Ethical and Philosophical Perspectives on Human-Computer Interaction in the Design of Intelligent Products: A Comprehensive Analysis

Pan Xin*
School of Art and design, Zhanjiang Institute of Science and Technology
China,524001
panxin8001@163.com

Abstract: This study investigated user perceptions and ethical considerations surrounding intelligent products. We employed a mixed methods approach, utilizing semi-structured interviews, focus groups, and surveys to gather both qualitative and quantitative data. Thematic analysis explored user experiences and concerns, while descriptive statistics assessed user awareness, concerns, and comfort levels regarding various ethical issues. While user awareness of ethical considerations (data privacy, human values alignment, duty/virtue ethics) remained moderate across all categories, user comfort levels were generally lower. However, overall usability remained the highest rated aspect, suggesting a prioritization of functionality despite privacy reservations. The analysis of data usage privacy emerged as a primary concern, followed by anxieties about human values alignment and the potential for intelligent products to clash with user beliefs. Thematic analysis identified three key areas of user concern regarding data usage: transparency and control, data security, and secondary uses of data. On the philosophical level, limited exposure to diverse viewpoints due to these products can hinder the development of phronesis (practical wisdom) and moral decision-making. Data collection practices might disrupt the Aristotelian Golden Mean, creating a privacy imbalance that could stifle self-exploration and hinder eudaimonia (flourishing life). Utilitarianism highlights maximizing overall well-being in accidents, raising questions about responsibility: the manufacturer for system safety or the user for misuse.
Keywords: Ethical Issues, Human Computer Interactions, Intelligent Product Design, Data Privacy, and Human Values

1. INTRODUCTION

The realm of Human-Computer Interaction (HCI) ethics encompasses a diverse set of considerations, including human well-being, ownership and property rights, privacy, unbiased design, universal usability, trust, user autonomy, informed consent, and accountability (Friedman & Kahn Jr, 2007). While the scope of ethical considerations in these fields can be broadly defined, as outlined above, certain recurring themes prominently emerge within the relevant literature at any given time. The current era of technological advancement ushers in a vision of a near future marked by

pervasive technology. Machines will not only predict and anticipate human needs, but seamlessly integrate with everyday life, augmenting human capabilities (Stephanidis et al., 2019). Homes, workplaces, and public spaces are predicted to evolve into "smart" environments – empowered by Artificial Intelligence (AI) and leveraging big data for continuous improvement – that anticipate and adapt to the needs of their occupants and visitors. Interactions within these environments will transcend the realm of conscious and intentional actions, encompassing subconscious and even unintentional behaviors. A user's location, postures, emotions, habits, intentions, cultural background, and even thoughts could all serve as potential input commands for the diverse array of technological artifacts – both visible and invisible – embedded within the environment. Robotics and autonomous agents will likely become commonplace features of these technologically rich environments. Furthermore, information exchange is envisioned to occur "naturally" between interacting entities, with the digital world seamlessly coexisting with and augmenting physical reality, giving rise to hybrid environments. Traditionally, Human-Computer Interaction (HCI) has centered on the user, aiming to design technology that optimally serves human needs (Dix, 2017). This user-centric approach, it is argued, should also be the guiding principle for the emerging realm of intelligent technologies. Over time, HCI has demonstrably broadened its scope of inquiry and achieved significant advancements. However, with the rise of complex new technologies and the ever-increasing need for nuanced interaction and communication, the human counterpart in this equation is also evolving. Users are becoming more aware of the impact interactive systems and devices have on their daily lives. This translates to a heightened level of attention and demand, coupled with a sense of diminished optimism and increased criticality. As a result, human-centered design approaches must confront new challenges. Shifts in both focus and methodology are necessary to address the critical issues that underpin a more trusting and mutually beneficial relationship between humans and technology. The future of Human-Computer Interaction (HCI) and its evolving research agenda have been the subject of numerous recent proposals. As artificial intelligence (AI) transitioned from theoretical concept to practical reality, Kaplan sought to dispel common misconceptions and myths surrounding machine intelligence in his book "Artificial Intelligence: Think Again" (Kaplan, 2016). Kaplan emphasizes the importance of human-centered design principles that integrate social, cultural, and ethical considerations into AI development. The latest generation of Artificial Intelligence (AI) technologies marks a significant

