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AI Ethics and Societal Perspectives: A Comparative Study of Ethical Principle Prioritization Among Diverse Demographic Clusters

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Abstract

Given the resource-intensive and occasionally impracticable nature of concurrently addressing all AI ethical principles, it becomes imperative to examine how distinct societal clusters assign varying degrees of importance to these principles when they are collectively implemented. This examination is crucial for developing a deeper understanding of societal priorities to facilitate more effective and contextually relevant applications of AI ethics. This study employed a qualitative research approach to examine the prioritization of various ethical and social concerns associated with artificial intelligence (AI) across different demographic groups. The research focused on diverse categories including age, educational level, industry/sector, technology usage, and gender identity, with a particular emphasis on ethical and social concerns such as autonomy, sustainability, transparency, safety and security, fairness and non-discrimination, privacy and data governance, accountability, and beneficence. A purposive sampling method was applied to ensure a representative sample of 280 participants. Data was primarily gathered through open-ended, semi-structured interviews, supplemented by a pilot study to refine the interview methodology. Content analysis was conducted on the interview transcripts to identify thematic categories and discern patterns in prioritization among demographic groups. The findings revealed significant variation in the prioritization of AI ethical principles across demographic groups. Young adults, for instance, highly valued autonomy, sustainability, and transparency, while middle-aged adults prioritized safety, privacy, and accountability. In contrast, older adults showed a preference for beneficence, fairness, and privacy. Educational level also influenced prioritization; those with higher education degrees tended to prioritize more complex and forward-looking aspects of AI ethics such as sustainability and beneficence, whereas those with lower educational attainment focused on immediate and tangible concerns like safety and privacy. Industry and sector-specific variations were also notable. For example, professionals in the technology and AI sector emphasized transparency and autonomy, while those in healthcare prioritized beneficence, safety, and privacy. Government and public policy professionals showed a strong inclination towards accountability, fairness, and privacy. Technology usage levels influenced prioritization as well. Frequent technology users valued transparency and autonomy, while those with limited technology usage focused on safety and security. Gender identity also played a role; for instance, individuals identifying as male prioritized autonomy and transparency, whereas female-identifying individuals focused on privacy and fairness. This study provides an in-depth understanding of how different demographic groups prioritize AI ethical principles. It highlights the necessity for AI development and policy-making to be cognizant of these diverse perspectives, ensuring inclusive and equitable AI practices.

Keywords: *Autonomy, Demographics, Ethical Principles, Privacy, Societal Impact, Technology Usage, Transparency*

Introduction

Artificial Intelligence (AI) is fundamentally altering the global landscape, influencing a myriad of sectors ranging from healthcare to finance, and from environmental

management to education. Its capacity to analyze vast quantities of data, recognize patterns, and execute tasks with efficiency surpassing human capabilities is undeniably advantageous. For instance, in healthcare, AI algorithms are being utilized for early disease detection and personalized treatment plans, for enhancing patient outcomes and streamlining healthcare delivery. In environmental management, AI assists in climate modeling and conservation strategies, contributing to more effective responses to ecological crises. However, the rapid proliferation of AI also begets substantial challenges. The inherent biases in AI algorithms, originating from skewed datasets or prejudiced programming, can perpetuate and even amplify societal inequities [1]–[3]. Moreover, the automation of jobs raises concerns about employment displacement and economic inequality. These challenges necessitate a holistic examination of AI's societal impacts, ensuring that its benefits do not come at the cost of exacerbating existing disparities or creating new ethical dilemmas.

Figure 1. Overview of Artificial Intelligence Impacts and Challenges in Key Sectors

Sector	AI Benefits	AI Challenges
Healthcare 	Improved diagnosis and treatment	Biases, ethical concerns, privacy issues
Environmental Management 	Enhanced climate modeling and conservation	Prediction biases, ethical issues in resource use
Finance 	Risk assessment, fraud detection	Algorithmic biases, privacy, employment impact
Education 	Tailored learning, efficient assessments	Content biases, privacy, access inequality

The ethical implications of AI's integration into daily life demand rigorous scrutiny. The technology's deployment often intersects with privacy concerns, as AI systems can collect and analyze personal data on an unprecedented scale. This raises questions about consent, data ownership, and surveillance. AI's decision-making processes, often opaque and lacking in transparency, pose challenges for accountability. When AI systems make errors or exhibit biased behaviors, attributing responsibility becomes complex, leading to ethical and legal quandaries. These issues demand the necessity for ethical frameworks and regulatory mechanisms to guide AI development and deployment. Such frameworks should be inclusive, considering the diverse impacts of AI across different demographics

and geographies, in order to ensure equitable access to the technology's benefits and protection from its potential harms [4].

