

Empathy in Action: How Motivation and Empathic Engagement Shape Creative Processes in Human-Computer Interaction

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ABSTRACT

As Human-Computer Interaction (HCI) continues to evolve, creativity has become a cornerstone for generating innovative and user-centered design solutions. Central to fostering this creativity is empathy, a core factor that enables designers to deeply understand and respond to users' needs and perspectives. This qualitative study investigates how HCI professionals conceptualize and apply empathy in their routine work, with particular attention to its interaction with intrinsic and prosocial motivation throughout the creative processes. Using semi-structured interviews with 15 practitioners from diverse domains, thematic analysis was conducted to explore how empathy is embedded in their understanding of creativity and integrated into both theory and practice. Three overarching themes emerged, *identifying real-life problems*, *enriching experiences*, and *creating greater value*, each corresponding to distinct stages of the creative process. Participants described empathy as a dynamic link between themselves and users, with cognitive and affective components playing complementary roles across different phases of their work. These empathic engagements were found to synergize with

intrinsic and prosocial motivation, fostering user-oriented creative solutions. The findings highlight how empathy and motivation jointly shape creativity in HCI practice, extending the Componential Model of Creativity. The study suggests the need for training programs that cultivate empathy and motivation as core competencies in HCI education and industry, thus reinforcing the creative process and human-centered design.

KEYWORDS:

Empathy; intrinsic motivation; prosocial motivation; creative process; human-computer interaction

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INTRODUCTION

Human-Computer Interaction (HCI) is a multidisciplinary field that integrates technology, psychology, and design to create systems that are both functional and meaningful for users. As the field evolves, creativity has become a cornerstone of this integration, enabling designers to move beyond technical problem-solving toward emotionally resonant and socially responsible solutions. Creativity in HCI often involves reframing problems, identifying gaps in understanding, as well as generating and evaluating ideas that lead to innovative, human-centered outcomes (Daly et al., 2014). Because HCI focuses on shaping people's experiences with technology, creativity must address not only usability but also experiential, value-driven dimensions of interaction (Norman, 2004). In an era of rapid technological advancement, these dimensions are increasingly critical for ensuring that design remains grounded in human meaning and engagement (Grant & Berry, 2011; Friedman & Hendry, 2019).

Importantly, creativity in HCI is understood as an iterative process unfolding across stages of problem preparation, idea generation, and evaluation, closely paralleling human-centered design workflows that emphasize continual reframing, prototyping, and refinement (Amabile, 2018; Warr & O'Neill, 2005). This process-based view provides a foundation for examining psychological drivers, such as empathy and motivation, that shape creative performance in real-world HCI practice. The HCI creative process is influenced not only by expertise but also by interpersonal and motivational constructs. Empathy and motivation are central drivers of creativity in HCI. Empathy provides designers with cognitive and affective insights into users' lived realities, enabling them to frame problems and generate ideas that are personally and socially meaningful (Drouet et al., 2022; Oleson et al., 2020). Motivation, both intrinsic and prosocial, guides persistence and goal-directed effort in creative tasks (Li et al., 2024; Zaki, 2014). When empathy converges with these motivational forces, it creates a synergy that enhances creativity and strengthens commitment to user-centered design (Grant & Berry, 2011). Together, these factors align with Amabile's Componential Model of Creativity (2018), in which empathy enriches creative skills and motivation sustains engagement across the creative process (Amabile, 2018; Grant & Berry, 2011). Despite this relevance, the interaction between empathy and motivation across distinct stages of the creative process remains underexplored in HCI research.

Accordingly, the present study investigates how HCI professionals conceptualize and apply empathy in their routine work, with particular attention to its relationship with intrinsic and prosocial motivation throughout the creative process within Amabile's Componential Model of Creativity (2018). This research is guided by three research questions: (1) How do HCI professionals conceptualize and apply empathy in their day-to-day work? (2) How is creativity conceptualized and practiced by HCI professionals in empathy-driven design contexts? And (3) how do empathy and motivation influence distinct stages of the creative process in HCI practice? By analyzing HCI practitioners' lived experiences and creative perceptions, this study aims to advance theoretical

understanding of creativity and provide actionable insights for fostering innovative, human-centered design practices.

LITERATURE REVIEW

In HCI, creativity has often been described as a form of “functional creativity,” as professionals must meet practical requirements while producing innovative and useful outcomes (Daly et al., 2014). Creativity is therefore central to HCI practice, where practitioners routinely engage in designing, prototyping, and evaluating interactive systems and tools. Frich et al. (2018) emphasize that creativity-oriented HCI research is frequently collaborative and socially situated, highlighting how creative work emerges through the interplay of technological tools and human cognition. Similarly, creativity supports HCI professionals’ ability to address real-world challenges by balancing user desirability, technical feasibility, and long-term viability in design solutions (Kuo et al., 2019). Taken together, these perspectives suggest that creativity in HCI is importantly understood as an iterative process shaped by motivation, expertise, social context, and empathic engagement with users.

Creative process in HCI practice

Creativity unfolds through an iterative process that closely parallels user-centered design workflows in HCI. The creative process typically begins with problem preparation, which involves identifying and defining a problem, establishing goals and constraints, gathering relevant information, and selecting useful data (Amabile, 2018; Warr & O’Neill, 2005). Amabile’s Componential Model of Creativity (2018) conceptualizes this stage as requiring sustained engagement and domain knowledge, with deeper investigation supporting higher-quality problem framing (Du et al., 2016). In the idea-generation stage, divergent thinking skill becomes dominant, which drives individuals to explore possible solutions and task-related factors, with creativity emerging through the novelty of produced ideas (Amabile, 2018; Green et al., 2024). Finally, during the idea-evaluation stage, outcomes are assessed against established criteria and compared to goal-state parameters (Green et al., 2024).