shift in the human-technology dynamic. Defined by their ability to "perform cognitive functions that we associate with human minds" (Rai et al., 2019), AI systems are not merely tools but rather intelligent collaborators (Maedche et al., 2019). Unlike previous technologies, AI can operate with a degree of (semi-)autonomy. This is exemplified by advancements in generative AI, such as Large Language Models (LLMs), which are increasingly accepted and implemented within organizations (Dwivedi et al., 2023). As AI capabilities mature and permeate various domains, they have the potential to reshape work structures, fostering the emergence of "human-machine hybrid work" (Mollick, 2022). AI-based technologies are no longer simply subservient tools; they can now "assume responsibility for tasks" (Baird & Maruping, 2021), shifting the balance of autonomy from humans to technical systems. This evolving collaboration raises critical ethical challenges. Concerns include distributive justice (fair distribution of benefits and burdens), potential for discrimination and exclusion, and issues of transparency due to perceived human powerlessness and the opaqueness of AI systems. Human-Computer Interaction (HCI) is an interdisciplinary field rooted in a user-centered approach to designing modern, complex computer systems (Preece et al., 1994). HCI encompasses all aspects of human engagement with these systems, ideally from the initial design phase through post-implementation evaluation. A fundamental tenet of HCI is the focus on designing and developing technology that benefits both individuals (users) and society as a whole. This is achieved through the application of various user-oriented methodologies that consider all forms of interaction between humans and machines. Traditionally, user interface (UI) analysis played a central role in HCI; however, the usability challenges associated with early personal computers presented significant difficulties (Carroll, 2009). The ubiquitous nature of technology, coupled with the growing presence of Artificial Intelligence (AI) and machine learning systems, ushers in a new era for Human-Computer Interaction (HCI). This era demands a shift beyond traditional approaches to encompass the intricate interactions humans have with a wider range of computer-based systems. This evolution will undoubtedly challenge our fundamental understanding of HCI, forcing us to re-evaluate how we define and design interactions with these systems. The landscape becomes even more complex as some of these systems claim "intelligence" and operate visibly, while others function covertly, remaining largely hidden from our awareness. The increasing maturity of artificial intelligence (AI) techniques has led to their incorporation within commercially available systems used by non-experts. This trend

necessitates a heightened focus on usability considerations for such production AI systems. Difficult or inefficient systems are error-prone, user-alienating, and costly to maintain. Unfortunately, many AI systems appear to be developed without any formal usability evaluation. For instance, Lee and Evens make usability claims about their natural language input system for an expert system but fail to mention any evaluation methods (Lee & Evens, 1998). Similarly, Xu and Li present an approach integrating various reasoning paradigms for problem-solving (Xu & Li, 2000), discussing the acceptability of solutions, but neglecting to address user interaction or user preference for their system over alternatives. A notable exception lies in the field of intelligent tutoring systems (ITSs), where educational effectiveness, inherently linked to user interaction, is the primary focus. As Self (1998) aptly states, ITSs prioritize their users, or rather, their designers prioritize user-centered design (Self, 1998).

1.1 Rationale and Main Objective

The ubiquitous integration of artificial intelligence (AI) into interactive products necessitates a critical examination of the ethical considerations arising from human-computer interaction (HCI) in this evolving landscape. This study aims to comprehensively analyze the ethical issues embedded within intelligent product design, exploring their philosophical significance. By doing so, we seek to illuminate potential pitfalls and pave the way for the development of ethically responsible AI products that prioritize human well-being and societal good.

2. METHODS

2.1 Research Design

Our study employed a mixed methods approach to comprehensively explore ethical issues in HCI for intelligent products. We conducted semi-structured interviews, focus groups, and surveys to gather rich qualitative data on user experiences and perceptions, along with quantitative data on user attitudes and concerns. This combined approach allowed for a nuanced understanding of the ethical landscape surrounding intelligent product design.

2.2 Data Collection

We utilized standardized surveys to gather quantitative data on user perspectives. These surveys consisted of focused questions designed to

assess user awareness, concerns, and comfort levels regarding various ethical considerations associated with intelligent products. All survey responses were collected and documented for subsequent processing and analysis. We conducted semi-structured interviews to delve into user experiences with intelligent products. The open-ended questions explored participants' ethical considerations and concerns regarding data usage, human values, implementation of duty and virtue ethics, and overall usability and user acceptance of these systems. We facilitated focus group discussions (5-8 participants each) to explore the philosophical implications of ethical issues surrounding intelligent products. These discussions allowed participants to share their perspectives and collectively examine the broader societal and ethical significance of these technologies.

2.3 Data Analysis

Qualitative data from interviews and focus groups underwent thematic analysis to identify recurring patterns and themes in user experiences and concerns. Quantitative data from surveys was analysed using descriptive statistics, including means, standard deviations, and frequencies. All analyses were performed using GraphPad Prism version 10.2.0.

3. RESULTS

In Table 1, Users want to understand what data is collected, how it's used, and have the ability to manage its usage. Data security is another major concern, highlighting the need for robust safeguards against unauthorized access, data breaches, and misuse. Finally, users emphasize the importance of secondary uses of data. They want clear communication about how their data might be repurposed beyond the initial stated purpose.

Table 1: Data Usage Privacy

Theme	Explanation	Example
Transparency and Control	Users should understand what data is collected, how it's used, and have control over its usage.	A smart speaker allows users to easily access and delete their voice history recordings.
Data Security	User data needs robust protection against unauthorized access, breaches, and misuse.	A fitness tracker encrypts user health data and requires two-factor authentication for login.
Secondary Uses of Data	Users should be informed of potential secondary uses of their data beyond the primary purpose.	A personalized news app clarifies upfront that browsing history might be used for targeted advertising.