AI ethics, a distinct but integral component of digital ethics [5], has emerged as an area of focus in response to the influence of artificial intelligence and other digital technologies like big data analytics and blockchain. This nascent field of study scrutinizes the moral dimensions and societal implications of AI, which are becoming increasingly salient as the technology permeates various facets of human life. At its core, AI ethics seeks to navigate the intricate moral landscape that arises from AI's capabilities and limitations, striving to balance the immense potential benefits with the inherent risks and challenges. This balance involves addressing a spectrum of ethical considerations, such as ensuring fairness in algorithmic decision-making, maintaining privacy and data security, and upholding human dignity and rights in the face of automated systems. As a subset of digital ethics, AI ethics extends beyond the technical aspects of AI development and deployment, encompassing broader societal and philosophical questions about the role and impact of technology in our lives.

The urgency of establishing a societal robust framework for AI ethics is caused by an increasing number of instances where AI has caused or has the potential to cause harm. High-profile cases have brought to light the detrimental effects of AI misuse, such as psychometric voter manipulation, where personal data is used to influence electoral outcomes, and the pervasive use of facial recognition technology, which raises significant surveillance and privacy concerns [6]. Similarly, the unintentional consequences of AI design flaws have also garnered attention. Algorithms in areas such as criminal justice, financial services, and healthcare have exhibited biases, leading to unfair outcomes like skewed recidivism predictions, discriminatory loan rejections, and medical misdiagnoses. These examples illustrate the dual-edged nature of AI: while the technology holds transformative potential, its misuse or flawed design can propagate harm, magnify existing inequalities, and undermine public trust in digital systems [7].

Given these challenges, the field of AI ethics is not only reactive but also proactive, aiming to anticipate and mitigate potential harms before they occur. Ethical AI development mandates a thorough understanding of the contexts in which AI systems operate and the populations they affect. This understanding helps in creating systems that are not only technically sound but also socially responsible. Moreover, there is a growing emphasis on incorporating ethical considerations throughout the AI design and deployment process, rather than treating them as an afterthought. This involves embedding principles such as transparency, accountability, and fairness into the very fabric of AI systems. By fostering a culture of ethical awareness and responsibility in the field of AI, practitioners and researchers can guide the technology towards positive societal outcomes while minimizing its adverse impacts.

In response to the ethical quandaries posed by artificial intelligence, initiatives has been launched by various entities including academic institutions, government bodies, non-

governmental organizations (NGOs), and corporate entities. These endeavors predominantly involve the formulation of AI ethics guidelines, reflecting a collective effort to navigate and mitigate the ethical complexities associated with AI. For instance, the Montreal Declaration [8], [9], primarily spearheaded by an academic institution, emphasizes the responsible development of AI. This declaration delineates a framework of principles that aspire to guide AI development in a manner that is beneficial and equitable for society at large. It accentuates core ethical values such as well-being, autonomy, and justice.

Another contribution in this domain is the work of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has published a report outlining the ethical considerations relevant to intelligent systems, marking a seminal effort in establishing normative guidelines for this field [10], [11]. Beyond the report, IEEE is actively engaged in the development of a series of technical standards tailored for AI and intelligent systems. These standards aim to provide a concrete foundation for the ethical design, implementation, and deployment of AI technologies, addressing many aspects such as transparency, accountability, and user data rights.

In the corporate sector, numerous companies are increasingly vocal about their commitment to ethical AI principles. Through press releases, policy documents, and public statements, these entities are articulating their stances on key ethical issues such as fairness, transparency, and privacy in AI systems. This trend reflects a growing recognition within the business community of the importance of ethical considerations in AI development and deployment. By publicly acknowledging and prioritizing ethical issues, these companies not only contribute to the broader discourse on AI ethics but also set benchmarks for responsible business practices in this technologically advancing era. This trend of corporate engagement in AI ethics is instrumental in shaping industry norms and influencing consumer expectations and regulatory frameworks.

Ethical principles of AI

The profound influence of artificial intelligence (AI) on societal dynamics has catalyzed numerous debates centered around the ethical principles and values that ought to steer its development and application. In the wake of these discussions, there has been a notable proliferation of ethical AI principles issued by various entities, including governments, national, and international organizations. These principles, varying in their scope and specificity, aim to provide a moral compass for the responsible implementation and utilization of AI technologies. A significant portion of these ethical guidelines is of a generic nature, predominantly devised by international organizations. The objective behind these universally applicable principles is to offer a broad, inclusive framework that can guide the implementation and use of AI across diverse member countries or companies. These principles often encapsulate fundamental ethical considerations such as fairness, transparency, privacy, and accountability, providing a foundational ethical outline that can be adapted and applied in various contexts [12].

Conversely, contextual principles are formulated with a more focused approach, tailored to address the unique challenges and requirements of specific environments or national contexts. These principles are primarily developed by national organizations and governments, taking into consideration the distinctive social, cultural, economic, and political landscapes of their respective countries. The design of such contextual principles involves understanding of the local AI ecosystem, including the prevalent technological capabilities, regulatory frameworks, and societal values. By factoring in these localized elements, national AI ethics guidelines aim to ensure that the deployment of AI technologies aligns with the specific needs and priorities of the country, while also addressing potential regional challenges such as disparities in technological access or the impact of AI on local labor markets.