According to Amabile and Pillemer (2012), the three stages are significantly influenced by the following components within the individual, including task motivation, domain-relevant skills, and creativity-relevant processes. Task motivation refers to intrinsic motivation to complete a task; domain-relevant skills are an individual’s expertise and knowledge in a particular field; and creativity-relevant processes reflect a flexible cognitive style, including personality and creative thinking skills for generating and evaluating creative ideas. For HCI professionals, these components shape how they draw on technical expertise, user understanding, and sustained motivation to develop innovative and user-centered interactive systems in their routines.

A theoretical framework for empathy and motivation-driven creative process

Empathy is a key consideration in the HCI creative process, particularly within user-centered design approaches (Li et al., 2024). Empathy is commonly conceptualized as comprising two components: cognitive empathy, which involves intellectually recognizing and adopting others' perspectives (perspective taking and fantasy), and affective empathy, which refers to emotional responsiveness (empathic concern and personal distress) that can motivate prosocial action (Davis, 1983). Throughout the creative process, empathy enables HCI practitioners to identify meaningful problems, generate relevant ideas, and refine user-centric solutions. It enhances engagement with diverse user groups, supports stakeholder communication, and broadens the range of design challenges that can be addressed (Daly et al., 2014; Oleson et al., 2020; Salminen et al., 2021). Within Amabile's model, empathy contributes to reinforcing task motivation by stimulating curiosity and a prosocial desire to help others (Grant & Berry, 2011; Li et al., 2024), enriching domain-relevant skills through a deeper understanding of users' experiences and needs for creative problem-solving (Drouet et al., 2022; Kim et al., 2022), and enhancing creativity-relevant skills through perspective taking that promotes problem reframing and idea originality (Forgeard, 2022; Zaki, 2014).

Motivation plays a central role in sustaining creative engagement and persistence throughout professional work (Amabile & Pillemer, 2012). Intrinsic motivation fosters creative engagement by allowing individuals to explore problems for their own sake, deepening concentration, cognitive flexibility, and willingness to experiment with novel approaches (Forgeard & Mecklenburg, 2013; Zhang & Bartol, 2010). In HCI practice, this internal drive is especially important because practitioners must iteratively investigate ambiguous user needs and persist through uncertain problem spaces during user-centered design processes (Zhang & Bartol, 2010). Prosocial motivation further channels creative effort toward socially beneficial and ethically responsible outcomes, encouraging individuals to prioritize others' well-being and broader societal impact in their creative decisions (Grant & Berry, 2011; Sormani & Uude, 2022). Together, these motivational forces provide the psychological energy that supports sustained creativity in HCI work.

Empathy works alongside other drivers of creative behavior and dynamically interacts with motivation, shaping the desire and persistence to create user-centered outcomes. Empirical research shows that empathy predicts both intrinsic motivation, which is curiosity and enjoyment, and prosocial motivation, which is for benefitting others (Li et al., 2024; Zaki, 2014). These motivational forces guide cognition, sustain engagement, and enhance creative performance in complex problem-solving contexts (De Zoysa et al., 2024; Forgeard, 2022; Yuan et al., 2019). In line with this, the interactions between empathy and motivation can be theoretically grounded in Amabile's Componential Model of Creativity.

Extending this componential view, Green et al. (2024) introduced a process-based definition of creativity as internally directed attention constrained by a generative goal, highlighting the cognitive mechanisms that underlie creative thought. In this concept, empathy and motivation can be considered as individuals' sustainable internal attention and goal-directed generativity through the creative process. This perspective aligns with Amabile's Componential Model of Creativity (2018)

through the cognitive mechanisms that drive creativity in HCI practice. In the HCI field, domain knowledge, creative problem-solving, and motivational or social factors have been integrated to foster positive user experiences in the design process, often in relation to empathic design practices (Gerber & Martin, 2012; Karakaya & Demirkan, 2015). However, despite this relevance, the Componential Model of Creativity has rarely been examined through the lens of empathy in real-world HCI practice.

Taken together, empathy can play a significant role in fostering creativity among HCI practitioners, particularly when it interacts with motivational factors (Strobel et al., 2013). Prior studies have demonstrated a direct relationship between empathy and motivation in enhancing individual creativity (de Jesus et al., 2013; Lee & Park, 2021; Zhang et al., 2021). However, the synergistic relationship between empathy and motivation, as well as the way this interaction unfolds within the creative process, remains underdeveloped in the creativity theory within HCI.

METHODOLOGY

The current study investigated how HCI practitioners consider and apply empathy with intrinsic and prosocial motivation during their creative process. A semi-structured interview was adopted to explore HCI professionals' perspectives, as interviews allow for in-depth insights into personal experiences, perceptions, and emotional drivers, thereby understanding the interplay of empathy and motivation in the real-life creative processes of HCI individuals. Given the conceptual overlap between empathy and motivational constructs, this flexible format enabled participants to describe how they perceive and integrate these elements in practice, while allowing the researcher to probe for clarification and differentiation as needed (Kallio et al., 2016). This study was approved by the Institutional Review Board (IRB# 21-053).

Participants

A total of 15 professionals working in the HCI industry were recruited through the authors' professional networks, with subsequent participants identified via snowball referrals. All participants met two inclusion criteria: (1) currently holding a position within the HCI field and (2) engaging with users both directly (e.g., conducting interviews and observations to identify problems and generate ideas) and indirectly (e.g., developing design concepts and solutions for end users).

