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Reconceptualizing ICTD: Prioritizing Place-Based Learning Experiences, Socio-Economic Realities, and Individual Aspirations of Young Students in India

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Abstract: This paper critically examines the neo-liberal conceptualization of Information and Communication Technology for Development (ICTD), which imposes the linear and simplistic notions of empowerment and development on the users from the global South. Using the rapidly growing EdTech segment in India as a case, this paper observes that EdTech has been touted as a magic multiplier and a savior for countries like India that aspire to educate their large populations. This has prompted EdTech companies to pursue platformization and templization to accomplish scalability and standardization in EdTech use. Based on immersive ethnographic research with youth from low-income families in three Indian cities—Ahmedabad, Delhi, and Vadodara—we argue that the practices of young people concerning EdTech resist standardization. Our analysis reveals that three major factors—challenges of access and autonomy, continued relevance of place-based learning and in-person interactions, and uneven quality and rigor—influence low-income students and families to not completely buy the promise of access, equity, and quality that EdTech companies and governments advance. We explore the significance of the socio-economic and cultural contexts of young learners in the global South context and argue that they aspire for personalization, place-based experiences, guidance/mentorship, high grades, and in-person interactions instead of standardization. They do not fully benefit by the experimentation, DIY practices, and tech-lead learning opportunities and resources offered by EdTech platforms in their current state.

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1. Introduction

Over the last decade, communication for development has taken a predominantly digital turn, with the emergence of a celebratory view of digital technologies as a panacea for various problems facing the countries of the global South. With the introduction of mobile health, FinTech, and EdTech, governments and masses alike have started expecting miracles in erasing poverty, illiteracy, and diseases using various technological solutions, and investing a huge portion of national as well as personal resources into these new technologies. This celebratory discourse around digital technologies reminds us of a similar euphoria in the early 2000s following the introduction of the diffusion of technology approach that was offered to newly independent countries struggling to address the deep inequities and socio-economic challenges caused by years of colonization, and later the concept of Information and Communication Technology for Development (ICTD) in the 1990s, following the neo-liberal ideology of the times.

In a parallel development, critical scholars have time and again called for bottom-up, context-sensitive, and humane approaches to using technology for development. It is easy to overlook these voices amongst the euphoric cries of tech companies, governments, and elite users. It is equally easy to take an ahistorical perspective while endorsing

techno-determinism in communication for development. This paper, while acknowledging that technology does have the potential to support development, reflects on the tensions generated by neo-liberal and critical approaches to ICTD.

The paper critically examines the neo-liberal conceptualization of ICTD that imposes linear and simplistic notions of empowerment and development on users from the global South. Using the rapidly growing EdTech segment in India as a case and based on immersive ethnographic research with youth in three Indian cities—Ahmedabad, Delhi, and Vadodara—we argue that the practices of young people concerning EdTech resist standardization. Our analysis reveals that three major factors—challenges of access and autonomy, continued relevance of place-based learning and human touch, and uneven quality and rigor—influence low-income students and families to not completely buy the promise of access, equity, and quality that EdTech companies and governments advance. We argue that young people in the global South aspire for personalization in EdTech use that is not an outcome of algorithmic authority, but a reflection of culturally responsive digital practices and learning needs and aspirations.

2. Historical Overview of ICTD

In this section, we present a critical reflection on the role of ICT in development and an overview of the evolution of key arguments and concepts in the field amidst global geo-political and socio-economic changes. We examine dominant conceptualizations of the role of ICTD: technologically deterministic, top-down, celebratory discourse, and the common assumption that ICTD will act as a savior of underdeveloped masses in the global South. In analyzing and critiquing the potential of these discourses, we call attention to a more contextual, bottom-up, and human-centric conceptualization of ICTD.

Before the term ICTD gained currency in the 1990s, the idea that technology can facilitate, and even spearhead, development had already been accepted. While this optimistic view of technology has not changed much, our notions and definitions of development have evolved to prioritize cultural understanding, empathy, and a grounded approach to designing interventions. A major reason for this was the birth and spread of post-colonial and decolonial thinking, and the popularization of indigenous epistemologies and ontologies. In the 1940s and 50s, several colonized nations achieved independence, and they started questioning and criticizing the linear notions of development, i.e., progressing from an underdeveloped to a developed nation. These post-colonies demonstrated how linear notions of development enabled colonial powers to retain moral, political, and epistemological authority over countries in the global South. During this time, technology (primarily telecommunications and agriculture-related) was considered a major tool in modernization and development processes. For example, Daniel Lerner, in his famous work 'Passing of the Traditional Society' (Lerner 1958), considered media participation an important pillar of modernization.

