, or techniques do you wish you had to advocate more for socially- and ethically-responsible outcomes?

Follow-up questions:

- Currently, what techniques do you use to help you categorize decisions as ethical or unethical?
- Can you list any ethics-focused methods/tools or techniques that you use in your everyday practice?
- What kind of strategies might help you support user groups more during decision making?

Covert Categories: Role of methods in ethical agency — Methods as a mechanism for ethical valence — Criteria to for methods to build social responsibility.

Zipper Question: Those are all the questions we have for you. Based on our conversation today and understanding our topic of interest, are there any questions you think we should have asked you that would be of our interest?

Wrap-up Question: Based on what we discussed today, would you be willing to suggest any other practitioners who might be interested in talking with us? We are interested in practitioners from a range of technology disciplines, including UX, data science, product management, and development, to name a few.

Thank you for your time and this conversation!

B. PRELIMINARY STUDY: PARTICIPANT DEMOGRAPHICS

Table B.1.
Participant Descriptors for Preliminary Study.

Pseudonym	# yrs. of Experience	Company Type	Disciplinary Role	Gender Identity
SP02	2	Freelance	Designer	Female
SP03	2	Enterprise (B2B2C)	UX Generalist	Female
SP04	4	Enterprise (B2B)	UX Researcher	Male
SP05.1	5	Enterprise (B2B)	UX Designer	Female
SP05.2	10	Enterprise (B2B)	Full-Stack Developer	Male
SP06	2	Enterprise (B2B)	Software Engineer	Female
SP07	4	Enterprise (B2B2C)	UX Designer	Female
SP08	17	Enterprise (B2B2C)	Engg. Manager	ND
SP09	15	Enterprise (B2B)	CTO	Female
SP10	8	Research Center	Software Engineer	Female
SP11	15	Enterprise (B2B)	Product Manager	Female
SP12	20+	Agency	CEO	ND
SP13	8	Enterprise(B2B)	Software Engineer/Founder	Male
SP14	9	Enterprise(B2B)	UX Designer	Male
SP15	17	Agency	Executive Creative Director	Non-binary

C. STUDY 1: SURVEY PROTOCOL

In this Appendix, I attach the Survey Protocol used in Study 1. More details about the Survey design, data collection, and analysis is provided in Section 4.5.

C.1 Introduction

1. Information Sheet as in Section E.1
2. I am 18 years of age or older and am willing to participate in this survey
 - Agree
 - Disagree
3. I currently work for a organization which designs, develops, or manages technological systems.
 - Agree
 - Disagree
4. I am currently pursuing my studies in an educational institution with industry experience only as an intern.
 - Yes
 - No

C.2 Demographics

In this section, we ask you questions relating to your current job role, company type, professional experience, geographical location, and other basic demographic information.

1. **What was your academic field of study?** [Options: o Information Technology o Computer Science o Engineering o Business o Economics o Government/Political Science o Psychology o Humanities o Design o Communication o Other]

2. **What is the highest degree or level of education you have completed?** [Options: ☐ High School Diploma ☐ Associate's degree ☐ Bachelor's degree ☐ Masters degree ☐ Doctoral degree ☐ Other]
3. **Did your curriculum provide ethics training?** [Options: ☐ Yes ☐ No ☐ I'm Not Sure]
4. **How many years of experience in do you have in your field?** [Options: ☐ Less than 1 year ☐ 1 to 2 years ☐ 3 to 5 years ☐ 6 to 8 years ☐ 8 to 10 years ☐ 10 to 12 years ☐ 12 to 14 years ☐ More than 15 years]
5. **What is your current role? Choose the closest from the list provided** [Options: ☐ UX/Product Designer ☐ Software Engineer/ Developer ☐ Hardware Engineer ☐ Data Scientist ☐ Product Manager ☐ Other]
6. **Do you play a management role in your organization?** [Options: ☐ Upper Level Manager- EG, Director, C-Suite ☐ Mid Level Manager ☐ Team Manager ☐ No management responsibilities]
7. **List any previous job roles you have had (Separate with commas).**
8. **What type of company do you currently work for?** [Options: ☐ Agency or Consultancy ☐ Enterprise (B2B) ☐ Enterprise (B2C) ☐ Enterprise (B2B2C) ☐ Retail ☐ Freelancer ☐ Other]
9. **What kind of projects do you usually handle?** [Options: ☐ Design projects ☐ Algorithmic Projects ☐ Marketing Projects ☐ Research Projects ☐ Security Projects ☐ Vendor Management ☐ Other (please specify)]
10. **What domain do you currently work in?** [Options: ☐ Health ☐ Tool Management ☐ Games ☐ Education ☐ Emerging Technology ☐ Transportation/ Ride Sharing ☐ Cyber Security ☐ Food ☐ Entertainment ☐ Shopping ☐ Communication Services ☐ Finance ☐ Automobile ☐ Marketing ☐ Other (please specify)]

11. **What is your age?** [Options: o 18 - 24 o 25 - 34 o 35 - 44 o 45 - 54 o 55 - 64 o 65 or older]
12. **Which country do you currently live?**
13. **If you are in the US, in which state do you currently reside?**

C.3 Awareness-Tools

In this section, we ask you questions about your familiarity, patterns of use, and need for various existing ethics-focused methodologies, approaches, toolkits, methods, policies, and codes of ethics, as relevant in your everyday work or decision-making. **Note:** For this study, this section was not appropriate, hence this part of the survey protocol is not presented here.

C.4 Awareness-Values

In this section, we ask you questions about values that you **personally hold, values that your discipline holds, and values your organization** cares about and supports.