Of the 15 participants, ten (67%) were female. The 15 participants had an average of 8.9 years of professional experience ($SD=7.3$). All participants held at least a bachelor's degree, and ten (67%) had graduate degrees. Job titles varied: the majority were designers (67%), three were researchers (20%), and two were directors of user experience (13%). All participants resided in the U.S. Three participants were from multinational corporations (A, C, and G) listed among the largest U.S. companies in the 2020 *Fortune 500*, including Big Five technology firms and manufacturers of agricultural and construction equipment (Bary, 2021). The remaining companies included

a UX and JavaScript development firm (B), the fifth-largest American banking institution (D), two American software companies (E and F), and a software development firm offering technical solutions across U.S. states (H). See Table 1 below for a clearer breakdown.

Table 1. Interviewees' profiles ($N = 15$)

Participant	Gender	Job title	Work experience	Background	Company
P1	Female	Lead UX researcher	6 years	Industrial engineering	A
P2	Female	UX designer, UX consultant	6 years	Digital communication, Marketing	B
P3	Male	Senior visual designer	12 years	Graphic design	B
P4	Male	User researcher	5 years	HCI	C
P5	Male	Director of UX	5 years	Visual communication, Graphic design, HCI	B
P6	Female	UX designer	25 years	Painting, Business	B
P7	Female	UX design consultant	15 years	Graphic design, HCI	B
P8	Male	Senior UX designer	7 years	Graphic design	C
P9	Female	UX designer	6 years	Graphic design, Business	D
P10	Female	UX researcher	6 years	HCI	E
P11	Male	Director of UX	3 years	Marketing, Graphic design	F
P12	Female	UX design lead	25 years	Graphic design	G
P13	Female	UX designer	1.5 years	Graphic design	A
P14	Female	UX designer, UX generalist	6 years	Communication	A
P15	Female	Product designer	5 years	Graphic design, HCI	H

Note: HCI (Human-Computer Interaction); UX (user experience)

Data Collection

Semi-structured individual interviews were conducted via Zoom between May 16 and June 4, 2021. Participants were contacted by e-mail to schedule sessions, which took place in such quiet, private places as conference rooms, private offices, or homes. Each interview lasted between 50 and 90 minutes and was audio-recorded with consent. The interview protocol, informed by a pilot study, included five core topics: participants' definition of empathy, their work and creative processes, the role of empathy and user considerations during creative tasks, and the influence of motivation. Example interview questions included: "Can you describe your creative process in your day-to-day work?", "How do you engage empathy in your everyday creative process?", and "How do you motivate yourself throughout your creative process?" The full interview questions are provided in the Appendix. Participants were encouraged to reflect on their personal experiences, perspectives, and values throughout the discussion.

Data analysis

The current study employed thematic analysis, following the six-phase approach outlined by Braun and Clarke (2006), which involves identifying, analyzing, and reporting patterns or themes within data. All fifteen audio-recorded interviews were transcribed verbatim. Approximately 16 pages of

written interview transcripts from each interviewee were imported into QSR's NVivo 12 software, a qualitative data analysis software widely used in social science research (Leech & Onwuegbuzie, 2011). NVivo facilitated the systematic coding and organization of data, supporting the identification of recurring themes across participants' narratives.

Regarding the five steps of the qualitative thematic analysis procedure, in Step 1 (Familiarization), two trained raters reviewed the verbatim transcripts of 15 audio-recorded interviews line by line to become familiar with the data. For Step 2 (Generating Initial Codes), transcripts were imported into NVivo 12. Words, phrases, and sentences related to empathy, motivation, and creative processes were coded both structurally and conceptually. The generated codes were compiled into the codebook and iteratively refined through repeated reviews of the data. Coding was conducted independently by two raters: the first generated initial codes from the raw data, and the second reviewed these codes against the transcripts to identify inconsistencies or omissions, documenting any modifications. Discrepancies were resolved through discussion, and inter-rater agreement was assessed to enhance reliability. Remaining ambiguities were addressed collaboratively, resulting in 34 original codes (11 related to empathy, 7 to motivation, and 5 to creative processes, along with 11 additional codes concerning UX, methods for understanding users, and industry context). In Step 3 (Searching for Themes), recurring or related concepts were grouped into the following 14 sub-themes: "helping/caring for others," "preventing harm/protecting users/linking users and companies," "building better experiences," "improving users' lives," "understanding/identifying others," "understanding users' expectations/motivation," "delivering product," "problem identification," "pressure/failure/worry/anxiety," "diverging and converging," "method," "developing better solutions/ideas," "validating ideas," and "clarifying goals/decisions". These sub-themes were then organized into three overarching themes: "role & mission," "making a useful product," and "values". For Step 4 (Reviewing themes), the entire dataset was reassessed to refine and validate theme coherence. Finally, in Step 5 (Defining and Naming Themes), each theme's narrative was analyzed to ensure alignment with the overall research objectives and to construct a coherent thematic "story."

Following the generation of 34 initial codes, the authors examined conceptual overlaps and semantic relationships among empathy-, motivation-, and creativity-related codes. Using constant comparison and memo writing, the codes were clustered into sub-themes that represented conceptually coherent processes (e.g., understanding users, taking various perspectives, creating better user experiences). Each sub-theme was then interpreted within the framework of the creative process, specifically mapped to the early (problem preparation), middle (idea generation), and later (idea evaluation) stages outlined in Amabile's Componential Model of Creativity (2018). Through this interpretive process, three overarching themes emerged: codes reflecting user exploration and curiosity were grouped under Theme 1, codes emphasizing idea development, affective resonance, and iterative refinement were consolidated into Theme 2, and codes related to reflection and decision-making were synthesized as Theme 3. These themes, along with nine sub-themes, are summarized in Table 2 below.