The discourse surrounding the ethical implications and governance of Artificial Intelligence (AI) has become increasingly pertinent in contemporary society, given the rapid advancements and pervasive integration of AI technologies across various sectors. Many entities, ranging from academic institutions to governmental bodies and international organizations, have embarked on the task of defining and implementing ethical principles for AI. These entities, dispersed across continents, reflect a diverse array of cultural, legal, and philosophical perspectives, yet converge on certain core principles that are deemed essential for the responsible development and deployment of AI technologies [13].

Among the central tenets consistently advocated by these bodies is the principle of human-centricity, which posits that AI should be developed and employed in a manner that prioritizes human welfare and dignity. This involves ensuring that AI systems do not infringe upon human rights and that they operate within the bounds of fairness, inclusivity, and non-discrimination. Moreover, there is a strong emphasis on the transparency and explainability of AI systems, recognizing the need for accountability in AI decision-making processes and the importance of making these processes understandable and interpretable to users and stakeholders [5]. These principles aim to foster trust and confidence in AI systems among the general public, which is crucial for the societal acceptance and ethical integration of AI into everyday life.

Another focal point in the discourse on AI ethics is the mitigation of potential risks associated with AI, including the prevention of harm and the careful management of privacy and data security. This involves the establishment of robust frameworks for the evaluation and monitoring of AI systems, ensuring they adhere to high standards of safety, reliability, and security. The potential impact of AI on employment and the economy is also a subject of intense scrutiny, with many advocating for strategies to address the displacement of workers and the creation of new opportunities in an AI-driven future [14]. Additionally, the environmental sustainability of AI systems has emerged as a critical concern, prompting calls for the development of AI in a manner that is cognizant of and responsive to environmental challenges.

Methods

In this study, a qualitative research approach was used to examine how various demographic groups prioritize different ethical and social concerns. The demographic categories considered included age, educational level, industry/sector, technology usage level, and gender identity. The focus was on ethical and social concerns such as autonomy, sustainability, transparency, safety and security, fairness and non-discrimination, privacy and data governance, accountability, and beneficence.

Table 1. Societal Clusters for Examining Valuation of AI Ethical Principles

Cluster Category	Sub-Clusters	Rationale
Age Groups	1. Young Adults (18-25 years)	Age-related differences may yield varying familiarity and comfort levels with AI technology, influencing ethical priorities.
	2. Middle-Aged Adults (26-55 years)	
	3. Older Adults (56 years and above)	
Educational Background	1. High School or Lower	Educational levels can shape one's comprehension and attitudes towards AI ethics.
	2. Undergraduate Degree	
	3. Postgraduate Degree	
Professional Sector	1. Technology and AI Industry	Different sectors have distinct stakes and viewpoints on AI ethics, shaped by professional experiences and requirements.
	2. Healthcare	
	3. Education	
	4. Government and Public Policy	
	5. Others (including unemployed and retired individuals)	
Income Levels	1. Low Income	Economic status can influence access to technology and perspectives on AI ethics' impact on societal outcomes.
	2. Middle Income	
	3. High Income	
Technology Usage and Literacy	1. Frequent technology users	The extent of technology usage and literacy can shape one's understanding and concerns about AI ethical issues.
	2. Moderate technology users	
	3. Limited technology users	
Gender and Gender Identity	1. Male	Gender perspectives can notably influence ethical concerns, particularly in areas like fairness and discrimination.
	2. Female	
	3. Non-Binary/Other gender identities	

The study employed a purposive sampling method to select participants, ensuring a diverse representation across the demographic categories. 280 participants were engaged in the study, with the sample size designed to provide depth and richness to the qualitative

data. Open-ended, semi-structured interviews were the primary data collection instrument. These interviews were designed to elicit detailed responses regarding the prioritization of the listed concerns.

A pilot study involving a small subset of the target demographic was conducted to refine the interview questions and approach. This preliminary phase was for ensuring the relevance and comprehensiveness of the questions posed in the main study.

In the analysis phase, the study used content analysis to systematically examine the interview transcripts. This involved coding the data into thematic categories and identifying patterns and trends in how different demographic groups viewed and prioritized the ethical and social concerns. The analysis sought to uncover underlying rationales and contextual factors influencing these prioritizations. Informed consent was obtained from all participants, and measures were taken to ensure their anonymity and confidentiality. The study employed strategies like using multiple interviewers and ensuring a diverse and representative sample.