1. **What are the human values you care about?** Click your response on the scale of "do not care" to "really care about". The definitions of the values are presented in the information bubble beside each value. *A matrix was offered with nine human values as listed in Table 3.2: advocacy, environmental sustainability, privacy, fairness, property rights, right to information, human rights, human wellness, and usability; and a five-point likert scale.*
2. These are the various aspects of ethical awareness that define your responsibility. Rank them in order of most important [Rank 1] to least important [Rank 4]:
 - Discipline- "I feel responsible only for doing my job well"
 - User- "I feel responsible for supporting the users through the design"
 - Stakeholder- "I feel responsible to support business and stakeholders decisions"
 - Society- "I feel responsible to think about the long term impact on the society through the design"

3. **What values does your discipline encourage you to follow?** Click your response on the scale of "do not care" to "really care about." The definitions of the values are presented in the information bubble beside each value. *A matrix was offered with nine human values as listed in Table 3.2: advocacy, environmental sustainability, privacy, fairness, property rights, right to information, human rights, human wellness, and usability; and a five-point likert scale. The scale is as follows: "We do not care about this value", "We rarely acknowledge this value", "We acknowledge this value", "We care about this value", and "We deeply care about this value".*

4. **What values does your organization care about?** Click your response on the scale of "do not care" to "really care about." The definitions of the values are presented in the information bubble beside each value. *A matrix was offered with nine human values as listed in Table 3.2: advocacy, environmental sustainability, privacy, fairness, property rights, right to information, human rights, human wellness, and usability; and a five-point likert scale.*

C.5 Interactions

In this section, we ask you questions about your interactions with people from other disciplinary roles.

1. Who do you interact with most frequently in your everyday work for decision making?
Select at maximum of 4 members from roles listed below: [Options o UX/Product Designer o Software Developer/ Engineer o Hardware Engineer o Data Scientist o Product Manager o Other]

Note: The next two questions repeat for every role selected in the previous question for practitioners to indicate their alignment/ misalignment with a typical disciplinary role and their anticipation of ethical commitments towards user, discipline, stakeholder, and society.

C.5.1 Interactions with a [Selected Role in the previous question]

1. How well do you feel that your own values are aligned with the values of a typical [Selected Role in the previous question]? [Options:
o Strongly Misaligned o Moderately Misaligned o Somewhat Misaligned o Neutral o Somewhat Aligned o Moderately Aligned o Strongly Aligned]
2. These are the various aspects of ethical awareness that define a [Selected Role in the previous question]’s responsibility. Rank them in order of most important [Rank 1] to least important [Rank 4]:
 - Discipline-“They feel responsible only for doing their assigned job well”
 - User-“They feel responsible for supporting the users through their work”
 - Stakeholder-“They feel responsible to support business and stakeholders decisions”
 - Society-“They feel responsible to think about the long term impact on the society through their work”

Thank you for your responses. You will be provided with a USD \$10 Amazon Gift Card incentive for completing this survey. Please provide your email address for us to share information on claiming your incentive. This will be processed in 3-4 business days after the response is recorded and validated for its completion. Your name and email address will be separated from all other survey data and deleted upon the completion of providing your incentive.

- Email address (Only used to send incentive)
- Name (Only used for Institution’s records for approving incentives)

C.6 Further Engagement

Beyond the survey responses,

1. Are you interested in participating in a follow-up study to engage further with ethical awareness in your job role?

- Yes
- No

2. How would you like to get involved (select all that apply)?

- I am interested in participating in an interview or focus group about my work experiences relating to ethics
- I am interested in modifying or creating ethical supports (methods, toolkits, etc.) for myself and other practitioners like me in a virtual workshop.
- I am interested in piloting new ethical supports in my organization.
- I do not wish to participate in any follow-up studies

What email address should we use to contact you regarding your interest in our future studies?

D. ETHICAL DILEMMA STORIES

The ethical dilemma stories shared by various technology and design practitioners are provided as analyzed from preliminary interviews from practitioners in Table B. The stories are used to design Dilemma Postcards in Activity B (Section 5.5).

D.0.1 MVP > user value

I was working as a designer for a Healthcare employer. At instances where I would suggest how a certain design would exclude a lot of people, the PM focused on the what it takes to ship. I had research that supported that the design would fail for users with vision impairment and other types of cognitive disabilities, they proceeded to avoid all those recommendations and it was MVP focused. Alongside, the ultimate decision is the product owner and the feasibility aspect was decided by the developers.

It was not in my best interest, but as a designer I provided them what they asked for, even if it isn't in my best recommendation. Until you don't have the opportunity to make the end decision, you tend to influence in whatever way possible. - *SP03, UX Designer*

Ethical Dilemmas: MVP vs. User Needs; My role's responsibility (Disciplinary Values) vs. My job's responsibility (Practitioner values); Research conducted vs. Decision taken.

D.0.2 Ethical practice is building a safety net!

For a UX researcher working at an organization, ethical practice is safety around expressing your opinions and not facing repercussions, such as knowing your appraisal or performance review will not be affected. Repercussions might occur when there are few people in the room agreeing with you, which could make you come across a person who is not cooperating within the team, but a warrior on their own.

In that case, you need an ally to support you. Building allies should start as you first join the organization, by delivering good work, making good suggestions, and gaining the trust of others. Then you are at a place where you could start voicing ethical concerns. - *SP04, UX Researcher*

Ethical Dilemmas: **Expressing opinions vs. Facing repercussions; Sole warrior vs. Team player**

D.0.3 Hardware vs. Software War!

I was working as a software engineer for a hardware product company, where the product we were creating did not completely get effect by the operating system we were using, but requirements on outputs, time, and the performance were very strict. The president of the company is famous for saying, “I would rather chew on broken glass than actually write software.” The management were all hardware engineers. So they didn’t value software as high as what, in my opinion, they should have.. But at the same time I am a code junkie, right. So I write code to solve problems. So for me it was not just about copy pasting code from one file into another. It was more about coming up with an architecture that efficiently does what it’s supposed to do.