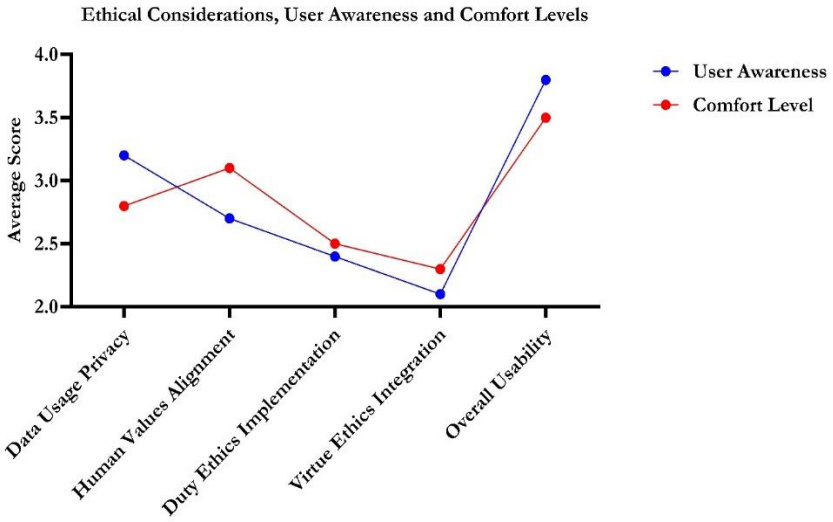

Figure 1: Analysis of Ethical Considerations, User Awareness and Comfort Levels

In Figure 1, we explored user perceptions of ethical considerations in intelligent products. While user awareness and comfort levels were generally moderate across all categories (data privacy: 3.2/2.8, human values alignment: 2.7/3.1, duty/virtue ethics: 2.4/2.5 & 2.1/2.3), overall usability remained the highest rated aspect (3.8/3.5). These findings suggest a need for increased transparency and education around the ethical implications of intelligent product design, while maintaining a focus on user-friendly interfaces.

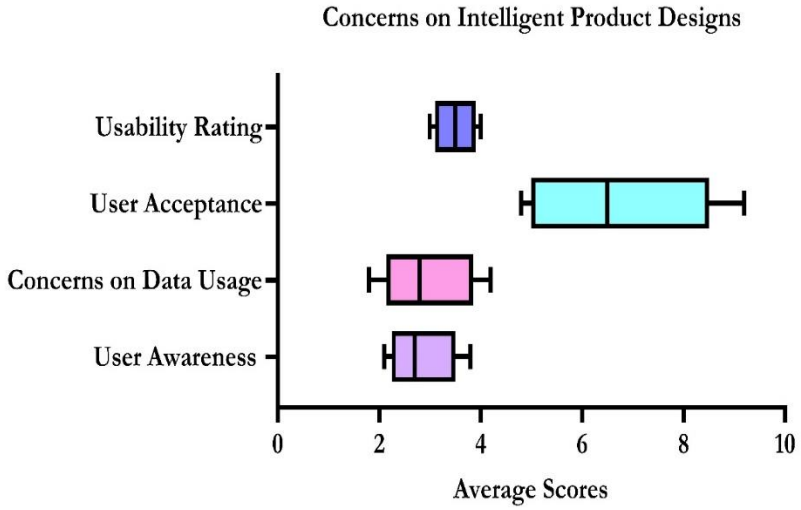

Figure 2: A Comparison of the levels of user awareness, concerns on data usage, acceptance and usability ratings of intelligent product designs.

In Figure 2, user awareness (average 2.9) and concerns about data usage (average 3.7) remained moderate, user acceptance (average 6.3) and usability ratings (average 3.7) were generally positive. This suggests that

users may prioritize functionality and ease of use even with some reservations about data privacy. There were variations across participants, with some individuals expressing high comfort levels (user 5: awareness 3.8, concerns 1.8, acceptance 9.2) while others showed greater apprehension

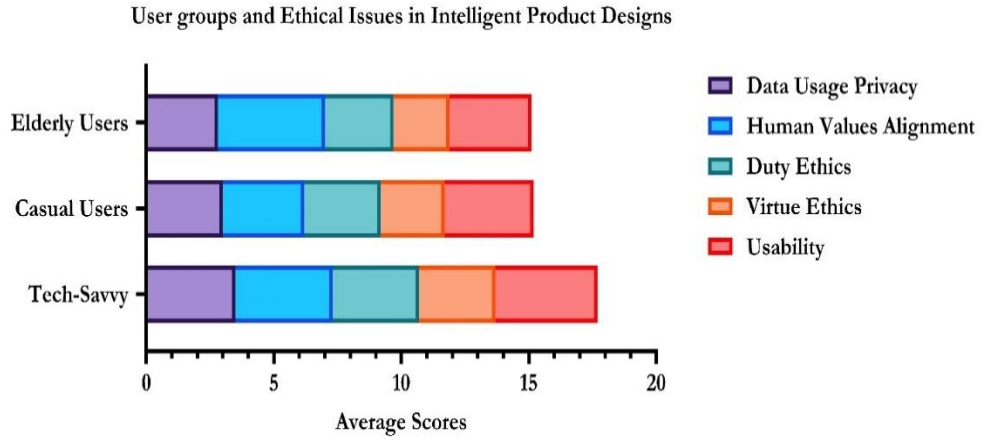

Figure 3: A Comparison of different user groups and ethical issues in intelligent product designs

In Figure 3, Tech-savvy users (average scores: data privacy - 3.5, human values - 3.8, duty ethics - 3.4, virtue ethics - 3.0, usability - 4.0) demonstrated higher awareness across all ethical considerations compared to casual users (average scores: data privacy - 3.0, human values - 3.2, duty ethics - 2.5, virtue ethics - 2.5, usability - 3.5). Interestingly, elderly users (average scores: data privacy - 2.8, human values - 4.2, duty ethics - 2.7, virtue ethics - 2.2, usability - 3.2) showed the highest concern for human values alignment despite having lower overall awareness of the other ethical categories.