Questions-A principle-specific question for participants

1. **Autonomy**:
   - Can you elaborate on how you perceive the concept of autonomy within AI technologies, and explain the factors that lead you to prioritize or deprioritize this aspect in relation to other ethical concerns in AI?
2. **Sustainability**:
   - How do you interpret the importance of sustainability in the development and application of AI technologies? What are your thoughts on the long-term implications of AI sustainability, and how does this shape your ethical stance?
3. **Transparency**:
   - In your opinion, what is the role of transparency in the operation and governance of AI systems? Could you describe scenarios where you find transparency to be crucial, and how you balance its importance with other ethical principles in AI?
4. **Safety and Security**:
   - Please discuss your views on the importance of safety and security in AI. How do you evaluate these concerns against other ethical dimensions, especially in scenarios where trade-offs might be necessary?
5. **Fairness and Non-discrimination**:
   - Reflect on the significance of fairness and non-discrimination in AI. How do you prioritize these principles in AI applications, and what are your thoughts on the challenges in ensuring fairness and non-discrimination in AI?
6. **Privacy and Data Governance**:

- Describe your perspective on the importance of privacy and data governance in AI. What factors influence your prioritization of these aspects, especially considering the evolving nature of data privacy in the digital age?

7. **Accountability**:
   - How do you define accountability in the context of AI, and what are your views on the mechanisms necessary to ensure accountability in AI systems? How do you compare its importance with other ethical considerations in AI?
8. **Beneficence**:
   - Please explain how you understand and prioritize beneficence in relation to AI. What are your thoughts on the potential positive impacts of AI on society, and how does this influence your ethical considerations?

Questions-B. demographic- specific question for participants

9. **Age Group**:
   - Could you discuss how your age group influences your perspectives and priorities regarding these ethical concerns in AI? Are there specific concerns that you believe are more pertinent or less relevant to your age demographic?
10. **Educational Level**:
    - How has your educational background, particularly in relation to technology and ethics, shaped your views on AI ethics? Do you believe that certain ethical principles in AI are more emphasized or overlooked due to educational influences?
11. **Industry/Sector**:
    - In what ways does your experience in your specific industry or sector impact your views on AI ethics? Are there certain ethical principles that are particularly prioritized or challenged in your professional field?
12. **Technology Usage Level**:
    - How does your frequency and depth of technology usage affect your perceptions and prioritizations of ethical concerns in AI? Do you believe that technology literacy plays a significant role in shaping ethical viewpoints?
13. **Gender Identity**:
    - Can you explore the role of your gender identity in shaping your ethical considerations of AI? Are there specific ethical concerns that you believe are more significant or less apparent based on gender perspectives?

Results

Table 2 demonstrates variations in prioritization of AI ethical principles among different age groups. Young adults predominantly prioritize autonomy, sustainability, and transparency, reflecting their future-oriented outlook and intrinsic familiarity with digital environments. This demographic exhibits a lower prioritization of privacy and data

governance, potentially due to their upbringing in an era characterized by pervasive digital information sharing. Middle-aged adults, conversely, place a higher emphasis on safety, security, privacy, and data governance, likely influenced by their dual responsibilities in professional and familial spheres and heightened engagement in online activities. Accountability is also a significant concern for this group, showing a desire for reliability and stability in technology that significantly impacts their lives. Older adults prioritize beneficence, fairness, non-discrimination, and privacy. This preference may stem from a heightened awareness of societal contributions and inclusivity concerns, coupled with a cautious approach to personal information protection. However, they exhibit less concern for autonomy and sustainability, which could be attributed to differing values or a lower degree of familiarity with these concepts in the context of AI.

Table 3 presents a stratification of AI ethical principle prioritization across varying educational levels. Individuals with a high school education or lower tend to prioritize safety, security, fairness, non-discrimination, and privacy in the context of AI. This inclination may stem from their focus on the immediate and tangible effects of AI in their daily lives, with less emphasis on the abstract or long-term implications. Their reduced prioritization of transparency and autonomy could be attributed to limited exposure to intricate discussions about AI's operational and governance aspects. Those with an undergraduate degree demonstrate a shift in priority towards transparency, accountability, and fairness, possibly reflecting a more critical and informed perspective gained through higher education. These individuals may exhibit less concern for beneficence and sustainability, indicating a focus on other ethical dimensions over long-term impacts.

Table 2. Prioritization of AI Ethical Principles by Different Age Groups

Demographic	High Priority	Moderate Priority	Lower Priority	Rationale
Young Adults	Autonomy, Sustainability, Transparency	Safety and Security, Fairness and Non-discrimination	Privacy and Data Governance, Accountability, Beneficence	Young adults, often being digital natives, might prioritize autonomy and sustainability due to their future-oriented perspective and comfort with technology. Transparency in AI might also be highly valued as this demographic often seeks openness and authenticity. However, they might place less emphasis on privacy, having grown up in a digital era where sharing information online is commonplace.
Middle-Aged Adults	Safety and Security, Privacy and Data Governance, Accountability	Fairness and Non-discrimination, Beneficence	Autonomy, Transparency, Sustainability	This group, often balancing professional and familial responsibilities, may prioritize safety and security to protect themselves and their dependents. They are likely to be concerned about privacy and data governance due to their increased online activities. Accountability in AI usage might also be a key concern, reflecting their desire for stability and reliability in technology that impacts their lives.
Older Adults	Beneficence, Fairness and Non-discrimination, Privacy and Data Governance	Accountability, Safety and Security	Autonomy, Transparency, Sustainability	Older adults might prioritize beneficence, seeking AI technologies that contribute positively to society and their well-being. Fairness and non-discrimination could be crucial due to concerns about ageism and inclusivity. Privacy remains important, potentially driven by a sense of caution and desire to protect personal information. However, they might place less emphasis on autonomy and sustainability, possibly due to differing values or less familiarity with the of these concepts in AI.