As a part of that team, we had to basically follow the requirements, which meant I had to trim a lot of fat that I was able to put in. I was only part of it. And they made their decisions, that leadership made their decisions, to how they were going to implement right. That worked for them, but it was not going to work for me. The quality of the product, which was hardware, mechanical software or firmware, user manuals, everything was worked on meticulously. When it came to software, the understanding of some of the engineers was, “Oh, you just copy paste this thing over here and it’ll work.” I was expected to paste it, patch it up and send it out. And at the time when I did the analysis, what I found was if I patch it up today, I will continue to patch it constantly over months and years from now. This regular patching work implies that the performance and efficiency would not be good. The other thing was if you are working in the firmware world where you’re basically

interacting with hardware directly, any hardware bug that can be fixed in software actually becomes a software bug. So we were fighting that mentality. So from that point of view, the definition of quality was definitely different between people who came from hardware backgrounds, which was my management, as I explained, and software background, which was me. - *SP13, Software Engineer*

Ethical Dilemmas: **Hardware vs. Software Requirements; Requirements vs. Contextual design failure**

D.0.4 There is only 0 and 1 when it comes to compliance

I am working as an experience designer for an internal tool dashboard design that allows employees to put individual's information to result in the potential revenue each employee is capable of making through our business. At product level, the majority of our team's work is around getting the data on the dashboards. The tricky part is among the 14 to 15 countries where we have our businesses, there are some countries where it's okay for people within the company to see the individual information, whereas in certain other countries there is a comparatively strict GDPR compliance. I was also playing a techie role versus data analyst role as well as experience designer role. So I was pretty familiar with the vulnerabilities and the loopholes the tool had. If you try to nudge the tool a little bit, it can start showing those employee information violating some of those labor laws and compliance. Upon bringing this to my product manager and team's attention, they were giving temporary solutions to reach the delivery deadlines.

I tried to escalate this situation via an email chain to create a direct communication with higher authorities and qualified decision makers like the CIO, and suddenly the senior leadership tries to remove them off the email, and tag it "internal." People are trying to convince me saying: "Hey, what are you doing, you're just trying to create some chaos, and can you just take it slow because you're trying to do some delivery and get data in the hands of people."

So that's a moral conflict, at least to me. And I think some of my colleagues agreed and they couldn't do much about it too, where you need to make a choice between being compliant or raise the war against delivery. So this means fundamentally as a product team, delivery is so important to you than trying to figure out how to solve this. A discussion with my product manager about this ended up into him saying "dude, this is not the way things work. You are supposed to get blanket approval from people so that he can make them say YES," That's when I understood my manager is being very unethical. I should just try my best to see to it by either convincing him to be right and make him to do the right thing in whatever power I can exercise, take it to the right people or take it to the real people who will be affected. The first realization of your colleague not being ethical, was even more painful than the tool having the vulnerability. I don't blame the tool. Tools are vulnerable. Things go wrong, unintentionally. That issue wasn't resolved and I felt like quitting the company as I was not empowered to have a say and strength in terms of my role and presence in the organization hierarchy. - *SP14, UX Designer*

Ethical Dilemmas: **Compliance vs. Delivery; User needs vs. Product manager requests; Universal policies vs. Organizational policies; Labor laws vs. Tool vulnerabilities**

E. CONSENT FORMS

E.1 STUDY 1: INFORMATION SHEET

STUDY INFORMATION SHEET

“Everyday Ethics” in Sociotechnical Practice

Colin M. Gray

Computer Graphics Technology

Purdue University

Purdue IRB Protocol #: 1906022353 - Expires: 20-JUN-2022

Key Information Please take time to review this information carefully. This is a research study. Your participation in this study is voluntary which means that you may choose not to participate at any time without penalty or loss of benefits to which you are otherwise entitled. You may ask questions to the researchers about the study whenever you would like. If you decide to take part in the study, you will be asked to agree to this form. Be sure you understand what you will do and any possible risks or benefits. The purpose of this study is to identify the ways in which you as a practitioner engage with ethical concerns in their design activity. Your participation in the study will include taking a 10 minute survey.

What is the purpose of this study? The purpose of this study is to identify opportunities to increase everyday ethical awareness and action in the work of sociotechnical practitioners. We plan to identify the ways in which you as a sociotechnical practitioner tacitly and explicitly engage with ethical concerns in your design activity. The outcomes of this research will include a set of factors that contribute to ethical awareness, decision making, and notions of designer responsibility. This study is funded by the National Science Foundation, and up to 200 survey participants may be enrolled.

What will I do if I choose to be in this study? If you agree to participate in the study, we will ask you to participate in a 10 minute online survey that relates to your experience with ethical concerns in your everyday work.

What are the possible risks or discomforts? The risk level for this study is minimal, and is no greater than you would encounter in daily life. There will be no direct benefit to you for taking part, however, you may benefit second-hand by any improvement in sociotechnical disciplines overall.

Will I receive payment or other incentive? You will be offered a chance of winning one of multiple \$50 gift cards, with an odds of winning of 1 in 20.

Will information about me and my participation be kept confidential? Efforts will be made to keep your personal information confidential. Your identity will be made anonymous in reports of the study. Any materials related to a study participant will be assigned a study-specific ID, and a code key will be maintained until all materials have been transcribed and coded with this ID.

Efforts will be made to keep any personal information you provide us confidential. Your identity will be made anonymous in reports of the study. The project's research records may be reviewed by the National Science Foundation, Office for Human Research Protections, and by departments at Purdue University responsible for regulatory and research oversight. We will not use the data from these studies in future research.

What are my rights if I take part in this study? Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled.

Who can I contact if I have questions about the study? If you have questions, comments or concerns about this research project, you can talk to one of the researchers. Please contact Colin M. Gray at 765-494-6363 (office). If you have questions about your rights while taking part in the study or have concerns about the treatment of research participants, please call the Human Research Protection Program at (765) 494-5942, email (irb@purdue.edu) or write to:

Human Research Protection Program - Purdue University
Ernest C. Young Hall, Room 1032
155 S. Grant St.,
West Lafayette, IN 47907-2114

E.2 STUDY 2.2: WORKSHOP CONSENT FORM

RESEARCH PARTICIPANT CONSENT FORM

“Everyday Ethics” in Sociotechnical Practice

Colin M. Gray

Computer Graphics Technology

Purdue University

Purdue IRB Protocol #: 1906022353 - Expires: 20-JUN-2022

Key information Please take time to review this information carefully. This is a research study. Your participation in this study is voluntary which means that you may choose not to participate at any time without penalty or loss of benefits to which you are otherwise entitled. You may ask questions to the researchers about the study whenever you would like. If you decide to take part in the study, you will be asked to agree to this form. Be sure you understand what you will do and any possible risks or benefits.

The purpose of this study is to create a set of ethics-focused methods through an iterative participatory approach, informed by and aligned to a comprehensive set of factors that influence ethical awareness and action by practitioners. Your participation in the study will include engagement in a 3-6 hour participatory workshop, where you will build, iterate, and disseminate ethics-focused methods. The outcomes of this workshop will result in a set of methods or tools that will be deployed in everyday design and technology practice.