Table 2: Human Values Alignment

Theme	Explanation	Example
Fairness and Non-Discrimination	Intelligent systems should treat users fairly and avoid perpetuating biases.	A facial recognition system used for security purposes is trained on a diverse dataset to minimize racial bias.
Autonomy and Control	Users should retain control over their interactions with intelligent products and the decisions they make.	A home automation system allows users to set custom privacy preferences for different devices.
Human Flourishing	Intelligent products should be designed to support human well-being and societal good, not undermine them.	An educational AI tutor adapts its teaching approach based on student learning styles and emotional state to optimize learning.

In Table 2, Fairness and non-discrimination emphasize the importance of systems that treat users equally, avoiding biases that could disadvantage certain groups. Autonomy and control highlight the user's right to maintain agency in their interactions with the technology, making informed decisions. Finally, the principle of human flourishing emphasizes the need for intelligent products to contribute to user well-being and societal good, not hinder it.

Table 3: Usability and User Acceptance

Theme	Explanation	Example
User Interface (UI) Design	The interface should be clear, intuitive, and designed for the intended user group.	A voice assistant app uses simple language commands and provides clear visual feedback for user interactions.
Transparency of Functionality	Users should understand how the intelligent system works and the basis for its decisions.	A recommendation engine on a shopping platform explains the factors influencing product recommendations.
Error Handling and Recovery	The system should gracefully handle errors and provide users with clear options to recover from mistakes.	A self-driving car encountering an unexpected obstacle activates emergency braking while notifying passengers and authorities.

In Table 3, User Interface (UI) Design should be clear and intuitive, tailored to the target user group. Transparency of Functionality is essential, allowing users to understand how the system works and the reasoning behind its decisions. Finally, robust Error Handling and Recovery are paramount. The system should gracefully handle errors and provide users with clear options to fix mistakes, minimizing frustration and ensuring a smooth user experience.

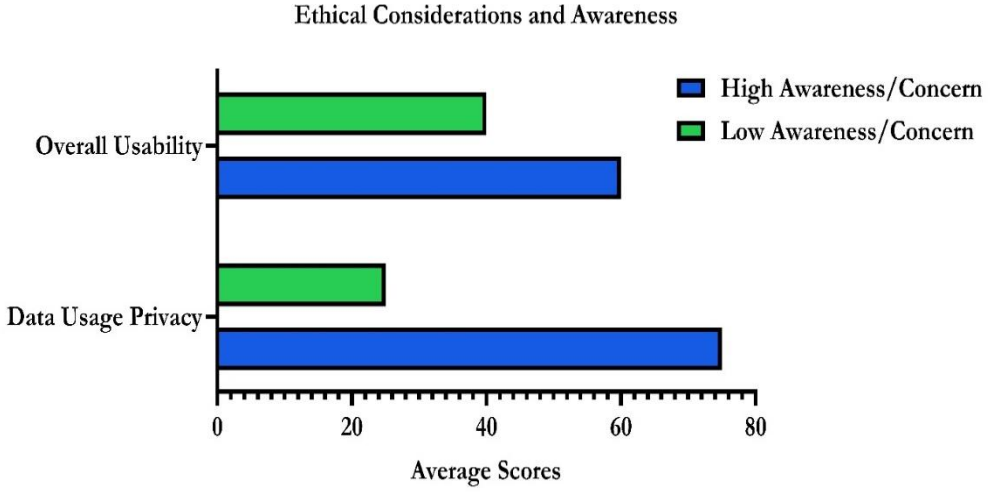

Figure 4: Ethical Considerations and Awareness

In Figure 4, a significant majority (75%) expressed high awareness or concern regarding data usage privacy, a smaller proportion (60%) reported high awareness or satisfaction with overall usability. This suggests a need for developers to bridge the gap by creating ethically responsible products that are also user-friendly and transparent about data practices.

Table 4: Philosophical Implications at the Individual Level

Theme	Explanation (Philosophical Principle)	Example
Free Will and Autonomy	Virtue of Phronesis (Practical Wisdom): Intelligent products can hinder our ability to develop phronesis by limiting exposure to diverse viewpoints and opportunities to make choices that require careful consideration. This can weaken our capacity for moral reasoning and acting virtuously.	A personalized news feed that filters content based on user preferences may restrict exposure to challenging perspectives, hindering the development of critical thinking and open-mindedness, which are crucial aspects of phronesis.
Privacy and the Self	Aristotelian Golden Mean: Data collection and analysis by intelligent products can disrupt the balance between individual privacy and the pursuit of a flourishing life (eudaimonia) as envisioned by Aristotle. Excessive data collection might create a chilling effect on open expression and limit opportunities for self-exploration, hindering eudaimonia.	Facial recognition technology used for social media filters can disrupt the balance between privacy and the desire for social connection and self-expression. While these filters offer creative outlets, excessive focus on curated online personas might detract from genuine self-discovery.
Moral Responsibility and Blame	Utilitarianism (Principle of Utility): In the case of accidents or errors involving intelligent products, the principle of utility suggests holding the party responsible for maximizing overall well-being. This could be the manufacturer for ensuring system safety or the user for potentially misusing the technology.	A self-driving car malfunctioning and causing an accident sparks debates about maximizing utility. The manufacturer is responsible for ensuring safe systems, but the user might also share blame for engaging the autonomous driving function without due diligence.