Table 2. Discovered themes from the content thematic analysis result in the creative process

Themes	Detected principles	Code examples	Representative quotes
Theme 1: Addressing real-life problems			
Sub-theme 1-1. Understanding users	Perspective taking; intrinsic and prosocial motivation	Understanding and identifying others	"As in like early stages of project during the discovery phase, 100%, it's all about the prosocial factors. It's all about understanding where the user is coming from, how and what I'm doing can support them or make their life easier or get them to the end results quicker, faster, and more accurately. And that feeds into the intrinsic curiosity factor. I want to understand the user. Because I'm also curious about how I can make this better." (P4)
Sub-theme 1-2. Taking various perspectives	Perspective taking; intrinsic and prosocial motivation	Problem identification	"Perspective gets more of like the problem-solving functioning. Perspective gives you the more perspectives that you get, it gives you a well-rounded optics to the problem." (P9)
Sub-theme 1-3. Establishing loyalty	Perspective taking; fantasy scale; prosocial motivation	Method	"Your personas, they kind of become your like North Star, your compass, because everything you do you have to run back through that fictitious group of people." (P3)
Theme 2. Enriching experiences			
Sub-theme 2-1. Strengthening user-provider connections	Cognitive and affective empathy; prosocial motivation	Linking users and companies	"The motivation is being a bridge between users and the company. I'm going to be the bridge, I'm going to link to what users are talking, feeling, and experiencing. I am saying that still, it is very provider-centered. But I'm like the one like a superhero for users." (P1)
Sub-theme 2-2. Enhancing user experience	Perspective taking and affective empathy; intrinsic and prosocial motivation	Users' pleasure	"I find joy in making sure that the experience is the greatest experience for them. So, it might not be I'm not saving the world, but at least I'm making them have a better experience through whatever they're doing." (P13)
Sub-theme 2-3. Recognizing constraints	Perspective taking; affective empathy; intrinsic and prosocial motivation	Professionals' worry, and anxiety for failure	"That's where if we can empathize with some of the constraints and realities that different individuals deal with, that helps. It helps shape the ideation because ideation is all like what you come up with. It's a product of what your constraints happen to be. And so, if you understand more of the constraints, they will help you make different choices when you build the thing." (P4)
Theme 3. Creating greater value			
Sub-theme 3-1. Looking beyond surface-level understanding	Fantasy scale; prosocial motivation	Making better solutions and ideas	"We need to know what the reason for that and that was based on motivation is like. I make sure with my research partner that we're really accepting the motivations of our users [...] we need to know the why, what our goals. It's beyond what works and what doesn't. It's about what is valuable to the user and why and not why." (P8)

Themes	Detected principles	Code examples	Representative quotes
Sub-theme 3-2. Enhancing decision-making processes	Perspective taking; fantasy scale; affective empathy; prosocial motivation	Validate ideas	"Emotional empathy is not something we get into as much; that's more about trying to. I feel like we use that successfully. You show them very meaningful as you show them a really powerful experience that will help them reprioritize how they're working on something." (P4)

The raters engaged in discussion and reached consensus to ensure trustworthiness. To establish dependability, the study implemented three measures: (1) all original data were retained as evidence to support the findings; (2) outputs generated in NVivo 12 were saved and printed throughout the analysis process; (3) reconstructed and synthesized data, organized by thematic categories, were printed and securely preserved.

RESULTS

The findings were classified into three overarching themes: *addressing real-life problems*, *enriching experiences*, and *creating greater value*, each aligned with a distinct stage of Amabile's Componential Model of Creativity (2018): problem preparation, idea generation, and idea evaluation. Across these stages, empathy, combined with intrinsic and prosocial motivation, supports the engagement of HCI professionals in the creative process.

Theme 1: Addressing Real-life Problems

This theme reflects how empathy and motivation enabled HCI practitioners to develop a broad, nuanced understanding of users during the problem preparation phase of the creative process. Three sub-themes emerged: *understanding users*, *taking various perspectives*, and *establishing loyalty*, highlighting the role of cognitive empathy and intrinsic motivation.

Understanding users

Participants emphasized the importance of empathy and motivation in understanding users' "ideologies" and "emotions" as a foundation for identifying their needs, expectations, and emotional contexts. This represents an essential first step in the creative process. Perspective taking was frequently cited as vital for uncovering user expectations and generating relevant ideas. Motivation emerged from two angles: that of HCI practitioners and that of users. For practitioners, intrinsic motivation, particularly "curiosity," was described as "the main driver in the early stages to understand everything." Conversely, understanding users' motivations required an empathic mindset and recognition of prosocial motivation, especially when setting clear goals for users at the outset of the creative process. These insights reveal that empathy enables practitioners to translate user observations into meaningful creative directions, while intrinsic motivation sustains curiosity and persistence during problem definition.

Taking various perspectives

The ability to adopt multiple viewpoints was described as essential for uncovering hidden or complex problems. Participants characterized perspective taking as a form of “problem-solving functioning” that offered “well-rounded optics” on design challenges. Intrinsic and prosocial motivation were seen as interrelated and mutually reinforcing. When reflecting on assisting and caring for others, participants emphasized that intrinsic “curiosity” and “prosocial factors” are critical to proficiency in the early stages of the creative process. While some debated which type of motivation emerged first, most described them as inseparable, functioning together to generate ideas that were both innovative and socially meaningful. This interplay suggests that cognitive empathy and motivation act as a bridge between analytical reasoning and moral intent, enabling practitioners to move beyond surface understanding and reframe user issues as creative design problems that balance innovation with social value.