In contrast, individuals with postgraduate degrees show a distinct preference for sustainability, beneficence, and accountability. This trend suggests a deep engagement with specialized knowledge and an awareness of AI's long-term implications and the necessity for accountable practices in its development and application. While they value transparency and autonomy, these aspects are somewhat secondary compared to their focus on forward-looking and systemic AI ethical principles. Their lesser emphasis on immediate practical concerns like safety and privacy points to a more systemic view of AI ethics.

Table 3. Prioritization of AI Ethical Principles by Educational Level

Educational Level	High Priority	Moderate Priority	Lower Priority	Rationale
High School or Lower Education	Safety and Security, Fairness and Non-discrimination, Privacy and Data Governance	Beneficence, Accountability	Transparency, Autonomy, Sustainability	Individuals with high school or lower education might prioritize immediate and tangible aspects of AI ethics such as safety, fairness, and privacy, which directly impact their daily lives. Their focus might be more on the practical applications of AI, rather than its underlying mechanisms or long-term implications. Transparency and autonomy might be less prioritized due to a potential lack of exposure to discussions about AI operations and governance.
Undergraduate Degree	Transparency, Accountability, Fairness and Non-discrimination	Autonomy, Privacy and Data Governance	Beneficence, Safety and Security, Sustainability	Individuals with undergraduate education may have a more understanding of AI and its societal implications. They might place a higher value on transparency and accountability in AI systems, reflecting a more critical perspective. Issues of fairness and non-discrimination could also be of higher importance, given the exposure to diverse ideas and social issues during undergraduate studies. However, they might have less emphasis on beneficence and sustainability, possibly due to a focus on other ethical dimensions.
Postgraduate Degree	Sustainability, Beneficence, Accountability	Transparency, Autonomy	Safety and Security, Fairness and Non-discrimination, Privacy and Data Governance	Postgraduate degree holders, likely having engaged deeply with specialized knowledge, might prioritize more complex and forward-looking aspects of AI ethics like sustainability and beneficence. They might be more aware of the long-term implications of AI and the importance of accountable practices in its development and use. Transparency and autonomy could also be valued, though to a lesser extent compared to the foresight-oriented principles. They might place less priority on immediate practical concerns like safety and privacy, assuming a more systemic view of AI ethics.

Table 4 shows the prioritization of AI ethical principles across various industries and sectors, revealing significant variations in their emphasis. In the technology and AI industry, professionals exhibit a pronounced preference for transparency, autonomy, and accountability. This trend likely stems from their deep involvement in AI development and implementation, where these principles are integral. However, there is a noticeable lesser emphasis on privacy and beneficence, suggesting a more technical and less societal-oriented perspective on AI ethics within this sector.

In healthcare, the priorities shift markedly towards beneficence, safety, security, and privacy, reflecting the sector's caregiving ethos and the paramount importance of patient care. Aspects such as transparency and autonomy receive less focus, overshadowed by

the immediate ethical concerns related to patient welfare. The education sector, conversely, places high importance on fairness, non-discrimination, autonomy, and transparency. This prioritization aligns with the diverse and inclusive nature of educational environments and the significance of autonomy in learning processes. However, beneficence and privacy are less emphasized, indicating a more pedagogical rather than patient-centric approach to AI ethics.

