Undone computer science through the rethinking of interdisciplinarity

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Introduction

This paper posits that one inroad into *doing* undone computer science is through observing how and where knowledge hierarchies within tech work are created. Through interviews with professionals from different disciplines and roles in the Indian EdTech sector, this paper demonstrates that even within spaces that invited interdisciplinarity and participatory approaches to building technologies, a narrower tech episteme determined the salient features of the problem space, rendering crucial contextual, cultural, and historical knowledge less worthy, and in many cases, invisible.

The technology industry is one of the dominant and influential spaces in which the computer science field makes sense of itself and advances its knowledge. The industry has increasingly attempted to become more interdisciplinary, with scholars repeatedly stressing the importance of involvement of actors from different disciplinary backgrounds and sectors (Madaio et al., 2020; Solanki et al., 2023). Using the EdTech sector in India as a case study, and drawing primarily from experiences of professionals working in three EdTech companies, this talk presents an argument for why talks of interdisciplinarity within the technology sector needs serious rethinking. 36 years since Diane Forsythe conceptualised the 'engineering ethos' that values certain types of knowledge (Forsythe, 1993), and despite massive changes to the constitution of teams and discourses within the tech industry, a lot would still appear to remain the same.

As I will show, while the presence of different disciplinary perspectives in EdTech companies was better than none, this alone did not help employees steer technologies towards meaningfully representing the diverse social realities of communities and students. The central contention in this paper is that in spite of bringing together experts from different fields and professional backgrounds, and many of the professionals themselves bringing to the table interdisciplinary experience, the epistemology of computer science—one that focuses on a narrow lens of machine-capturable inputs and outputs—dominated the imaginations and actions of professionals working within Indian EdTech; which in turn heavily influenced how **everyone** engaged, or rather *disengaged* in the face of complex contradictions that arose in their work. There were different types of knowledge people working in these organisations possessed; some of which were acted upon, and some were set aside. Critically inspecting what gets set aside, dismissed as what Frickel et al. (2010) in their conception of undone science term "negative knowledge" becomes increasingly important as technologies—particularly AI and GenAI-driven systems that demand even more niche expertise—continue to be pushed into social domains such as education. Doing so also contributes to, as has been proposed by this conference, the work of undone CS in its concern with "reflecting on the epistemological and ethical aspects" of the field.

Methods & Methodology

This paper is based on 20 semi-structured interviews with predominantly EdTech professionals working in three Indian EdTech companies (and some professionals working in

American Big Tech) between March 2024 and October 2024. My methodology draws inspiration from the idea of "studying up" (Nader, 1972), and was driven by Gusterson's (1997) notion of "polymorphous engagement" when it comes to studying up experts. Gusterson, in his work on weapon scientists describes this methodology as one that involves "interacting with informants across a number of dispersed sites…and…collecting data eclectically from a disparate array of sources in many different ways." (p.116). I thus spoke to a variety of actors across different sites: from machine learning scientists and software engineers to education specialists and learning scientists.

Key Findings and Arguments

The way product and feature development unfolded in EdTech workplaces demonstrated the epistemological dominance of the technological perspective and its goals of engagement and scale (a standpoint legitimated by financial impetuses as well as the immense complexity of algorithmic systems driven by machine learning and other AI technologies). Those with expertise in fields like education and community engagement felt that their concerns, even when voiced aloud, were not being heard; to the point where one interlocutor—the head of curriculum and learning at an EdTech organisation—resigned to the fact that the technology they were building was going to remain "pedagogically unsound". This, while fellow team members such as engineering tech leads remained steadfast in their belief that their work was demonstrably doing good, as represented in captured metrics such as engagement. Underscoring these attitudes was an understanding of these initiatives— built to aid the education of children in under-resourced, marginalized communities—as implicitly 'doing good' (in of itself a vague notion (Green, 2019)).

The argument presented here is that, part of *doing* undone computer science—specifically in the field's manifestation within capitalist, corporate frameworks that build technologies for use by society—needs a rethinking of what ideas of interdisciplinarity mean within tech workplaces; particularly if goals of social justice are to be achieved through technological means. Such a rethinking, I argue, requires a decentering along two axes.

First, it is about vigilance against what I call the creep of the tech episteme or *'tech creep'* (following Koops' (2020) definition of creep concepts). Tech creep is how certain learnings, such as the aspirations of rural parents, become quantified categories to nudge and circumvent, while still other important ways of engaging in pedagogy—of care for the child who might come to the classroom hungry—are set aside and deemed unworthy. More importantly, and what distinguishes tech creep from being a mere representation of the ways technology and the datafication it engenders adversely impact domains such as education, is that it subtly moves the needle of the best laid interventions. Tech creep can transform goals that begin from genuine care, of empowerment even, to a confined space of extractivism, creating a pockmarked terrain of neglect.

The second act of decentering is the acknowledgement of humans already 'in the loop'. It requires an acknowledgement that no piece of technology is built by technologists alone. That so-called "domain experts" are not merely there to aid and advise the core engineering team who are the ones "in charge" of creating these technologies. There is no education technology without the education experts; there is no education technology without community members and project leads who work to bring these technologies to the hands of children, and to support communities in their use of said technologies.

These two axes or tenets of doing undone CS, are grounded in acts of decentering both the tech and the 'coding elite' (Burrell & Fourcade, 2021). Doing so, I argue, is a 'matter of care' (de la Bellacasa, 2011). It is an orientation of technology work that "requires a speculative commitment to neglected things" (ibid, p.85) in order to reimagine the current constitution and contributions of technology companies. This is not to say that all tech is bad, or to suggest that the discipline of computer science is incapable of stepping out of a technosolutionist lens. Such a decentering too is approached through a feminist ethics of care, which acknowledges that "technical knowledge [does] have a place, but that it needs to be put alongside these other knowledges, leaving a considerable place for adjustment and negotiation in the light of gaining understanding of persons and situations" (Parton, 2003, p. 13).

Conclusion

My argument in this paper is not against the need, use, or value of nuanced ideas of disciplinary interweavings in technology building. But interdisciplinarity, especially as practiced in domains such as EdTech, cannot continue with a one-size-fits-all approach, where processes of software development and expectations of tech rollout and delivery follow universal patterns set out by scholars of software engineering and the tech industry. Every domain has its own specificities and peculiarities. If EdTech, for example, is about doing good, of caring for children and for communities and their aspirations, then, as de la Bellacasa (2011) states: "we need to ask 'how to care' in each situation" (p.100). To understand how to care, we need the voices of those who have the theoretical expertise and practical know-how to inform technologists *how* to care. And these experts (whether that is a seasoned educator, a parent, or a project lead) need to have an equal, if not outsized voice, especially when the occasion calls for it. This type of practice requires a reimagining of software development that confronts and reconciles through democratic participation of all 'experts', the different epistemological and ontological tensions that may arise in the process of creating educational solutions.

Such a shift is not simply about putting measures in place to combat the anti-politicality scholars have observed in those who are trained within and work in computer science (Malazita & Resetar, 2019). It is about putting that anti-politicality—one that acknowledges the social, the cultural, the contextual, the political while also abstracting it away as distinct and separate from concerns of technology building—front and centre with the goal of dismantling it, by rethinking and reworking decades-old taken for granted modes of software development. Such a move can be a piece of what is needed for the necessary shift of the tech sector into a space of *radical transdisciplinarity*, where equal weightage is given to different ways of knowing and different knowledges (Tsing et al., 2017; Cresswell, 2022; Bayne & Ross, 2024).

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