Establishing loyalty

Establishing loyalty focused on techniques that cultivate empathy and trust between designers and users, including active listening, observation, user interviews, and feedback loops. Participants highlighted “listening” as a particularly effective strategy for identifying user problems and refining design direction. It enabled HCI practitioners to gain insight into “[what] they want to see” and guided decisions about “how we should do this.” The interview method supported HCI professionals in various ways, including “developing themes,” defining goals that will allow “greater efficiency within the product,” and providing in-depth insights through targeted questions. These interactions not only deepened empathic understanding but also activated prosocial motivation, ensuring that ideas resonate with users and build long-term engagement. Overall, the findings suggest that empathy serves not only as an emotional connection but also as a methodological tool for validating assumptions and strengthening user trust. When combined with prosocial motivation, these empathic practices transform user relationships into collaborative partnerships that shape creative direction.

Theme 2: Enriching Experiences

The second theme corresponds to the idea-generation stage of the creative process, where open-ended ideation and brainstorming occur. Interviewees described that empathy, combined with intrinsic and prosocial motivation, facilitated the development of effective and innovative ideas while maintaining strong user involvement. Three sub-themes emerged: *strengthening user-provider connections*, *enhancing user experience*, and *recognizing constraints*.

Strengthening user-provider connections

Participants portrayed themselves as “user advocates,” “translators,” and even “superheroes for users,” emphasizing their commitment to user-centered design. Interviewees frequently cited persona and storytelling as the most crucial tools for identifying gaps, understanding users’ needs,

generating ideas, and evaluating the long-term viability and impact of each idea. These findings reveal that empathy serves as a multifaceted bridge, both relational and cognitive, supporting HCI practitioners to translate user insights into meaningful idea generation. When paired with prosocial motivation, empathy fosters deep connections with users and empowers practitioners to advocate for their interests throughout the creative process.

Enhancing user experience

Participants emphasized the importance of understanding users' emotions, noting that emotional resonance fosters more meaningful and memorable experiences. They noted that "people tie emotions to objects" and that such resonance "makes [users] buy things." Practitioners also expressed intrinsic "joy" in enhancing user experiences, indicating a close link between affective empathy and intrinsic motivation. Moreover, the desire to create emotionally impactful solutions reflected a strong prosocial orientation, reinforcing the connection between affective empathy and user-centered creativity. Collectively, these insights illustrate how affective empathy and prosocial motivation enrich divergent thinking, enabling the generation of solutions that prioritize the interests and needs of others.

Recognizing constraints

Identifying constraints represented how constraints and negative emotions, such as pressure or fear of failure, could serve as productive forces in the creative process. Rather than hindering creativity, these challenges often triggered intrinsic motivation to plan more carefully and explore alternative solutions. For example, even when HCI experts perceived negative feelings, such as fear of "failure," it prompted proactive measures and careful planning that can lead to creative consequences. Similarly, external constraints and contextual realities often serve as catalysts for HCI practitioners to "shape adaptive ideation" and "make different choices," fostering flexibility and learning from setbacks. These findings suggest that empathy supports reflective awareness of contextual boundaries, transforming limitations into creative prompts. When guided by intrinsic and prosocial motivation, constraints become generative forces that strengthen perseverance, adaptability, and other core qualities of creativity.

Theme 3: Creating Greater Value

The third theme, *creating greater value*, captures how HCI professionals apply empathy during the idea-evaluation stage of the creative process, particularly in evaluation and refinement. Participants described that empathy, especially when combined with prosocial motivation, guided them to evaluate ideas not only for usability but also for their broader social and emotional impact. Two sub-themes emerged: *looking beyond surface-level understanding* and *enhancing decision-making processes*.

Looking beyond surface-level understanding

Participants emphasized the importance of moving beyond surface-level needs to understand users' deeper goals, values, and cultural contexts. The fantasy scale of cognitive empathy allowed them "to be truly empathetic beings who you truly have to understand more than I can," supporting efforts to determine "what is valuable to the user and why, and why not." Prosocial motivation was also leveraged to identify the underlying "reason," "value," and "why" that inform idea selection and evaluation in the later stages of the creative process. These insights suggest that cognitive empathy reinforces evaluative thinking, and when integrated with prosocial motivation, it enables professionals to assess creativity through both functional and ethical lenses.

Enhancing decision-making processes

Participants noted that perspective taking and the fantasy scale of cognitive empathy significantly shaped their decision-making processes: "Decisions could impact what we do" and "emulate a potentially negative experience." They also reported affective empathy as a "key indicator for mind experience," influencing how to "make decisions" and "how people experience outcomes." The synergy between empathy and prosocial motivation was particularly evident here, as participants aimed to "take unique individual factors" and "make a decision that could impact what users do," thereby strengthening idea selection and evaluation. This highlights empathy's role as a cognitive tool that supports evaluative judgment, allowing practitioners to anticipate user responses and make ethically grounded decisions. Prosocial motivation reinforced this process by orienting choices toward collective benefit and long-term value.

DISCUSSION

The current study explored how HCI practitioners conceptualize, apply, and extend their understanding of empathy within real-world creative processes, with particular attention to the interplay between empathy and motivation in shaping their perception of creativity. The findings contribute to the broader literature on creativity and help address gaps in understanding the role of empathy within HCI. Specifically, they highlight how empathy can be integrated into creativity theory, not only as a design principle but also as a motivational and cognitive resource. While exploratory in nature, this work provides observations that may help clarify conceptual relationships between empathy, motivation, and creativity in HCI. These insights can serve as a starting point for refining theoretical frameworks and guiding future research in this area.

