Four Compelling Reasons to Urgently Integrate AI Development With Humanities, Social and Economics Sciences

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Abstract—As AI systems increasingly influence various aspects of human life, it is critical to ensure their development and deployment align with ethical standards and societal values. Our paper argues that integrating expertise from Humanities, Social, and Economic Sciences (HSES) into AI development is essential to achieving responsible AI. We present four compelling reasons to advocate for this integration: enhancing social legitimacy, ensuring meaningful impact, strengthening credibility and capability building. These reasons emerged from a collaborative effort involving 16 researchers from AI and HSES fields. Together, we explored the enablers and barriers to integrating our knowledge for the purpose of developing effective, responsible, and socially grounded AI products. We aim to inspire others to adopt an integrated approach to AI development, promoting innovations that are both technologically advanced and aligned with societal needs.

Index Terms—AI, collaboration, humanities, psychology, social factors, social implications of technology, social sciences.

I. INTRODUCTION

ARTIFICIAL intelligence (AI) presents both unique opportunities and significant challenges due to its rapid development, its capability to replicate, automate and augment tasks previously performed by humans [1], and accelerate science discoveries [2]. It also has the potential to amplify existing biases and social inequalities [3], [4], and to contribute

to unsustainable levels of energy and resource use [5]. Notably, the risks of AI misuse include unethical practices and harmful consequences and have even extended to scenarios of existential threats [6], [7]. Recognizing these concerns, regulations and ethical frameworks have emerged globally to guide AI development and deployment [8], [9], [10]. These responses are a step towards building 'responsible AI', which emphasizes the need for ethical considerations in the development and deployment of AI [11].

Many fields, such as psychology, sociology, philosophy, behavioral sciences, anthropology and ethics, have the expertise to help identify these important human values in AI development. Multiple and diverse literatures have explored these disciplinary contributions across comparable applied and theoretical contexts including: responsible technology development and ethical design [12]; sociology of science [13]; higher education [14]; and the emerging field of interdisciplinary studies [15]. Integrating humanities and social and economic sciences (HSES) expertise (which we consider to include behavioral sciences) into AI development presents an invaluable opportunity to create truly responsible AI products – products that are not only efficient but also ethical, inclusive, and beneficial to society. However, despite repeated calls for responsible AI development, HSES integration with AI remains an exception, with siloed single-disciplinary approaches continuing to dominate AI projects [16].

While others have called for AI developers to consult social scientists, we do not think this approach will be sufficient to build responsible AI [17]. Instead, we argue that only cross-disciplinary *integration* where AI developers and HSES researchers work collaboratively together to create new understandings of problems and issues, will achieve these positive outcomes. Integration, in this context, refers to bringing together different bodies of knowledge to improve the understanding of real-world problems [15], [18]. This includes interdisciplinary and transdisciplinary research, which represent different forms and degrees of integration. The former focuses on bringing together different strands of discipline-based knowledge (interdisciplinarity), and the latter on bringing together disciplinary and other forms of knowledge (transdisciplinarity) [18].

In what follows, we articulate four compelling reasons why integrating HSES early and throughout the AI development process is crucial for fostering responsible and pragmatic AI

solutions. These reasons either relate to the impact of AI (external) or to AI development teams (internal). They capture the collective reflections of a group of Australian AI and HSES scientists who came together to form a Community of Practice focused on developing effective, responsible and socially grounded AI products. Over 18 months, we engaged in a planned process of learning and creating a new practice of integrating our diverse disciplinary knowledge. While our group operates within a public sector science organisation, we believe that these reasons are also relevant for organisations in other sectors.

II. SOCIAL LEGITIMACY

Social legitimacy refers to society's acceptance of an AI tool for a specific purpose. To have legitimacy in human societies, institutions and networks, scientific and technological innovations must conform to the rules and standards of those systems [19], [20]. For AI products to be seen as legitimate, they must align with societal rules and standards. AI often interacts directly with people or becomes part of human organizations and social settings. Understanding human society, behaviors, and values is exactly what HSES researchers specialize in.

Achieving social legitimacy by aligning with the rules and standards of human systems also extends to developing AI that is in alignment with a diverse spectrum of human values [21]. How different social groups view and respond to AI may differ from how we might assume they would. For example, involving HSES researchers in the AI development process may have avoided the implementation of facial recognition software for recruitment, as using facial recognition in this context reproduces existing social norms that are influenced by implicit gendered and racial prejudices about how an 'ideal employee' would respond [22]. Drawing on HSES expertise allows us to design inclusive processes for eliciting and incorporating these societal rules and standards into AI products [23]. For example, HSES insights were incorporated into an educational project about the American Civil War that used facial recognition to find portraits from the Civil War era that resemble the user [24]. In this case, the developers consulted experts on gender, history, and race to critically evaluate the initial design, and incorporated their feedback into the design, such as allowing users to use the system without uploading a picture of themselves, and being transparent about the gender and racial biases in who was pictured in Civil War photographs. Incorporating these considerations enhanced this project's social legitimacy by demonstrating that the developers were responsive to concerns about privacy and gender and racial bias.