In Table 4, Limited exposure to diverse viewpoints due to these products can hinder the development of phronesis (practical wisdom), impacting our ability to make moral decisions (virtue ethics). Data collection might

disrupt the Aristotelian Golden Mean, creating a privacy imbalance that could stifle self-exploration and hinder eudaimonia (flourishing life). Utilitarianism highlights maximizing overall well-being in accidents, raising questions about responsibility: the manufacturer for system safety or the user for misuse.

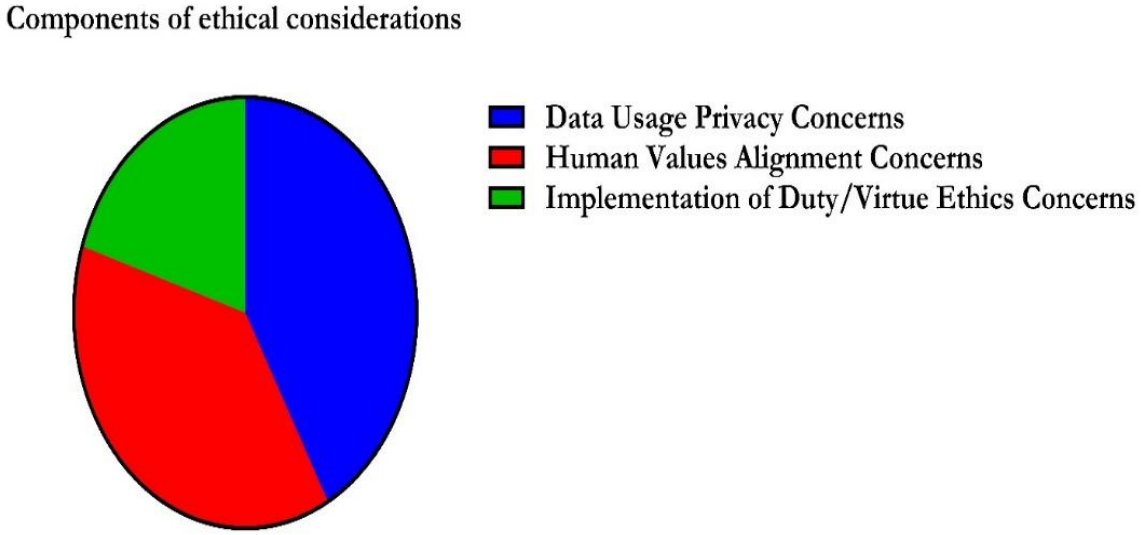

Figure 5: Percentage Representation of Components of ethical considerations

In Figure 5, Data privacy emerged as the primary concern, with 42% of participants expressing apprehension about data usage practices. Human values alignment followed closely at 38%, suggesting user anxieties about the potential for intelligent products to clash with their personal beliefs. Concerns regarding the implementation of duty and virtue ethics within these systems came in last at 20%, indicating a lower level of user awareness or focus on the specific ethical frameworks employed by the technology.

Table 5(a): Philosophical Implications at the Societal Level

Theme	Explanation (Philosophical Principle)	Example
Social Justice and Equity	John Rawls' Veil of Ignorance: Intelligent products can perpetuate social inequalities by failing to consider a fair distribution of benefits and burdens for all members of society, violating the Rawlsian concept of justice as fairness. Algorithmic bias based on historical data patterns can disadvantage certain demographics.	Algorithmic decision-making tools used in loan applications might disproportionately disadvantage certain demographics based on historical data patterns. This violates the Rawlsian concept of justice as fairness, which emphasizes equal opportunity for all members of society behind a "veil of ignorance" where one's social position is unknown.

Table 5(b): Philosophical Implications at the Societal Level

Theme	Explanation (Philosophical Principle)	Example
The Nature of Work and Employment	Virtue of Eudaimonia (Human Flourishing): As intelligent systems automate tasks, the nature of work and employment may shift, potentially impacting opportunities for human flourishing. While automation offers benefits, it might also limit opportunities for engaging in meaningful work that contributes to a sense of purpose and fulfilment.	The rise of AI-powered customer service chatbots raises questions about the future of human jobs that contribute to a sense of purpose and fulfilment. While automation can increase efficiency, it's important to consider how it might impact human well-being and the opportunity to engage in work that contributes to eudaimonia.
The Human-Machine Relationship	Aristotelian Teleology (Function): Intelligent products reshape our interactions with technology, prompting us to re-evaluate the purpose and function of human relationships in a world increasingly mediated by machines. This raises questions about what constitutes a "good life" (eudaimonia) in this evolving landscape.	The growing use of AI companions and social robots compels us to re-evaluate the purpose and function of human relationships in an age of artificial companionship. While these technologies offer connection and entertainment, it's important to consider how they might redefine human flourishing in a world where human-machine interaction becomes increasingly prominent.

In Table 5, Intelligent products raise social justice concerns (Rawls' Veil) as algorithms might perpetuate bias and disadvantage certain groups. Automation's impact on work (Eudaimonia) is complex, potentially limiting opportunities for purpose-driven jobs. The human-machine relationship (Aristotelian Teleology) compels us to redefine the role of human connection in a technology-driven world, questioning what constitutes a flourishing life (eudaimonia) in this new landscape.