Table 4. Prioritization of AI Ethical Principles by Industry and Sector

Industry/Sector	High Priority	Moderate Priority	Lower Priority	Rationale
Technology and AI Industry	Transparency, Autonomy, Accountability	Fairness and Non-discrimination, Safety and Security	Beneficence, Privacy and Data Governance, Sustainability	Professionals in the technology and AI sector might prioritize transparency and autonomy due to their understanding of the importance of these aspects in AI development and implementation. Accountability is likely crucial given their role in creating AI systems. However, they might place less emphasis on privacy and beneficence, assuming a more technical rather than societal view of AI ethics.
Healthcare	Beneficence, Safety and Security, Privacy and Data Governance	Accountability, Fairness and Non-discrimination	Transparency, Autonomy, Sustainability	Healthcare professionals are likely to prioritize beneficence due to the caregiving nature of their work, along with safety and privacy, which are fundamental in patient care. However, aspects like transparency and autonomy might be less emphasized compared to the immediate ethical concerns related to patient welfare.
Education	Fairness and Non-discrimination, Autonomy, Transparency	Accountability, Sustainability	Beneficence, Safety and Security, Privacy and Data Governance	Educators might value fairness and non-discrimination highly, given the diverse nature of educational environments. Autonomy in learning and transparency about educational tools, including AI, might also be significant. However, they might focus less on beneficence and privacy, assuming a more pedagogical approach to AI ethics.
Government and Public Policy	Accountability, Fairness and Non-discrimination, Privacy and Data Governance	Transparency, Safety and Security	Autonomy, Beneficence, Sustainability	Government and public policy professionals are likely to prioritize accountability due to regulatory responsibilities, along with fairness and privacy, which are crucial in public administration. Transparency and safety might also be important but to a lesser extent compared to the regulatory aspects.
Others (including Unemployed and Retired Individuals)	Safety and Security, Privacy and Data Governance, Beneficence	Fairness and Non-discrimination, Sustainability	Transparency, Accountability, Autonomy	This diverse group may prioritize safety and privacy due to general concerns about technology's impact on daily life. Beneficence might also be valued, reflecting a societal perspective on AI. However, they might place less emphasis on transparency and accountability, possibly due to less direct engagement with AI development or policy-making.

Government and public policy professionals prioritize accountability, fairness, non-discrimination, and privacy, aligning with their regulatory responsibilities and the critical nature of these aspects in public administration. While transparency and safety are considered important, they are secondary compared to the regulatory and ethical aspects.

The *Others* category, encompassing diverse groups such as unemployed and retired individuals, shows a preference for safety, security, privacy, and beneficence. This trend

might reflect general societal concerns and perspectives on technology, with less emphasis on transparency and accountability, possibly due to a lower degree of direct involvement in AI development or policymaking.

Table 5. Prioritization of AI Ethical Principles by Technology Usage Level

Technology Usage Level	High Priority	Moderate Priority	Lower Priority	Rationale
Frequent Technology Users	Transparency, Autonomy, Accountability	Privacy and Data Governance, Fairness and Non-discrimination	Safety and Security, Beneficence, Sustainability	Individuals who frequently use technology and are highly literate in this domain might prioritize transparency and autonomy due to their understanding and engagement with technology. They may also value accountability, recognizing the importance of responsible tech development. However, they might be less concerned with safety and security, perhaps due to a higher level of comfort and trust in technology.
Moderate Technology Users	Safety and Security, Privacy and Data Governance, Fairness and Non-discrimination	Beneficence, Accountability	Transparency, Autonomy, Sustainability	This group, while familiar with technology, may not be deeply engaged with its intricacies. Therefore, they might prioritize safety, privacy, and fairness, focusing on how technology affects them personally and socially. However, they might place less emphasis on transparency and autonomy, possibly due to a less in-depth understanding of these aspects.
Limited Technology Users	Safety and Security, Beneficence, Privacy and Data Governance	Fairness and Non-discrimination, Sustainability	Transparency, Accountability, Autonomy	Individuals with limited technology usage and literacy might prioritize safety and security due to concerns about their ability to navigate technology safely. Beneficence and privacy are also likely to be high priorities, reflecting concerns about the societal and personal impacts of technology. However, they might have less interest or understanding of transparency and accountability in AI, perhaps due to a lower engagement level with technologies.

Table 5 presents the results of how the level of technology usage influences the prioritization of AI ethical principles. Individuals who are frequent technology users demonstrate a strong preference for transparency, autonomy, and accountability. This inclination likely stems from their heightened understanding and active engagement with technology, fostering a keen interest in the responsible development and governance of tech systems. However, they exhibit a relatively diminished concern for safety and security, which may be attributed to their increased comfort and trust in technological systems. Moderate technology users, possessing a general familiarity but not deeply immersed in technological issues, prioritize safety, security, privacy, and data governance. Their focus is more on the personal and social impact of technology, emphasizing fairness and non-discrimination. Yet, this group places less importance on transparency and autonomy, potentially due to a less comprehensive grasp of these aspects.

In contrast, individuals with limited technology usage and literacy prioritize safety, security, beneficence, and privacy. Their concerns are primarily centered on navigating technology safely and the societal and personal impacts of technological advancement. Their understanding or interest in transparency and accountability in AI is comparatively

lower, likely owing to their minimal engagement with the detailed workings of technology.