HCI professionals' definition of empathy based on their creative routines

Empathy was illustrated as a foundational concept that guides how HCI practitioners approach creative problem-solving and user-centered innovation. Many described cognitive empathy as the ability to grasp users' "intentions" and "perspectives," while others emphasized affective empathy,

such as the desire to “make things better” for users. Importantly, the present study revealed that HCI practitioners engage with both cognitive and affective dimensions of empathy, using them to connect with users and inform the development of meaningful, user-centered solutions. This finding offers a potential extension of the Componential Model of Creativity within the HCI context. Empathy may influence domain-relevant skills by enabling deeper user understanding, strengthening creativity-relevant skills through perspective taking and emotional attribution, and enhance task motivation by integrating prosocial intentions. In this sense, HCI practitioners can leverage empathy as a creative mechanism, applying it to both analytical reasoning and emotional imagination throughout their professional work.

Empathy and motivation in the creative process

Our findings highlight the significant roles of cognitive and affective empathy in synthesizing intrinsic and prosocial motivation in the HCI field. Building on Amabile’s Componential Model of Creativity (2018), this study proposes an extended framework for HCI professionals’ everyday design work in which empathy and motivation jointly operate across three key stages of the creative process: problem preparation, idea generation, and idea evaluation. This extended model underscores the synergistic role of empathy and motivation in fueling creativity within HCI practice (see Figure 1 below).

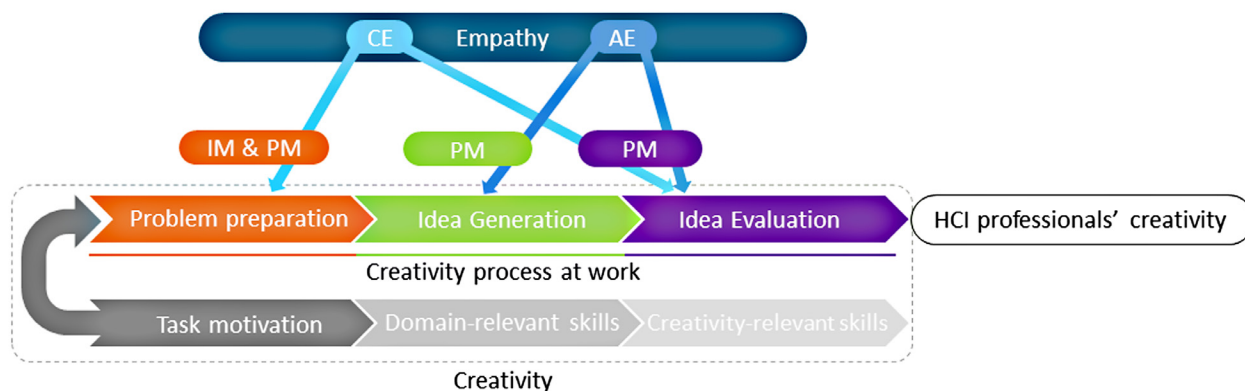


Figure 1. Integration of the findings in the creative process

Note: CE is cognitive empathy, AE is affective empathy, E is empathy, IM is intrinsic motivation, and PM is prosocial motivation

Early stage: Empathy and motivation in creative problem preparation

Within Amabile’s Componential Model of Creativity (2018), the problem preparation stage is shaped primarily by task motivation and domain-relevant skills, as individuals must draw on both expertise and sustained engagement to define problems (Amabile et al., 1996, Amabile, 2018). In our study, HCI practitioners described this stage as involving active cognitive exploration guided by cognitive empathy, intrinsic motivation, and prosocial motivation. This interplay between empathy and motivation echoes prior findings that intrinsically and prosocially motivated individuals are more likely

to adopt multiple viewpoints and generate user-centered solutions (Forgeard, 2022; Grant & Berry, 2011). Our findings reinforce Amabile's notion of domain-relevant skills. HCI professionals reported using cognitive empathy to refine their understanding of users' contexts, which in turn enabled more accurate and comprehensive problem definition. This is consistent with research, showing that empathy reduces bias, broadens mental representations of problems, and strengthens domain-relevant knowledge during early-stage creative work (Amabile et al., 1996, Amabile, 2018; Davis, 1983; Grant & Berry, 2011; Zaki, 2014). Theoretically, cognitive empathy can also be understood as a creative-relevant skill that fuels curiosity and reinforces practitioners' desire to produce socially beneficial outcomes. By doing so, it transforms problem finding from a routine analytical task into a purposeful, human-centered pursuit (Alzayed et al., 2021; Grant & Berry, 2011; Nazir & Lin, 2023). In this sense, cognitive empathy directly contributes to the componential mechanisms that initiate creativity by shaping how practitioners interpret, frame, and construct design problems.