4. DISCUSSION

Our findings revealed a complex interplay between user awareness, concerns, and acceptance of intelligent products. While user awareness of ethical considerations (data privacy, human values alignment, duty/virtue ethics) remained moderate across all categories, user comfort levels were

generally lower. However, overall usability remained the highest rated aspect, suggesting a prioritization of functionality despite privacy reservations. Interestingly, user experience varied based on technological expertise. Tech-savvy users displayed higher awareness across all ethical categories compared to casual users, highlighting a potential knowledge gap. Elderly users, however, showed the highest concern for human values alignment despite having lower overall awareness of other ethical considerations. The analysis of data usage privacy emerged as a primary concern, followed by anxieties about human values alignment and the potential for intelligent products to clash with user beliefs. Thematic analysis identified three key areas of user concern regarding data usage: transparency and control, data security, and secondary uses of data. Users emphasized the need to understand what data is collected, how it's used, and have control over its usage. Robust data security safeguards and clear communication about potential secondary uses of data were also deemed crucial. Considering the societal aspects of HCI research, Hochheiser and Lazar (2007) in "HCI and Societal Issues: A Framework for Engagement" identify the factors and mechanisms shaping HCI responses to societal demands (Hochheiser & Lazar, 2007). They advocate for proactive and principled engagement in design processes. Additionally, Value Sensitive Design (VSD) promotes the explicit consideration of specific values, such as democracy, fairness, inclusion, and responsible technology use, as a means of achieving design goals. VSD practitioners address questions like: which values are most relevant in a particular design case, whose values are being considered and how are they defined within the context, and what methods are most effective for uncovering, eliciting, and defining these values. Additionally, VSD emphasizes the necessary social science knowledge and skills required for effective value-driven design (Friedman et al., 2013). Harper et al. (2008) address the growing importance of human values in the design of intelligent interactions in the first decade of the new millennium (Harper et al., 2008). They propose a new paradigm for understanding the human-technology relationship. This paradigm emphasizes the blurring boundaries between computers and people, as well as between computers and the physical world. Furthermore, it acknowledges the increasing reliance on technology (techno-dependency), the expanding collection of digital footprints, and the rise of creative user engagement. In response to these trends, HCI research needs to evolve. This includes developing new perspectives on the role, function, and consequences of design, fostering collaboration with other disciplines, and critically reevaluating its core concepts and terminology. Schneider et al.

(2017) analyze the role of HCI in tackling critical societal challenges and identified 16 grand challenges categorized as either society-oriented or technology-oriented (Schneider et al., 2017). Furthermore, they emphasize the need for fostering improved interdisciplinary methods that bridge the gap between science, engineering, and design disciplines. Our analysis suggests that usability and user acceptance concerns for intelligent systems, at both the implementation and social/organizational levels, largely mirror those of traditional systems. However, the core challenge lies in the nature of interaction itself. We propose an alternative framework for understanding the essential requirements for human-system interaction, regardless of system type. This is particularly important because, after all, it's the same humans interacting with diverse systems. We argue that traditional HCI approaches rely on assumptions about technology features that may not hold true for intelligent systems, necessitating a new perspective on interaction design. Traditional HCI approaches have addressed usability by assuming computer systems are simply tools, analyzing user needs from that perspective. We use Heidegger's hammer analogy to argue that systems should be "ready-to-hand," similar to how a carpenter doesn't think about a hammer until encountering a problem. The user should ideally be unaware of the system's intricacies while performing a task. For instance, a word processor should be "invisible," supporting document creation without users needing to focus on its internal workings. Similarly, information systems like web documents should be easily navigable, allowing users to concentrate on content rather than navigation mechanics. Such applications may incorporate AI technologies (e.g., spell-checker suggestions or intelligent search agents), but these should remain transparent to the user. Established HCI theories and techniques like domain-device fit and learnability remain relevant for these systems. However, "intelligent systems" whose behavior adapts or becomes unpredictable to the user demand new approaches. One approach is to reformulate learnability as a process of establishing and maintaining "common ground" between user and system (Blandford, 2001). From this perspective, learnability focuses on how easily users develop a shared understanding with the system, while conceptual fit considers how well the system aligns with the user's initial knowledge. Ultimately, achieving and maintaining this common ground necessitates dialogue coherence. The evolving nature of human-AI interaction necessitates a reevaluation of management practices within organizations to mitigate potential ethical pitfalls (Rai et al., 2019). To ensure positive outcomes, such as employee well-being, organizations must prioritize ethical considerations when