Table 6. Prioritization of AI Ethical Principles by Gender Identity

Gender Identity	High Priority	Moderate Priority	Lower Priority	Rationale
Male	Autonomy, Accountability, Transparency	Safety and Security, Fairness and Non-discrimination	Privacy and Data Governance, Beneficence, Sustainability	Individuals identifying as male might prioritize autonomy, valuing independence and control in their interaction with technology. Accountability and transparency in AI systems could also be significant, reflecting a preference for clear, understandable systems and responsible practices. However, they might place less emphasis on privacy and data governance, possibly due to differing concerns or perceptions about personal data security.
Female	Privacy and Data Governance, Fairness and Non-discrimination, Safety and Security	Beneficence, Sustainability	Autonomy, Transparency, Accountability	Individuals identifying as female may place a higher value on privacy and data governance, possibly due to concerns about personal data security and its implications. Fairness and non-discrimination might also be key concerns, reflecting an emphasis on equitable and just AI practices. Safety and security could be prioritized due to a focus on protective measures in technology use. However, aspects such as autonomy and transparency might be less emphasized.
Non-Binary/Other Gender Identities	Fairness and Non-discrimination, Beneficence, Sustainability	Privacy and Data Governance, Accountability	Safety and Security, Transparency, Autonomy	For individuals identifying as non-binary or with other gender identities, fairness and non-discrimination could be paramount, given the importance of inclusivity and representation. Beneficence and sustainability might also be highly valued, reflecting a focus on the broader societal impacts of AI. Privacy and data governance could be important, but possibly less so compared to the overarching societal concerns.

Table 6 provides an overview of how different gender identities influence the prioritization of AI ethical principles. Individuals identifying as male exhibit a pronounced preference for autonomy, accountability, and transparency in AI systems. This trend could be indicative of a desire for independence and control in technological interactions, as well as a preference for clear, understandable systems and responsible practices. However, there is a notably lesser focus on privacy and data governance, which might suggest different concerns or perceptions about personal data security within this demographic.

Participants identifying as female prioritize privacy and data governance, possibly driven by heightened concerns regarding personal data security and its broader implications. They also emphasize fairness and non-discrimination, pointing to a significant concern for equitable and just practices in AI. Safety and security are also key priorities, indicating a focus on protective measures in technology usage. However, aspects such as autonomy and transparency appear to be less emphasized.

For those identifying as non-binary or with other gender identities, fairness and non-discrimination are paramount, likely reflecting a strong inclination towards inclusivity and representation. Additionally, beneficence and sustainability are highly valued,

denoting a focus on AI's broader societal impacts. While privacy and data governance are considered important, they might be secondary compared to the overarching societal concerns.

To analyze intersections across the various demographics, educational levels, industry sectors, technology usage levels, and gender identities regarding the prioritization of AI ethical principles, we looked for commonalities and divergences in their ethical prioritizations. The following list shows the divergences in the valuation of different AI ethical principles across these diverse groups.

a) ***Common High-Priority Principles Across Groups:***
   - **Safety and Security**: Frequently prioritized by middle-aged adults, individuals with high school or lower education, and moderate technology users. This suggests a universal concern for immediate and tangible impacts of AI on personal and familial security.
   - **Fairness and Non-discrimination**: A recurrent theme among older adults, those with high school education or lower, and in the education sector. This underscores a societal concern for equitable AI practices across age and educational spectrums.

b) ***Common Moderate-Priority Principles Across Groups:***
   - **Accountability**: Noted by young adults, postgraduates, and in the technology and AI industry. This reflects a recognition of the need for responsible AI practices across different levels of educational attainment and professional engagement with AI.
   - **Privacy and Data Governance**: A moderate priority for young adults, middle-aged adults, and frequent technology users, indicating a balanced concern for personal data across varying age groups and technology engagement levels.

c) ***Common Lower-Priority Principles Across Groups:***
   - **Autonomy**: Less emphasized by middle-aged adults, those with high school education or lower, and limited technology users. This might reflect a lesser focus on control and independence in interactions with AI among these groups.
   - **Sustainability**: Often a lower priority for young adults, undergraduate degree holders, and in the healthcare sector, possibly due to a focus on more immediate or tangible ethical concerns.

d) ***Notable Divergences Across Groups:***
   - **Transparency**: High priority for young adults and frequent technology users but lower for those with high school education or lower and limited technology users. This divergence could be attributed to different levels of comfort and understanding of AI mechanisms.
   - **Beneficence**: Prioritized by older adults and in healthcare but less so in the technology and AI industry. This indicates a split between groups focused on societal good and those with a technical orientation towards AI.

e) ***Gender-Specific Trends:***

- **Male Identifying Individuals**: Tend to prioritize autonomy and transparency, indicating a preference for independence and clarity in AI systems.
- **Female Identifying Individuals**: Show a preference for privacy and fairness, reflecting concerns about data security and equitable AI practices.
- **Non-Binary/Other Gender Identities**: Highlight fairness and sustainability, emphasizing inclusivity and long-term societal impacts.

Conclusion

The field of AI ethics, despite having been a focal point of interdisciplinary scholarly discussion for several years, remains nascent. Characterized by its extensive scope and dynamic evolution, AI ethics has garnered escalated scholarly interest recently. This domain includes a broad spectrum of topics and challenges, changing rapidly in response to the swift advancements in AI technology and its increasing integration into various facets of human life.

AI ethics serves as a foundational element for the construction of ethical AI systems and for ensuring ethical behavior in AI applications. This domain is concerned with the moral values and principles that delineate ethical conduct. The establishment of sound AI ethics is crucial for the development and implementation of AI technologies in a manner that aligns with these ethical standards.