What is the purpose of this study? The purpose of this study is to create and refine methods to support ethically-centered practice through participatory engagement, using existing design methods to inform validation, dissemination, and adoption of these methods

by practitioners. Our goal is for the resulting methods to be resonant with practitioner concerns and the realities of sociotechnical practice. After identifying and creating design methods, we will iteratively validate and disseminate these methods to ensure that they are resonant with practice and able to be used effectively by practitioners in authentic work contexts. This study is funded by the National Science Foundation, and up to 50 industry participants may be enrolled.

What will I do if I choose to be in this study? If you agree to participate in the study, we will ask you to participate in a 3 to 6 hour workshop. This workshop will engage you in co-design and participatory design activities with 3-5 other practitioners to build, iterate and disseminate ethics-focused methods based on provided prompts and your personal experiences. We will audio and video record the workshop, and we will collect all artifacts created during the session for further analysis.

How long will I be in the study? Your participation in the workshop will be three to six hours, depending on scheduling and location.

What are the possible risks or discomforts? The risk level for this study is minimal, and is no greater than the participant would encounter in daily life. While taking part in the study you may become frustrated or feel awkward being observed as part of the workshop. Your participation in the study will be known to co-participants and the workshop organizers. Any information disclosed during the workshop may be recognizable in final anonymized form by workshop participants. In addition, your name will be listed on a participant payment log in accordance with institutional requirements, which could link you to this study if confidentiality is unintentionally breached.

Are there any potential benefits? There will be no direct benefit to you for taking part, however, you may benefit second-hand by any improvement in sociotechnical disciplines overall.

Will I receive payment or other incentive? An incentive of \$50 will be given to practitioners for their participation in this study.

Will information about me and my participation be kept confidential? Efforts will be made to keep the personal information of research participants confidential. Any references to the study participants in research reports will be made using assigned pseudonyms, and no directly identifiable information will be included in the final report. Digital audio and video recordings will be transcribed, analyzed, and de-identified, after which the recordings will be destroyed. Any materials related to a study participant, including consent forms, transcriptions, photographs, and other collected artifacts will be assigned a study-specific ID, and a code key will be maintained until all materials have been transcribed and coded with this ID. During the transcription process, digital recordings and other research artifacts will be stored using a secure institutional repository. Any notes or other materials captured during the session will be restricted to use by the research team and locked into storage during the required period for which we must retain them.

We cannot guarantee absolute confidentiality. In particular, your co-participants may be able to identify you in anonymized quotes, and we cannot guarantee that the other participants will not breach your confidentiality if they read published reports of this research or attend presentations of it. In addition, if you are participating in a group, you may have your identity revealed to other participants, and we cannot guarantee that the other study participants will not breach your confidentiality. The project's research records may be reviewed by the National Science Foundation, Office for Human Research Protections, and by departments at Purdue University responsible for regulatory and research oversight. We will not use the data from these studies in future research.

What are my rights if I take part in this study? Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled. If you choose to withdraw your participation, you will be able to exclude data already collected from being used by the researchers. Additionally, you are able to

identify portions of the collected data that you wish to remain off the record; these portions will be redacted during the analysis or coding process. You will be unable to withdraw your participation in the study after the data has been refined, coded and de-identified. Your decision to participate or not in the research will have no effect on your relationship with your co-participants or workshop organizers.

Who can I contact if I have questions about the study? If you have questions, comments or concerns about this research project, you can talk to one of the researchers. Please contact Colin M. Gray at 765-494-6363 (office) or 864-354-5358 (cell). To report anonymously via Purdue's Hotline see www.purdue.edu/hotline If you have questions about your rights while taking part in the study or have concerns about the treatment of research participants, please call the Human Research Protection Program at (765) 494-5942, email (irb@purdue.edu) or write to:

Human Research Protection Program - Purdue University
Ernest C. Young Hall, Room 1032
155 S. Grant St.,
West Lafayette, IN 47907-2114

Documentation of Informed Consent I have had the opportunity to read this consent form and have the research study explained. I have had the opportunity to ask questions about the research study, and my questions have been answered. I am prepared to participate in the research study described above. I will be offered a copy of this consent form after I sign it.

Participant's Signature and Date

Participant's Name

Researcher's Signature and Date

F. DISCARDED IDEAS OF CO-CREATION ACTIVITIES

In Section 5.3.2, I talk about some sketches ideas that I discarded after finalizing the three main Activities A, B, and C. These ideas include activities such as reacting to practitioner’s video/audio clips about their claims of ethical awareness and discipline-based responsibility; sketching practitioner’s typical design process to identify stakeholders, ethical tensions, and supporters; critically engaging with “ethico meter”; and drawing and identifying practitioner’s ethics-related identities or archetypes.

Idea 1- React to other practitioners: Activity to engage practitioners through video/audio clips from interviews with practitioners from different sociotechnical disciplines as a form of elicitation to capture reactions from practitioners. This activity allows to capture reactions from practitioners about ethical dilemmas, tensions, ethical valence, or support stories shared by practitioners. From the A.E.I.O.yoU model (Figure 5.2), it taps into Others (O), and Interactions (I) aspects of everyday work.



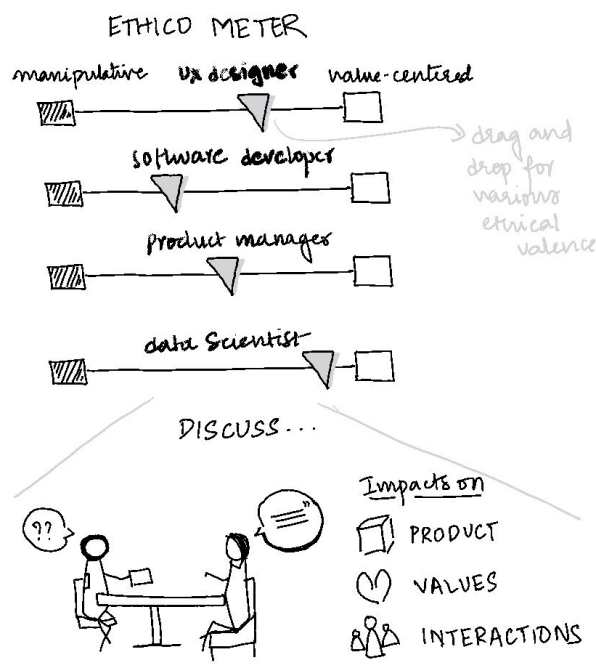
(a) Discarded Idea 1: React to other practitioners.