Affective empathy was notably limited during the early stage of the creative process, reflecting the analytical orientation that often characterizes HCI practice. This pattern may be influenced by training programs that emphasize technical proficiency and problem-solving over emotional attunement (Li et al., 2024; Wilcox et al., 2019). Importantly, this absence suggests that emotional resonance does not emerge automatically during problem preparation but requires intentional engagement with users. From the Componential Model of Creativity perspective, affective empathy offers a potential pathway to strengthen all three components at this phase. Affective empathy can amplify task motivation by fostering intrinsic curiosity and prosocial intent, reframing creative work from a technical challenge into a meaningful endeavor that aligns personal fulfillment with the desire to benefit others (Li et al., 2024). Affective empathy can also deepen domain-relevant skills by enabling professionals to interpret user experiences, such as frustration or delight, within their emotional context (Drouet et al., 2022; Oleson et al., 2020). In terms of creativity-relevant skills, affective empathy can guide divergent thinking and inspire ideas that evoke positive emotional responses rather than remaining purely functional (Forgeard & Mecklenburg, 2013). Overall, the early creative process appears to be characterized by analytical exploration, gradual emergence of empathic imagination, and growing emotional resonance, laying the foundation for meaningful ideation in HCI.

Middle stage: Empathic engagement in creative idea generation

According to the Componential Model of Creativity, idea generation relies heavily on creativity-relevant processes, which require individuals to engage in flexible thinking, imagination, and experimentation to produce novel possibilities (Amabile et al., 1996, Amabile, 2018). In our findings, both cognitive and affective empathy emerged as key drivers supporting this stage, particularly in the development of meaningful and emotionally resonant solutions. HCI experts emphasized that affective empathy enabled them to attune to users' frustrations and emotional experiences, allowing them to envision more responsive and adaptable solutions (Drouet et al., 2022; Oleson et al., 2020).

Intrinsic and prosocial motivation further amplified this effect, supporting prior evidence that empathy and motivation together enhance creative output (Grant & Berry, 2011; Li et al., 2024). Overall, the findings suggest that when paired with intrinsic and prosocial motivation, empathy can increase both the quantity and quality of ideas by aligning personal fulfillment with user benefit (Forgeard, 2022; Li et al., 2024). Extending these findings to Amabile's model, intrinsic motivation sustained curiosity and playfulness during open-ended ideation, while prosocial motivation infused the process with purpose, guiding practitioners toward ideas that deliver social value (Grant & Berry, 2011). Together, these components transformed empathy and motivation into cognitive and emotional energy that fueled innovative idea generation in HCI.

Moreover, cognitive and affective empathy can enrich domain-relevant skills by enabling professionals to integrate user insights and emotional envisioning into concept development, while fostering sensitivity to the experiential quality of ideas (Alzayed et al., 2021). These empathic capacities strengthen creativity-relevant skills by inspiring flexible thinking, emotional imagination, and the ability to translate user needs into tangible, creative forms (Gilet et al., 2013; Oztop et al., 2018). Therefore, empathy functions as both a cognitive bridge between user understanding and creative ideation, and an affective generator of experiential novelty.

Later stage: Creative maturity in idea evaluation

Within the Componential Model, the evaluation stage emphasizes both domain expertise and creativity-relevant judgment, as practitioners must critically assess ideas in relation to user goals, practical constraints, and potential broader impact (Amabile, 2018). In our findings, both cognitive and affective empathy remained to play a role during this later phase of the creative process; however, cognitive empathy, particularly the fantasy scale, became more prominent. This pattern aligns with prior research indicating that fantasy supports goal-directed reasoning, imaginative projection, and future-oriented decision-making (Ganiev & Tashev, 2021; Weibel et al., 2018).

Prosocial motivation was especially dominant in this phase, as HCI practitioners prioritized solutions that benefit users and minimize harm, reflecting the ethical orientation of user-centered and socially responsible design (Grant & Berry, 2011; Friedman & Hendry, 2019). The interaction between cognitive empathy and prosocial motivation appears to encourage HCI practitioners to consider user engagement more deeply and to develop robust evaluation criteria within the Componential Model. This synergy can also reinforce domain-relevant skills, enabling practitioners to project themselves into users' future experiences, anticipate potential outcomes and unintended emotional consequences, and assess the long-term impact of their ideas (Oleson et al., 2020; Zaki, 2014). These empathic insights strengthened creativity-relevant skills by fostering reflective judgment and ethical discernment in decision-making (Hess & Fila, 2016). Across all stages, prosocial motivation functions as a primary driver of task motivation, amplifying empathy's influence and sustaining engagement with user well-being (Grant & Berry, 2011). Empathy further acts as a catalyst for enhancing domain-relevant skills (e.g., integrating user insights into design concepts) and enabling such creativity-relevant skills as flexible thinking, emotional imagination, and the ability

to translate user needs into innovative solutions (Amabile, 2018; Drouet et al., 2022). Taken together, this integrated framework conceptualizes empathy as a cross-cutting mechanism that connects domain expertise, motivational persistence, and evaluative judgment across the creative process, thereby highlighting the synergistic role of empathy and motivation in sustaining creativity within real-world HCI practice.

IMPLICATIONS

This study contributes to the literature by examining how empathy interacts with intrinsic and prosocial motivation to shape creative processes in real-world design contexts, specifically through the lens of Amabile's Componential Model of Creativity (2018). The findings advance understanding of empathy in creativity by demonstrating its multidimensional role across all stages of the creative process in HCI. While prior research has largely positioned empathy as relevant primarily to early-stage problem identification (e.g., Kim et al., 2022), the present study demonstrated that both cognitive and affective empathy play meaningful roles throughout the process. Perspective taking, when combined with intrinsic and prosocial motivation, supports deep user understanding during problem identification; affective empathy enhances emotional resonance and responsiveness during idea generation; and cognitive empathy, particularly the fantasy scale, together with prosocial motivation, informs the development of socially impactful solutions.