making strategic decisions about implementing and utilizing the latest AI technologies (Marabelli et al., 2021). A two-pronged approach is key to integrating ethical principles into strategic management. First, organizations must enforce a culture of "ethics by duty" by establishing clear guidelines and developing ethical principles that define obligatory ethical behavior for both employees and AI systems (Alsheibani et al., 2020). Ethical considerations must extend beyond simply enforcing guidelines (duty ethics) to encompass the inherent moral values that motivate individuals (virtue ethics) within the workforce (Flathmann et al., 2021). A successful approach to managing human-AI interaction ethically requires a balanced integration of both perspectives (Eitel-Porter, 2021). Despite the growing body of research on AI ethics, several key gaps remain. First, a unifying theoretical framework that bridges the technical and ethical aspects of AI is needed (Berente et al., 2021). Second, there is a lack of research that comprehensively explores the ethical challenges arising at the intersection of society, business, and technology (Islam & Greenwood, 2021). Finally, the current focus on developing rules and guidelines for ethical AI behavior (Siau & Wang, 2020) represents only one facet of a multifaceted ethical management strategy. On the philosophical level, the study explored how intelligent products impact core concepts. Limited exposure to diverse viewpoints due to these products can hinder the development of phronesis (practical wisdom) and moral decision-making. Data collection practices might disrupt the Aristotelian Golden Mean, creating a privacy imbalance that could stifle self-exploration and hinder eudaimonia (flourishing life). Utilitarianism highlights maximizing overall well-being in accidents, raising questions about responsibility: the manufacturer for system safety or the user for misuse. Socially, intelligent products raise concerns about justice and equity (Rawls' Veil of Ignorance) as algorithms might perpetuate bias and disadvantage certain demographics. Automation's impact on work (Eudaimonia) is complex, potentially limiting opportunities for purpose-driven jobs. The human-machine relationship (Aristotelian Teleology) compels us to redefine the role of human connection in a technology-driven world, questioning what constitutes a flourishing life (eudaimonia) in this evolving landscape. Aristotle, in his Rhetoric, identified three key attributes that influence an orator's ability to convince an audience: ethos, pathos, and logos. Ethos refers to the speaker's credibility, as trust is more readily granted to those perceived as honorable. Pathos pertains to influencing the audience's emotional state, as persuasion can be achieved by evoking specific feelings. Logos refers to the logical arguments presented in the speech, where

persuasion hinges on demonstrably true propositions (Stephanidis et al., 2019). While human-technology interaction in augmented environments may be more akin to a dialogue than a monologue, the underlying principles of persuasion still hold relevance. For users to accept and adopt these technologies, they must be perceived as ethical (ethos), evoke positive emotions (pathos), and demonstrate trustworthiness through their functionality (logos). Ethical considerations, including privacy, trust, and security, have always been central concerns surrounding technology. However, these issues take on new dimensions in the context of intelligent and technologically augmented environments. The sheer volume of recent literature on ethics in various emerging technological domains, such as AI, AmI, big data, IoT, autonomous agents, robotics, and mobility services (e.g., automated driving) underscores the urgency and importance of this topic (Biondi et al., 2019; Dignum, 2018). Furthermore, the existence of specialized communities and organizations dedicated to exploring ethics and ethical intelligence further highlights its growing significance (Marcus, 2015). These developments underscore the critical role of ethical considerations in fostering a symbiotic relationship between humans and technology within these evolving environments. The growing ubiquity of interactive technologies across all aspects of life presents a challenge for HCI research. Traditionally conducted in lab settings, the field now necessitates expanding research methodologies to encompass real-world contexts and "in the wild" studies (Crabtree et al., 2013). Public spaces, in particular, pose a unique ethical dilemma. Standard procedures for informing participants and obtaining informed consent can potentially influence user experience and behavior if participants are aware they are being observed (Williamson & Sundén, 2016). Similar concerns arise when conducting research involving participants in museums or at the intersection of art and technology, where clear distinctions between research participants and event attendees are often blurred (Fiesler et al., 2018). Beyond the challenges of informed consent, conducting HCI research with vulnerable user populations like older adults, people with disabilities, immigrants, socially isolated individuals, patients, and children requires particular sensitivity. In addition to ensuring participants' comprehension of the study and obtaining their informed consent, researchers must address potential misunderstandings, manage unrealistic or overly optimistic expectations about the technology, and be prepared to handle situations where the technology malfunctions (Waycott et al., 2016). The recent surge in technological advancements has brought to light new ethical concerns regarding online data usage in HCI research. One such

concern is the use of data without explicit user consent. A critical question emerges: can researchers ethically utilize publicly available data without consent? (Frauenberger et al., 2017). This raises further questions about the very definition of "public data" and the best practices for obtaining informed consent in such scenarios. Additionally, participant anonymity presents a significant challenge, as studies have shown that data can be de-anonymized when combined with other datasets (Vitak et al., 2016).

5. CONCLUSION

Our study explored the complex relationship between user perceptions and ethical considerations in intelligent products. While user awareness of ethical issues existed, concerns regarding data privacy and human values alignment remained high. Usability prioritized over privacy suggests a need for user-friendly interfaces coupled with robust data practices. Philosophical considerations highlight the potential impact on human flourishing and social justice. These findings urge developers to create ethically responsible products that prioritize user well-being alongside functionality.

References

Alsheibani, S. A., Messom, D. C., Cheung, Y., & Alhosni, M. (2020). Reimagining the strategic management of artificial intelligence: Five recommendations for business leaders.

Baird, A., & Maruping, L. M. (2021). The Next Generation of Research on IS Use: A Theoretical Framework of Delegation to and from Agentic IS Artifacts. *Mis Quarterly*, *45*(1).

Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Managing artificial intelligence. *Mis Quarterly*, *45*(3).

Biondi, F., Alvarez, I., & Jeong, K.-A. (2019). Human–vehicle cooperation in automated driving: A multidisciplinary review and appraisal. *International Journal of Human–Computer Interaction*, *35*(11), 932-946.