Post-colonial and decolonial thinking and practices encouraged a few critical scholars, social workers, and political actors to foresee the need to recalibrate the influence of ICTD and reflect on the evolving notions of development based on the economic, social, and cultural contexts of a country. Even still, technological optimism was the dominant rationality, and ICT projects in countries from the global South could not attain their full developmental potential, and worse, led to the marginalization of low-income groups in the global South (Lin et al. 2015; Walsham 2017). Over the past decade, scholars have made long strides in reanalyzing their approach to using ICT for development and appreciating why past projects or interventions could not achieve substantial results. They are championing the urgent need to design long-term, contextually relevant, and culturally sensitive processes for development (Andersson and Hatakka 2013). They are also advocating for an approach in ICTD that requires it to be dynamic and flexible to reconfiguration according to relevant and complex socio-cultural problems (Avgerou 2010; Bhatia et al. 2024). Before we elaborate on a human-centered, culturally relevant approach to ICTD in the context of

educational technologies in India, it is important to highlight two dominant but differing trends in this field:

1. **Universalism:** ICTD research saw an influence of universalistic research traditions in the early 2000s (Avgerou and Madon 2004). Such an approach focuses on techno-economic reasoning of innovation within ICT processes while detaching it from the social context of the actors who are the beneficiaries of the process. By focusing on best practices (Fulk and Desanctis 1999), such an approach focuses on an all-encompassing rationality and universal goals for ICTD (Porter and Millar 2009). Based on the principles of generalization and flat replicability, this approach endorses the transfer and diffusion perspective, i.e., technological innovations can be transferred from developed economies and eventually adjusted to the conditions of the developing economies through diffusion. This approach to ICTD looks at the material and cognitive entities comprising technologies in isolation, detached from the social context and lived realities of people and communities in other countries where the technology is introduced. Accordingly, technologies and knowledge processes are easily transferrable and can be deployed in any given society to make suitable developmental changes. It does not foreground or prioritize contexts of the recipient country nor antecedent factors such as economic conditions, technological competence of people, and their attitudes towards technology, all of which could influence the acceptance and use of ICTD (Davis 1989; Rogers 1995).
2. **Situated knowledge:** This approach emphasizes the role of agency and meaning-making processes in different contexts in the potential of ICT to usher in development (Orlikowski and Baroudi 1991; Suchman 1996). A primary principle of this approach is to appreciate how technologies have to be embedded in society and how they must respond to different contexts and lived realities. By contesting the transfer and diffusion perspective and criticizing it for its oversimplification, the social embeddedness perspective looks at the process of ICTD innovation in situ and tries to understand the lived realities of local actors, including their aspirations, motivations, everyday practices, and knowledge processes and practices, to appreciate what is locally meaningful and relevant. Such an approach helps to better shed light on how particular ICT innovations may emerge out of local contexts where local actors can design and mold these innovations to align them with their routines and everyday lives (Avgerou 2003).

The field is witnessing some strategic and systematic upturns, and more scholars are investing critical energies in re-evaluating their use of ICTD in research, advocacy, and governance. Critical studies scholars have observed epistemic violence “exerted both through knowledge and against it” (Galván-Álvarez 2010) as a serious issue implicit in a Western-centric approach of the global North and previously colonial powers. Epistemic violence operates through the systematic silencing of marginalized voices, and constitutes, as Mignolo (2013) notes, an integral part of the processes of colonial domination. By giving authority to the voice of the colonizer, epistemic violence results in the forced devoicing of the colonized, producing systematic injustice against them (Milan and Treré 2019). This results in the establishment of a narrative that erases the stories of the colonized, canceling their perspectives from history.

3. Recognizing the Complexities within ICTD Research

Development is a contested notion, and it has been subject to a long theoretical debate. Moreover, development policy and action are entangled with conflicting interests and power relations in contemporary global and national politics, and the international development agencies’ policies for economic growth and institutional reform are widely contested in developing countries. In his book, Arturo Escobar (2011) presented a trenchant and detailed critique of development and development theory. This seminal thesis was based on Foucault’s method of analyzing discourse, and presented a historical reconstruction of the notion of development and how it has shaped thinking and policy around the world.

Escobar analyzed development discourse through three axes, which may be stated as three questions: (1) How is the development discourse constructed, and through what forms of knowledge are the concepts and theories arrived at? (2) What is the system of power that regulates its practice? and (3) How is the subjectivity of people fostered by the discourse through which people come to see themselves as developed or underdeveloped? Escobar's concerns are with how the discourse of development is created, how it is sustained through regimes of power, and how its subjects view themselves through the "colonized reality" that is thus created.