III. MEANINGFUL IMPACT

Integrating diverse disciplines enables researchers to identify and address knowledge gaps that single-discipline efforts cannot, fostering more comprehensive and impactful solutions [25]. To date, in response to the formidable challenges that AI poses, we are witnessing a plethora of HSES peer reviewed contributions on AI [26], and applying methods such as value sensitive design and responsible innovation [27], [28]. We are also noticing an increase in engineering solutions to building safer responsible AI [29]. However, none of this single-focused disciplinary research fully rises to the challenge of building impactful, responsible AI. Integration provides team members with a unique understanding of the potential limitations and opportunities and, consequently, the research directions that will be necessary for achieving this goal [30]. Integrated teams are more able to span the requisite knowledge necessary to fully understand the role of both people and technology in these limitations and opportunities. An interdisciplinary-by-design methodology for AI development is presented in [31]. Other examples of integration include co-designing datasets and machine learning (ML) models to support activists in collecting and monitoring data on feminicide [32] and assisting decision-making in child maltreatment hotline screening decisions [33].

IV. CREDIBILITY

Credibility refers to the trustworthiness or believability of the outputs of an AI tool [34]. It differs from social legitimacy in that it concerns how credible the AI's output is to those using it or are affected by it, rather than whether the AI's purpose is acceptable within a society. Integrating HSES and AI increases the credibility of the developed AI solutions in two ways. First, credibility is built on the technical quality of AI outputs, and how those outputs are presented to, and interpreted by, users. However, relying only on transparency and explainability to gain credibility does not guarantee that users will necessarily have greater trust in an AI's output [35], [36]. For example, ensuring that users find the output to be clear, understandable, and that the output's limitations and uncertainties are supported by transparent explanations helps to ensure the AI tool's credibility and encourages its responsible use. HSES expertise with specializations in problem identification and communication is essential in this domain.

Second, HSES researchers also contribute expertise in identifying potential biases and societal risks that AI applications may pose to disadvantaged and marginalized groups [37]. Without drawing on HSES, AI developers risk overlooking, misinterpreting, or inadequately addressing these important social issues [17]. Conversely, without the contribution of AI developers, the workings of AI may be opaque to HSES researchers due to their lack of technical literacy [38] which risks them proposing solutions that are unworkable in practice. An illustration of what is possible when researchers from these fields work together is a collaboration of computer scientists and psychologists that provided guidance on the effective and inclusive use of large language models in psychological science [39]. A similar collaboration drew on both areas of expertise to identify gender bias in word embeddings [40].

Drawing on both sets of expertise during system development and usage would contribute to the AI's effectiveness in fulfilling its intended purpose. Making a credible contribution to building responsible AI requires proper engagement from both HSES and AI developers.

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V. Capability Building

Although there is increasing recognition of the need for interdisciplinary collaboration to develop responsible AI [12], [31], there remains a gap in expertise on effectively integrating diverse knowledge. AI researchers may have difficulty in understanding HSES concepts if they are unaware of their philosophical assumptions [41]. The technical complexity of AI technology makes these systems difficult for HSES researchers to fully understand. These impediments to integration could be partially addressed by clearer communication and understanding between disciplines. For example, writing papers with the intent that they should be understood by other disciplines would go a long way towards removing barriers between HSES researchers and AI developers.

Another approach has been the creation of interdisciplinary institutes and curricula to overcome academia's tendency to incentivize specialization within single domains [42]. However, an approach that requires a single individual to develop deep expertise in fields as diverse as AI and HSES is unlikely to provide a realistic solution. What is likely to have a greater impact is building capability among domain experts in effective and meaningful collaboration across disciplines [15]. We believe in an approach that prioritizes and articulates cross-disciplinary integration, in which HSES and AI domain experts are embedded early in development teams as collaborators, providing the opportunity to individuals to develop collaborative capability that augments their domain expertise. This integration is also important for HSES: in a world with increasingly ubiquitous AI, it is not just AI that needs HSES, but HSES also needs this integration with AI to remain relevant. For example, the project CLARITI focused on capability building through interdisciplinary collaboration, enabling social scientists to understand machine learning and data scientists to address ethical, social, and political considerations. It emphasized documenting processes, adapting models to evolving contexts, and sharing tools to support responsible and effective ML development, aligning with the principles of responsible innovation [43].