Additionally, the current study extends Amabile's Componential Model of Creativity (2018) by emphasizing the role of prosocial motivation, along with intrinsic motivation, in professional HCI practice. Prosocial motivation appears to amplify the creative potential of empathy by encouraging practitioners to prioritize user well-being, ethical considerations, and broader social responsibility (Grant & Berry, 2011). The findings highlight the synergistic interaction between empathy and motivation: cognitive empathy combined with intrinsic motivation strengthens user understanding in early problem discovery, while affective empathy paired with prosocial motivation fosters commitment to producing meaningful, user-centered outcomes. This integrated perspective offers a richer theoretical account of how empathy and motivation jointly shape creativity in applied design contexts.

The findings also offer actionable implications for HCI education and professional practice. In educational contexts, HCI curricula can incorporate both cognitive and affective empathy training through reflective projects, scenario-based learning, and multimedia storytelling exercises to foster students' creativity (Park & Lee, 2025). For example, students could engage in role-play simulations to experience users' emotional perspectives or analyze short videos followed by guided discussions to identify, generate, and evaluate ideas. Such methods can help future professionals develop the emotional and motivational competencies essential for user-centered problem-solving throughout the creative process.

In professional practice, organizations can promote empathy and motivation by establishing structured creative environments that intentionally support creative work. Initiatives such as design-thinking workshops and virtual-reality-based empathy labs (Gabriel et al., 2016; Tian et al., 2021; Zwoliński et al., 2023) can deepen practitioners' emotional engagement and enhance their understanding of user experiences. Additionally, cultivating a workplace climate that values empathic collaboration, intrinsic interest, and prosocial goals (Grant & Berry, 2011; Lin et al., 2022) can sustain creativity over time. Practical strategies include recognition systems that reward socially impactful design outcomes and team reflection sessions where practitioners share empathic insights gained from user interactions. Together, these approaches help embed empathy-driven creativity as a core norm within HCI practice.

LIMITATIONS AND FUTURE STUDY

Several limitations should be acknowledged. First, the participant pool lacked diversity in professional background and gender. Most interviewees had academic training in Graphic Design and held UX-related roles, such as UX researchers and designers. This narrow scope may limit the generalizability of the findings. Additionally, the underrepresentation of gender diversity may have restricted insights, as prior research suggests that mixed-gender teams foster greater synergy in creativity and empathy (Souto et al., 2024). Future studies should include participants from a broader range of HCI-related roles, such as product managers, scrum masters, and software engineers, and ensure gender diversity to capture a more comprehensive understanding of how empathy and motivation influence creativity. Second, several participants were employed at large technology firms or multinational corporations, which may have shaped their perspectives due to organizational cultures, resources, and workflows specific to these contexts. These environments may differ significantly from those in startups, non-profits, or academic environments. Future research should explore how variables such as team dynamics, company culture, and technological constraints influence the role of empathy and motivation in creative processes. A comparative approach across organizational settings could yield richer, more nuanced insights into how empathy operates in diverse HCI environments. Third, while semi-structured interviews provided rich, contextual insights into the lived experiences of HCI professionals, the conceptual overlap between empathy, intrinsic motivation, and prosocial motivation may have made these constructs difficult for participants to distinguish. Therefore, this study focused on how participants interpreted and enacted these concepts in practice rather than treating them as separate constructs. Future research could employ mixed or comparative methods to further empirically differentiate these constructs. Lastly, participants were recruited through the researchers' personal networks and word-of-mouth, which may have introduced sampling bias and further limited generalizability. Future research should expand recruitment beyond personal contacts to include individuals from more diverse cultural and disciplinary backgrounds, thereby enhancing the validity and transferability of the results.

CONCLUSION

This study provides valuable insight into how HCI professionals integrate empathy and motivation throughout the creative process. Thematic analysis revealed three core themes: *identifying real-life problems*, *enriching experiences*, and *creating greater value*, each aligned with distinct stages of creative engagement. Empathy consistently emerged as a foundational element, shaping user-centered solutions, guiding early problem identification, and contributing meaningfully to idea generation and evaluation. Notably, the findings demonstrate a strong, positive interplay between empathy and both intrinsic and prosocial motivation, which together enhance creativity and foster user-oriented design outcomes. Empathy was shown to strengthen domain-relevant skills through deep user understanding, bolster creativity-relevant skills via perspective taking, and reinforce task motivation through intrinsic and prosocial engagement within HCI practice. By contributing empirical evidence in a relatively underexplored area, this study expands theoretical perspectives on creativity and underscores the importance of empathy- and motivation-based training to cultivate innovative, human-centered design practices. In an era increasingly defined by artificial intelligence, where efficiency and automation often overshadow human values, this research reaffirms empathy's enduring role in guiding socially responsible innovation.

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APPENDIX

Interview Questions

The following semi-structured interview questions were used to explore HCI professionals' experiences of creativity, empathy, and motivation in their routine work. Follow-up questions were asked as needed to clarify responses.

1. Would you please introduce yourself briefly?
 - a. Can you tell me your job titles, responsibilities, job experience in years, and majors?
2. What does your typical day look like? Can you describe your creative process in your day-to-day work?
 - a. Would you walk through one example of your creative process step by step?
3. How do you engage empathy in your everyday creative process?
 - a. How does empathy play a role in the different stages of your work?
 - b. (Additional probing questions were asked as needed, depending on participants' responses.) How do you consider understanding others' perspectives and emotions in the different stages of your work?
4. How do you motivate yourself throughout your creative process?
 - a. (Additional probing questions were asked as needed, depending on participants' responses.) Any intrinsic or prosocial factors?
5. What professional activities do you incorporate into your work process?
 - a. Are there any specific activities associated with the stages of your creative process?
 - b. How do your empathy and motivation shape those activities?