(b) Discarded Idea 2: Sketch your design process.

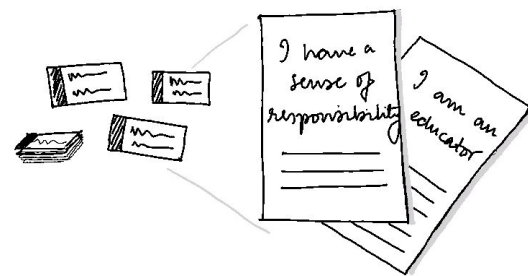
Figure F.1. Co-creation Discarded Ideas- 1: React to other practitioners and 2: Sketch your design process.

Idea 2- Sketch your design process: Activity to engage practitioners to sketch their typical design process, using the language of sprints, as a tool to discuss and visualize

factors involved in their everyday decision making. This activity allows to create a consolidated experience map of the practitioner to mark supporters, barriers, ethical tensions, stakeholders, and instances of use or need of ethics-focused methods or tools as necessary for the practitioner. Additionally, it will also capture how different disciplinary practitioners are approached with a project brief by stakeholders, clients, or other disciplinary practitioners. From the A.E.I.O.yoU model (Figure 5.2), it taps into individual (yoU), Ecological (E), Interactions (I), and Artefacts (A) aspects of everyday work.



(a) Discarded Idea 3: Play with “ethico meter”.



(b) Discarded Idea 4: Draw “Identity Claims” cards.

Figure F.2. Co-creation Discarded Ideas- 3: Play with the “ethico meter” and 4: Draw “Identity Claims” cards.

Idea 3- Play with “ethico meter”: Activity to critically engage practitioners about the roles played by different disciplinary roles in creating a product. This activity allows to create scenarios to speculate and describe perceptions about the impact on the product, values, and interactions among different roles depending on different combinations of ethical valence being manipulative to value-centered. From the A.E.I.O.yoU model (Figure 5.2), it taps into the individual (yoU) and Others (O) aspects of everyday work.

Idea 4- Draw “Identity Claims” cards: Activity to engage practitioners to talk about identity claims (eight distinct claims representing roles relating to learning, educating, following policies, feeling a sense of responsibility, being a member of a profession, a translator, an activist, and deliberative) and how they activate them in everyday ethical decision making. This activity allows elicit various identities practitioners mostly claim depending on their roles and responsibilities and kinds of support they will need to build other identities. From the A.E.I.O.yoU model (Figure 5.2), it taps into the individual (yoU) aspects of everyday work.

G. ACTIVITY MANUALS

Figure G.1 presents the activity manual for Activity A1.1: Building Practitioner's Own Ecological Complexity Model.

BUILDING ECOLOGICAL ETHICAL COMPLEXITY MODEL

Hello!

Thank you for participating in this activity. In this MIRO board, you are detailed about the expectations from this activity, MIRO capabilities, the toolkit provided to you, and what you have to do.

WHAT IS AN EXPECTED OUTCOME?

You are expected to map out your ecological model using the toolkit provided to you. As you map various components you have to identify interactions between and among various components of the model and the verbs you would like to attribute when you think of *ethical decision making or ethical responsibility* towards/of/through these components. This is not a general ecological model, but a complexity model as you have experienced when focusing on the ethical dimensions of your everyday work.

WHAT YOU ARE PROVIDED WITH?

In this board, you are provided with the following:

1. **Toolkit** consisting of various ecological components, potential relational verbs, examples of probes to help you create a model, and a legend of the terms used in the toolkit.
2. **Grid** to provide your demographics.
3. **Practitioner Playboard** to build your complexity model using the toolkit components.
4. **Reflection and Feedback form** to reflect on the activity and provide feedback and suggestions to the researcher in improving various aspects of the activity.

*****Note:** Feel free to add any model components, verbs, etc., as you feel necessary.

WHAT YOU HAVE TO DO?

Few steps to follow:

1. **Familiarize** yourself with various toolkit components provided.
2. **Refer** to the probes and legend as you create the model.
3. **Provide** your Demographics.
4. **Map** all the toolkit model components to create the complexity model based on your everyday work in your organization.
5. **Identify** verbs as required to tell us the story behind your mapping.
6. **Reflect** on the activity and provide feedback to the researcher.

QUICK TIPS ABOUT MIRO

Miro is a collaborative tool that you can easily create concept maps using the given features. Imagine it as a digital whiteboard and watch how it works [here](#). You can **double click to write** on the created arrows to add the verbs or use the tags provided in the toolkit.

Figure G.1. Activity A1.1 Manual.

Figure G.2 presents the activity manual for Activity C1: Evaluation of an ethics-focused method using designed Method Heuristics.

HEURISTIC EVALUATION OF A METHOD

Hello!

Thank you for participating in this activity. In this MIRO board, you are detailed about the expectations from this activity, MIRO capabilities, the toolkit provided to you, and what you have to do. Feel free to contact the facilitator as required via email at cshruthi@purdue.edu or leaving a comment on this board.

WHAT IS AN EXPECTED OUTCOME?

You are expected to evaluate an ethics-focused or value-centered method proposed to do technology design work. You are provided with a set of heuristic evaluation tags which you have to use to place over the method material as you feel appropriate as an evaluation of the method. You can add your own tags as you feel necessary. After this activity, you are expected to reflect on the activity and provide feedback to improve this activity. There will be a follow-up interview conducted based on your heuristic evaluation of the method.

WHAT ARE YOU PROVIDED WITH?