VI. Discussion

We have presented four compelling reasons why HSES researchers and AI developers should integrate more closely than they have in the past. We are fully aware that interdisciplinary work has significant challenges, and we have not discussed in this piece how such collaborations might occur in practice [44]. We believe that other organizations may face similar challenges in performing interdisciplinary work as we have. Institutional and cultural factors, such as differing expectations about specialization, the different speeds of research and publication, and incentives for AI researchers to move away from institutions that better facilitate collaboration, can also create tensions and a barrier to successful integration [44]. As a team, we are currently developing practices that enable more fruitful collaborations between AI developers and HSES researchers to occur. Part of this process is building trust and understanding between practitioners in these fields: HSES are not the 'ethics police' seeking to slow down AI projects with speculative concerns based on esoteric theories, nor are AI developers disinterested in or unable to engage with the social and ethical dimensions of their work.

From a process perspective, ideally the best time to initiate these collaborations is at the project's outset [23] which maximizes the impact of AI and HSES integration. Interdisciplinary collaborations need time to develop a shared understanding of their research [45]. This early engagement fosters mutual learning throughout the project's entire lifecycle. Conversely, delaying collaboration until later stages hinders the organic development of a shared understanding of the AI product and its potential societal implications. The time pressures that follow from late collaboration in projects reduce the opportunities for team members to reflect and respond to the challenges of interdisciplinary projects [45]. Without this common ground, the input of HSES might be perceived as distracting and unhelpful. The leaders of interdisciplinary projects need to foster a reflective environment of mutual trust, respect, and goodwill, and create opportunities for team members to interact with each other to share knowledge [45]. It is the responsibility of both HSES researchers and AI developers to create circumstances where this trust and goodwill may flourish.

As an interdisciplinary working group, collaborating has allowed us to gain deeper insights into the potential ethical and social challenges of AI than we would achieve separately. The expertise of AI developers has assisted HSES researchers in understanding the technical characteristics of systems that may be concerning. Similarly, HSES researchers have helped AI developers to express their own concerns about AI and to recognize potential issues that may otherwise have been invisible to them.

These benefits of integration do not have to be limited to organizations that possess internal expertise in both AI and HSES. The appropriate mix of AI and HSES expertise may differ from project to project. Industry AI development teams can draw on networks of HSES expertise within academic institutions and public sector organizations to identify and bring together the appropriate combination of AI and HSES expertise needed for AI projects. Collaborating and co-creating with stakeholders [46] may also give AI developers working in industry the opportunity to build capability while also fostering social legitimacy and credibility with those who will be affected by the AI they develop.

Looking ahead, we see several broad future scenarios for the interactions of HSES and AI. If AI developers and HSES researchers continue to work in isolation from each other, they will continue to have an incomplete understanding of each other's perspectives on AI. This creates a missed opportunity to use each other's expertise to contribute to developing AI projects that are less likely to negatively impact society. If AI and HSES researchers continue to interact only marginally, with HSES researchers being invited or becoming involved only when problems emerge, the critiques and insights from HSES will be too late to effectively contribute to AI projects. For the reasons we have described above, we believe that early and extensive collaboration between the two domains is the most effective way of bringing together their skills

and insights, so that AI products are produced because they should, not because they can. These collaborations require both institutional support and individual drive to succeed.

Institutions can support integration in four ways [47]. Firstly, by establishing impactful partnerships between AI and HSES groups to facilitate regular interdisciplinary workshops, joint research initiatives, and the sharing of valuable knowledge and resources. Secondly, institutions can provide dedicated funding by allocating specific funding to support interdisciplinary research and removing organizational barriers that currently hinder such collaboration. Thirdly, institutions can incentivize collaboration by recognizing and rewarding teams that successfully integrate through joint publications, shared grants, and career advancement opportunities. Finally, institutions can highlight success stories by showcasing existing interdisciplinary collaborations to illustrate their tangible benefits to inspire future integration. However, such institutional responses will be ineffective without the willingness of HSES and AI researchers to work together in overcoming the challenges of interdisciplinary research. Researchers should be alert for opportunities to collaborate across disciplinary boundaries, and assist colleagues in overcoming the difficulties of integration.

In the current rapid development and deployment of AI systems, not working together is simply risking being complicit in permitting unnecessary and avoidable harms occurring from developing AI products without the benefit of a wider range of expertise in their social impact. Through collaboration, AI developers and HSES researchers will be strongly placed to ensure that AI systems will benefit society.

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