Blandford, A. (2001). Intelligent interaction design: the role of human - computer interaction research in the design of intelligent systems. *Expert systems*, *18*(1), 3-18.

Carroll, J. M. (2009). Human computer interaction (HCI). *Encyclopedia of Human-Computer Interaction. Aarhus: The Interaction Design Foundation*.

Crabtree, A., Chamberlain, A., Grinter, R. E., Jones, M., Rodden, T., & Rogers, Y. (2013). Introduction to the special issue of "The Turn to The Wild". In (Vol. 20, pp. 1-4): ACM New York, NY, USA.

Dignum, V. (2018). Ethics in artificial intelligence: introduction to the special issue. *Ethics and Information Technology*, *20*(1), 1-3.

Dix, A. (2017). Human–computer interaction, foundations and new paradigms. *Journal of Visual Languages & Computing*, *42*, 122-134.

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., & Ahuja, M. (2023). Opinion Paper:"So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642.

Eitel-Porter, R. (2021). Beyond the promise: implementing ethical AI. *AI and Ethics*, *1*(1), 73-80.

Fiesler, C., Hancock, J., Bruckman, A., Muller, M., Munteanu, C., & Densmore, M. (2018). Research Ethics for HCI: A roundtable discussion. Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems,

Flathmann, C., Schelble, B. G., Zhang, R., & McNeese, N. J. (2021). Modeling and guiding the creation of ethical human-AI teams. Proceedings of the 2021 AAAI/ACM Conference on AI, Ethics, and Society,

Frauenberger, C., Bruckman, A. S., Munteanu, C., Densmore, M., & Waycott, J. (2017). Research Ethics in HCI: A town hall meeting. Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems,

Friedman, B., & Kahn Jr, P. H. (2007). Human values, ethics, and design. In *The human-computer interaction handbook* (pp. 1267-1292). CRC press.

Friedman, B., Kahn, P. H., Borning, A., & Huldtgren, A. (2013). Value sensitive design and information systems. *Early engagement and new technologies: Opening up the laboratory*, 55-95.

Harper, R., Rodden, T., Roggers, Y., & Sellen, A. (2008). Being human: Hci in 2020. *Microsoft, Cambridge, UK*.

Hochheiser, H., & Lazar, J. (2007). HCI and societal issues: A framework for engagement. *International Journal of Human [# x02013] Computer Interaction*, *23*(3), 339-374.

Islam, G., & Greenwood, M. (2021). Reconnecting to the social in business ethics. In (Vol. 170, pp. 1-4): Springer.

Kaplan, J. (2016). Artificial intelligence: Think again. *Communications of the ACM*, *60*(1), 36-38.

Lee, Y. H., & Evens, M. W. (1998). Natural language interface for an expert system. *Expert systems*, *15*(4), 233-239.

Maedche, A., Legner, C., Benlian, A., Berger, B., Gimpel, H., Hess, T., Hinz, O., Morana, S., & Söllner, M. (2019). AI-based digital assistants: Opportunities, threats, and research perspectives. *Business & Information Systems Engineering*, *61*, 535-544.

Marabelli, M., Newell, S., & Handunge, V. (2021). The lifecycle of algorithmic decision-making systems: Organizational choices and ethical challenges. *The Journal of Strategic Information Systems*, *30*(3), 101683.

Marcus, A. (2015). *Mobile persuasion design*. Springer.

Mollick, E. (2022). ChatGPT is a tipping point for AI. *Harvard Business Review*, *14*, 1-6.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S., & Carey, T. (1994). *Human-computer interaction*. Addison-Wesley Longman Ltd.

Rai, A., Constantinides, P., & Sarker, S. (2019). Next generation digital platforms: toward human-AI hybrids. *Mis Quarterly*, *43*(1), iii-ix.

Schneider, O., MacLean, K., Swindells, C., & Booth, K. (2017). Haptic experience design: What hapticians do and where they need help. *International Journal of Human-Computer Studies*, *107*, 5-21.

Self, J. (1998). The defining characteristics of intelligent tutoring systems research: ITSs care, precisely. *International journal of artificial intelligence in education*, *10*, 350-364.

Siau, K., & Wang, W. (2020). Artificial intelligence (AI) ethics: ethics of AI and ethical AI. *Journal of Database Management (JDM)*, *31*(2), 74-87.

Stephanidis, C., Salvendy, G., Antona, M., Chen, J. Y., Dong, J., Duffy, V. G., Fang, X., Fidopiastis, C., Fragomeni, G., & Fu, L. P. (2019). Seven HCI grand challenges. *International Journal of Human–Computer Interaction*, *35*(14), 1229-1269.

Vitak, J., Shilton, K., & Ashktorab, Z. (2016). Beyond the Belmont principles: Ethical challenges, practices, and beliefs in the online data research community. Proceedings of the 19th ACM conference on computer-supported cooperative work & social computing,

Waycott, J., Munteanu, C., Davis, H., Thieme, A., Moncur, W., McNaney, R., Vines, J., & Branham, S. (2016). Ethical encounters in human-computer interaction. Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems,

Williamson, J. R., & Sundén, D. (2016). Deep cover HCI: The ethics of covert research. *Interactions*, *23*(3), 45-49.

Xu, L. D., & Li, L. X. (2000). A hybrid system applied to epidemic screening. *Expert systems*, *17*(2), 81-89.