In this board, you are provided with the following:

1. **Testing Heuristics- a combination of Intention Cards, Phase Cards, Ecology Heuristics Tags, Artifact Heuristic Tags** that provide tags for you to place wherever felt necessary on the method material.
2. **Grid** to provide your demographics.
3. **Method/s** description and kit as designed by the method developer. Note that these methods are created by other method designers other than the facilitator.
4. **Reflection Board** to reflect on the method/s and its connections with your everyday work.
5. **Feedback Board** to provide feedback and suggestions to the researcher in improving various aspects of the activity.

WHAT YOU HAVE TO DO?

Few steps to follow:

1. **Familiarize** yourself with the heuristics provided to evaluate a method on the "Testing Heuristics" board.
2. **Familiarize** yourself with the material provided related to the method.
3. **Select** a use case scenario from the two options provided below and attach visuals of you using the method or any sketches made through your thought process on the "Application Visuals" board.
4. **Provide** your Demographics.
5. **Evaluate** the method by bookmarking the method material using the heuristics tags. You can place the heuristic tags on the method material.
6. **Reflect** on the activity and provide feedback to the researcher using the probes on the "Reflection Board" and "Feedback Board".

***Note: Feel free to add any heuristics or comments as you feel necessary.

USE CASE SCENARIOS FOR PRACTITIONERS

Scenarios I can provide the practitioners to evaluate the method:

1. **Familiarize. Imagine. Evaluate:** Familiarize yourself with the method materials; Imagine you apply this method in your current design work; and Evaluate based on the content and your understanding of how the method is a fit or misfit for your design work.
2. **Familiarize. Apply. Evaluate:** Familiarize yourself with the method materials; Apply in your design work; and Evaluate based on the content and your experience of using method in your design work.

QUICK TIPS ABOUT MIRO

Miro is a collaborative tool that you can easily create concept maps using the given features. Imagine it as a digital whiteboard and watch how it works [here](#). You can write on the created arrows to add the verbs or use the tags provided in the toolkit. You can add your own tags by either using "Copy + Paste" option or adding a Sticky Note.

Figure G.2. Activity C1 Manual.

H. THE ETHICAL CONTRACT

The Ethical Contract designed as a part of Ethics for Designers Toolkit Gispén, 2017. This method was used as part of Activity C- Method Heuristics Kit for evaluating an ethics-focused method (Section 5.6.5)

Ethical contract

Designing is never a solitary act. Therefore it is important that everyone is on the same page. This technique guides you in a value negotiation with all stakeholders involved in order to find common ethical ground.

PROCESS

- 1 Explain your disclaimer to all involved stakeholders.
- 2 Go through the unethical situations and collect important ethical themes. Collectively define these themes for this project.
- 3 Discuss who is responsible for each situation. Write everyone's responsibilities down.
- 4 Formulate three main ethical objectives everyone agrees on. Make sure everyone knows what they mean.
- 5 Write down (an updated version of) the design goal as agreed upon by all stakeholders.
- 6 Place your signatures to commit to the design goal and ethical objectives.

SPECS

Suggested Time
30 - 45 minutes

Materials needed
An ethical disclaimer, this template, pens

Participants
Design team, stakeholders

Process phase
Framing, validating

for more tools check out:
www.ethicsfordesigners.com

Moral advocacy → Ethical contract

1. EXPLAIN YOUR ETHICAL DISCLAIMER TO THE STAKEHOLDERS

2. DEFINE IMPORTANT ETHICAL THEMES:

THEME				
DEFINITION				

3. DIVIDE THE RESPONSIBILITIES:

NAME	RESPONSIBILITIES

4. OUR MAIN ETHICAL OBJECTIVES ARE...

1

2

3

5. OUR DESIGN GOAL IS...

6. PLACE SIGNATURES:

Toolkit Ethics for Designers

Figure H.1. The Ethical Contract.

I. EMAIL SCRIPTS

I.1 Study 1: Survey Recruitment Script

I sent the survey link to past interview participants and posted it on social media (Twitter, LinkedIn, etc.). The recruitment scripts for both modes of distribution are presented below.

I.1.1 Email

Hello [**Participant Name**],

I am a researcher in the UX Pedagogy and Practice Lab (UXP2; <https://uxp2.com>), the research lab of Dr. Colin M. Gray at Purdue University. A few months back, you expressed interest in participating in a semi-structured interview relating to ethics in your everyday work practices. Due to the overwhelming response from many sociotechnical practitioners and to capture a wide range of responses, we have designed a survey. This email is to just reach out to you directly for your expressed interest in our study and we wish to talk with you in more detail in the future once we commence the second round of interviews again.

The purpose of this survey is to identify the ways in which you as a practitioner engage with ethical concerns in your design activity and interact with practitioners from other disciplines. The survey will take 10-15 minutes to complete, and you will be provided an incentive of a \$10 Amazon gift card if you are willing to share your email address in the survey. Your email address will be unlinked from all other data, ensuring your anonymity.

You can take the survey at the following link: [Click Here](#)

Additionally, we would greatly appreciate if you can help us circulate the survey link on your social media or personal communication channels with your co-workers or other contacts who are currently employed in roles that include (but are not limited to): User Experience (UX), Data Science, Front/Back-end Development, Product Management, and other design personnel responsible for the development of digital systems in any industry or governmental context. We are trying to capture responses from at least 50 practitioners from each role.

Thank you for your consideration!

Shruthi Chivukula
Graduate Research Assistant
Purdue UXP2 Lab

I.1.2 Social Media Post

Are you a technology or design practitioner? Tell us about how you navigate ethics in your everyday work! [Survey Link](#)

The survey will take 20-25 minutes to complete, and you will be provided an incentive of \$10 Amazon gift card if you are willing to share your email address in the survey. #ethics #technology #values #designethics #Techethics #digitaletics #everydayethics #techindustry

I.2 Study 2.2: Co-Creation Activities Recruitment Script



Figure I.1. Tweet for recruiting co-creation participants.

I.2.1 LinkedIn Post

Interested in discussing ethics in your everyday work?