This study addresses the critical need to understand how different societal groups prioritize various ethical considerations in the realm of artificial intelligence (AI). This understanding is vital because AI, as a transformative technology, has far-reaching implications across all sectors of society. Different demographic groups, influenced by their unique experiences, perspectives, and needs, may view AI ethics through diverse lenses.

The increasing acknowledgment of the need for AI technologies to be created and managed in a way that is technically robust, ethically sound, and socially inclusive highlights the importance of this study. By examining the variations in ethical prioritization across demographic groups, the research offers crucial insights into how AI policies and practices can be tailored to accommodate a spectrum of ethical values and concerns. This tailoring is essential for ensuring that AI advancements do not inadvertently perpetuate biases, inequalities, or overlook important ethical considerations.

Moreover, the study contributes to the broader discourse on responsible AI by highlighting the need for a pluralistic approach to AI ethics. It challenges the one-size-fits-all paradigm and advocates for a more detailed understanding of ethical principles in the context of AI, acknowledging that different societal segments may prioritize principles like autonomy, transparency, fairness, and privacy differently. This approach

is instrumental in guiding policymakers, technologists, and stakeholders towards more equitable and contextually relevant AI solutions.

In the recent past, numerous ethical guidelines have been promulgated by governments, as well as national and international organizations. These guidelines provide overarching principles aimed at steering the ethical development, deployment, and governance of AI systems. Nonetheless, the inherent abstractness, diversity, and context-specific nature of these principles present significant challenges in their practical application and operationalization [15]. This disconnect frequently leads to discrepancies between the stated principles and their actual implementation in AI systems and practices.

The concept of *principlism* in AI ethics, which aims to guide the development of safe and beneficial artificial intelligence, has been subject to scrutiny regarding its efficacy. Critics have highlighted that the field of AI ethics predominantly generates principles and value statements that are vague and high-level. This critique is substantiated by a study conducted by McNamara et al. in 2018 [16], which examined the role of ethical guidelines in shaping the decision-making processes of developers. The study concluded that the influence of these guidelines on altering the behavior of students and technology professionals is minimal, suggesting that these principles, in their current form, are insufficient in driving meaningful ethical conduct in AI development.

The complexity of instilling ethics in AI development is further exacerbated by the lack of a uniform professional culture, a shared understanding of moral obligations, and established standards defining what constitutes a "good" AI developer. AI ethics initiatives attempt to bridge this gap by proposing broadly applicable guidelines, intended to be universally relevant across the diverse contexts in which AI is used. However, this approach results in the formulation of principles and values that are abstract and based on concepts, lacking the specificity required for actionable guidance. Consequently, these principles are subject to wide interpretation by developers, who may apply them inconsistently or inadequately [17].

In contrast to academic settings, practical mechanisms for translating ethical principles into everyday practice in the field of AI are conspicuously absent. The medical field, as a point of comparison, is bolstered by a robust infrastructure of professional societies, accreditation boards, ethics committees, codes of conduct, and self-governance, all supported by strong institutional frameworks. These mechanisms ensure that medical professionals adhere to ethical standards consistently. AI development, on the other hand, lacks equivalent structures that could effectively operationalize ethical guidelines, especially considering that much of AI technology is developed in non-transparent settings. This gap highlights the challenge in ensuring that AI, developed largely in isolation from public scrutiny, is aligned with societal values.

A critical shortcoming in AI ethics is the relative deficiency of professional and legal accountability mechanisms to address misconduct and enforce standards. The mere existence of codes of ethics is insufficient, often perceived as mere formalities rather than

substantive guidelines for ethical conduct. The reliance on broader guidelines and self-regulatory practices is inadequate to avert failures or misuse in AI development. Moreover, the diversity and decentralization of the AI field, which spans multiple sectors without a long-standing tradition of unified aims, complicate the establishment of robust accountability mechanisms. This situation casts doubt on the effectiveness of high-level ethical principles as a means to effectuate meaningful change in AI ethics.

The effectiveness of AI ethical guidelines in shaping the future trajectory of AI development is questioned due to several intrinsic characteristics of the field. A key issue is the misalignment of fundamental objectives among AI developers, users, and those impacted by AI. This divergence is compounded by the absence of a unified regulatory framework within the AI domain, which would establish explicit fiduciary responsibilities towards data subjects and users. Consequently, there is a pervasive lack of trust among users regarding developers' commitment to implementing ethical principles effectively. While reputational risks might prompt companies, and personal moral convictions might influence individual developers towards ethical behavior, actions that prioritize public interest over company objectives are improbable, particularly if they conflict with the company's incentive structures.

This lack of alignment and the absence of a robust regulatory framework indicate a fundamental challenge in the practical application of AI ethics. The existing approaches to AI ethics, primarily based on high-level principles, fail to address the interactions between different stakeholders' interests, the varied incentives driving AI development, and the AI's societal impact.

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