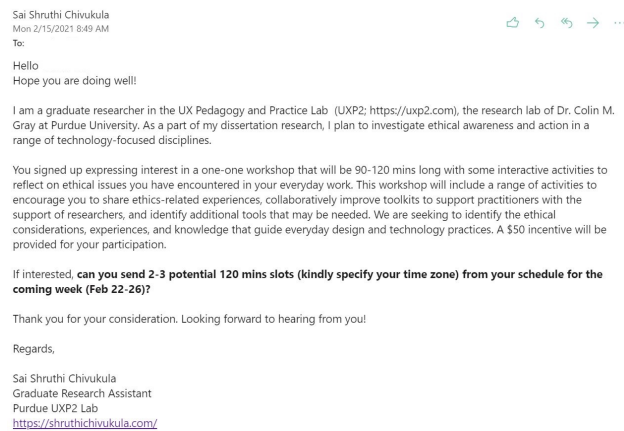
UXP2 Lab is looking forward to having a conversation with you. We are introducing activity-based sessions where you can interact with our new tools under development to reflect on ethics in your everyday work. Incentives will be provided for your participation (25forInterviewsand50 for Activity-based sessions).

Please fill out the following form to participate in our study! [Sign-up Form](#)

We are looking for practitioners who are currently employed in roles that include (but are not limited to): User Experience (UX), Data Science, Front/Back-end Development, Product Management, and other design personnel responsible for the development of digital systems in any industry or governmental context.

#ethics #technology #values #everydaypractice #everydayethics #pm #productmanagement #strategy #darkpatterns #aiethics #responsibles #datascientist #datascience

I.3 Preparation Email Script



Sai Shruthi Chivukula
Mon 2/15/2021 8:49 AM
To:

Hello
Hope you are doing well!

I am a graduate researcher in the UX Pedagogy and Practice Lab (UXP2: <https://uxp2.com>), the research lab of Dr. Colin M. Gray at Purdue University. As a part of my dissertation research, I plan to investigate ethical awareness and action in a range of technology-focused disciplines.

You signed up expressing interest in a one-one workshop that will be 90-120 mins long with some interactive activities to reflect on ethical issues you have encountered in your everyday work. This workshop will include a range of activities to encourage you to share ethics-related experiences, collaboratively improve toolkits to support practitioners with the support of researchers, and identify additional tools that may be needed. We are seeking to identify the ethical considerations, experiences, and knowledge that guide everyday design and technology practices. A \$50 incentive will be provided for your participation.

If interested, **can you send 2-3 potential 120 mins slots (kindly specify your time zone) from your schedule for the coming week (Feb 22-26)?**

Thank you for your consideration. Looking forward to hearing from you!

Regards,
Sai Shruthi Chivukula
Graduate Research Assistant
Purdue UXP2 Lab
<https://shruthichivukula.com/>

Figure I.2. Preparation email sent to co-creation participants.

VITA

SAI SHRUTHI CHIVUKULA

<https://shruthichivukula.com/>

EDUCATION

2017-2021 *Purdue University, West Lafayette*

Degree: Doctor of Philosophy; **Advisor:** Dr. Colin M. Gray

Major: Technology; **Concentration:** UX Design & Qualitative Research

Dissertation Thesis Title: Designing for Co-Creation to Engage Multiple Perspectives on Ethics in Technology Practice

2011-2015 *Indian Institute of Technology (IIT), Guwahati-Department of Design*

Degree: B. Des; **Advisor:** Dr. Prasad Bokil

Major: UX Design; **Minor:** Mechanical Engineering

WORK EXPERIENCE

2017-2021 *Research Assistant, UXP2 Lab, Purdue University*

Domain: Dark Patterns, design practice, ethics and values

Role: Conducting qualitative research and analysis in different studies under NSF Grants #1909714 and #1657310.

Spring'19 *Teaching Assistant, Purdue Polytechnic Institute*

Domain: User Experience Design

Role: Taught two class sessions, gave feedback on projects, organized grading, and held office hours for CGT 172-08 User Experience Design Studio 1: Fundamentals.

Jun' 15-July' 17 *Senior UX Designer, Samsung R&D, Bangalore, India*

Domain: Intelligence UX, Natural User Experience

Role: Researcher, UX and Interaction Designer for Next-Gen technology solutions. Designer of Intelligent Agent– BIXBY. Collaborator with HQ team in South Korea.

May' 14 - July' 14 *UX Research Intern, Samsung R&D, Bangalore, India*

Domain: Gamification, Health

Role: Formulate user experience principles for "Gamification and Motivation" for fitness. This contribution was commercialized in S-Health, Samsung's health and fitness app.

Aug'13– Dec'13 *Undergraduate Research Assistant, EI Lab, IIT Guwahati*

Domain: Accessibility, Smartphones

Role: IIT Guwahati collaboration with Samsung R&D. Formulate journey maps, pain points, and opportunity areas for accessibility on smartphones for Geriatrics. Design initial concepts for the pain points and present them to the Samsung R&D team.

May' 13-July' 13 *Design Intern, L'Avenir d'auroville, Auroville TDC*

Domain: Communication Design, Branding

Role: Communication and Graphic Designer- Website interface design; information graphics and visualization design of the house planning study report; branding of the organization.

RESEARCH PROJECTS

2019-2021 *CHS: Small: "Everyday Ethics" in Sociotechnical Practice*

P.I: Dr. Colin M. Gray, Purdue Polytechnic Institute; [NSF Award Information](#)

Keywords: Sociotechnical practice, everyday ethical awareness, ethics and values, qualitative research, methods and approaches.

Role: Assisted in grant writing and annual report writing. Led multiple studies, writing research articles, and mentored undergraduate and graduate research assistants.

2017- 2019 *CRII: CHS: Dark patterns, Pragmatist Ethics, and User Experience*

P.I: Dr. Colin M. Gray, Purdue Polytechnic Institute; [NSF Award Information](#)

Keywords: UX Design, ethics and values, dark patterns, qualitative research

Role: Led multiple studies, writing research articles, and mentored undergraduate and graduate research assistants.

REFEREED CONFERENCE PROCEEDINGS

Goffe, L., Chivukula, S.S., Bowyer, A., Bowen, S., Toombs, A., & Gray, C. M. (In Press). Appetite for Disruption: Designing Human-Centred Augmentations to an Online Food Ordering Platform. *Proceedings of British HCI 2021*.

Gray, C. M., Chivukula, S. S., Manocha, R., Melkey, K. (In Press). Understanding “Dark” Design Roles in Computing Education. *Proceedings of the 2021 ACM International Computing Education Research Conference*.

<https://doi.org/10.1145/3446871.3469754>

Chivukula, S. S., Hasib, A., Li, Z., Chen, J., & Gray, C. M. (2021). Identity Claims that Underlie Ethical Awareness and Actions. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*.

<https://doi.org/10.1145/3411764.3445375>

Chivukula, S. S., & Gray, C. M. (2020). Co-Evolving Towards Evil Design Outcomes: Mapping Problem and Solution Process Moves. *Proceedings of Synergy - DRS International Conference 2020*. <https://doi.org/10.21606/drs.2020.107>

Gray, C. M., Chivukula, S. S., & Lee, A. (2020). What Kind of Work Do “Asshole Designers” Create? Describing Properties of Ethical Concern on Reddit. *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, 61–73.

<https://doi.org/10.1145/3357236.3395486> [Awarded DIS Honorable Mention, top 5%]

Chivukula, S. S., Watkins, C. R., Manocha, R., Chen, J., & Gray, C. M. (2020). Dimensions of UX Practice that Shape Ethical Awareness. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–13.

<https://doi.org/10.1145/3313831.3376459>

Chivukula, S. S., Gray, C. M., & Brier, J. A. (2019). Analyzing Value Discovery in Design Decisions Through Ethicography. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–12.

<https://doi.org/10.1145/3290605.3300307> [**Awarded Best of CHI Honorable Mention, top 5%**]

Gray, C. M., & Chivukula, S. S. (2019). Ethical Mediation in UX Practice. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–11. <https://doi.org/10.1145/3290605.3300408>

Chopra, S., & Chivukula, S. S. (2017). My phone assistant should know I am an Indian: influencing factors for adoption of assistive agents. *Proceedings of the 19th International Conference on Human-Computer Interaction with Mobile Devices and Services*, 1–8. <https://doi.org/10.1145/3098279.3122137>

Ghosh, S., Chivukula, S. S., Bansal, H., & Sethia, A. (2017). What is user’s perception of naturalness? an exploration of natural user experience. *Proceedings of the 13th International Conference of IFIP Conference on Human-Computer Interaction-INTERACT*, 224–242.

https://link.springer.com/chapter/10.1007/978-3-319-67684-5_14

Bansal, H., Chivukula, S. S., & Ghosh, S. (2016). Exploring Design for Multi-device, Multi-environment and Multimodal Connected Experiences. *Proceedings of the 4th International Conference of Distributed, Ambient and Pervasive Interactions*, 15–25. https://doi.org/10.1007/978-3-319-39862-4_2

JOURNAL PUBLICATIONS

Gray, C. M., Chen, J., Chivukula, S. S., & Qu, L. (Accepted). End User Accounts of Dark Patterns as Felt Manipulation. *Proceedings of the ACM: Human-Computer Interaction*, 5(CSCW3).

Gray, C. M., & Chivukula, S. S. (2021). “That’s dastardly ingenious”: Ethical Argumentation Strategies on Reddit. *Proceedings of the ACM: Human-Computer Interaction*, 5(CSCW1). <https://doi.org/10.1145/3449144>

TRADE PUBLICATIONS

Chivukula, S. S. (2020). Feminism(s) through Design: A practical guide to implement and extend feminism. *Interactions*, 27(6), 36-40.
<https://doi.org/10.1145/3427338>

Gray, C. M., & Chivukula, S. S. (2019). When does manipulation turn a design “dark”? *Interactions*, 27(1), 96. <https://doi.org/10.1145/3375016>

EXTENDED ABSTRACTS

Chivukula, S. S., & Gray, C. M. (2020b). Bardzell’s “Feminist HCI” Legacy: Analyzing Citational Patterns. Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems, 1–8.
<https://doi.org/10.1145/3334480.3382936>

Chivukula, S. S., Watkins, C., McKay, L., & Gray, C. M. (2019). “Nothing Comes Before Profit”: Asshole Design In the Wild. Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems, 1–6.
<https://doi.org/10.1145/3290607.3312863>

Chivukula, S. S., Brier, J., & Gray, C. M. (2018). Dark Intentions or Persuasion? UX Designers’ Activation of Stakeholder and User Values. *Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems*, 87–91.
<https://doi.org/10.1145/3197391.3205417>

Fansher, M., Chivukula, S. S., & Gray, C. M. (2018). #darkpatterns: UX Practitioner Conversations About Ethical Design. Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems, 1–6.
<https://doi.org/10.1145/3170427.3188553>

WORKSHOPS

Lukoff, K., Hiniker, A., Gray, C. M., Mathur, A., & Chivukula, S. S. (2021). *What Can CHI Do About Dark Patterns?*. Workshop at CHI 2021, Virtual Conference.

Gray, C. M., Chivukula, S. S., Toombs, A. L., Light, A., (2018). *Mapping Designers' Ethical Responsibility and Value Discovery*. Workshop at DRS 2018, Limerick, Ireland.

Gray, C. M., Chivukula, S. S. (2018) *Engaging Design Students in Value Discovery as "Everyday Ethicists"*. Conversation at DECIPHER, Ann Arbor, Michigan, USA.

SERVICE

To Department

F'19-Sp'20 Graduate Student Representative, Computer Graphics Technology Search Committee.

To Academic Community

2021 - Reviewer for CHI, CSCW, ISTJ.

2020 - PC member for DIS PWiP; Reviewer for CHI, CSCW.

2019 - Reviewer for CHI, Creativity and Cognition, CSCW, and Design Studies; Student Volunteer at CHI conference; Student Volunteer at DECIPHER conference.

2018 - Reviewer for DIS Pictorial PWiP.

Awards

F'19-Sp'20 - Purdue Research Foundation Fellowship, Purdue Polytechnic Institute.

F'18-Sp'19 - Sriver Graduate Scholarship, CGT, Purdue Polytechnic Institute.

Dec'16 - Employee of the Month, Samsung R&D.

2012-2013 - Institute Merit Scholarship: Best academic performance-Highest GPA, IIT Guwahati.

2008 - Certificate of Excellence in Music: Distinction in Certificate Course, Carnatic Classical (Vocal) Music from Potti Sreeramulu University, Govt. of Andhra Pradesh.