As the term development has started to become redefined, its reflection can be seen in the way ICTD is articulated and researched. After the introduction of the Millennium Development Goals (MDGs), the focus of ICTD research began to obtain a more holistic view of development beyond economic growth. The Sustainable Livelihood Framework, and Amartya Sen's human development perspective, articulated through his Capability Approach, have been frequently adopted in ICTD analysis (Andersson and Hatakka 2013; Zheng 2015). However, one of the major downsides of such arguments is that their focus has remained largely static, and there is an absence of discussion on neoliberalism, which is the dominant development model today, and its consequences. Most ICTD studies avoid engaging in discussions on what constitutes development. Some authors have taken a critical stance on the prevailing view of development that drives the discourse on the digital divide and foregrounds the role of ICT in creating a country's competitiveness capabilities in a global free market (Wade and Hulland 2004; Warschauer 2003). Others have pointed out the ongoing controversies regarding development, development policy, and the role attributed to ICT in various development policies (Avgerou 2003; Ciborra 2005). More recently, Walsham (2017) observed that the role of ICTD for marginalized communities in developing and underdeveloped economies is still being widely debated.

In recent years, some scholars from the global South have started studying ICTD in a nuanced way and have called for a re-examination of these technologies from the user perspective. They argue for immersive methodologies centering on lived realities in the global South (Arora and Rangaswamy 2013; Pathak-Shelat and DeShano 2014; Bhatia et al. 2024) and to pay attention to user aspirations instead of an imposed development agenda. For example, Arora and Rangaswamy (2013) argue that studies in the field of ICTD have relegated the enactments of leisure in the global South as anecdotal, which has partly occurred because much of such research is driven by developmental agendas with a strong historical bias towards socio-economic focus (Burrell and Anderson 2009). They emphasize the need to look at ICTs as leisure (entertainment/pleasure/play) artifacts in emerging markets. ICTs are also seen as tools of poverty alleviation and empowerment, leaving little room for alternative use of ICT, especially for marginalized communities. This ties into the paternalistic attitude of the West within ICTD research, which looks at people from the global South as simple-minded utilitarian beings who cannot use ICT artifacts for pleasure or leisure, but only for utilities that can be "beneficial" to them. Thus, people from the global South are looked at by the West as simple beings who just need to be economically liberated, and who are inert recipients of developmental action. More recently, several other scholars have called for the decolonization of ICTs. The production of knowledge in ICTD research has been characterized by an ongoing shift from dominantly Western-based to Indigenous theory formations. In her recent monograph examining children's engagement with digital technologies in urban slums of India, Bhatia (2024) argues that there is a need to rethink the role of ICT in low-income communities as more than a developmental project to save the poor from systems of discrimination and violence. She debunks universalizing theories and binary notions and provides complex narratives on novel ethnographic categories, such as romance, privacy, surveillance, shame, glamor, and creativity, in her exploration of children's quotidian digital experiences. She contends that a view of poor children's digital engagement emerges at multiple scales within low-income and digitally accessible environments, initiating new reflexivity about poverty and its influence on the potential of ICT in social identities, complete with risks and obligations (p. 13). Accordingly, there is

a growing need to put ICTD research into direct relation with theory formulated for and within the local context for elaboration (Davison and Díaz Andrade 2018), and relating to an explicitly decolonial discourse (Jimenez et al. 2022).

Zheng et al. (2018) argue for the need for ICTD research to evolve in the face of growing technological advancements and complex social dynamics and needs. They talk about the need for ICTD research to be situated in an assemblage with development, offering a better understanding of development processes, their ideological nature, the power structures and driving forces, and the mechanisms through which ICTs are embedded in and shape these processes. There is a growing understanding that ICTD should not be about achieving a designated level of technology adoption or diffusion, but a multifaceted, dynamic, and contentious socio-technical process. Our research agenda has to recognize that ICTD can result in unintended consequences or contradictory effects on development. Also, development is not a linear process, nor is there a one-size-fits-all solution, which is why it is important to embrace the multidimensionality and heterogeneity of development in ICTD. Critical and participatory research on ICT in developing countries acknowledges and addresses distinctions of context. The context where a new technology artifact and business model first takes shape (usually in an advanced economy) may be different from the context where this combined artifact and model is implanted or implemented as part of technological innovation in a developing country. Moreover, the socio-organizational settings of ICT development and use within sectors, countries, or regions may differ substantially from each other. Educational technology (EdTech) is an appropriate example of ICTD that should ideally be developed and designed to align with the learning motivations and technological practices and aspirations of student-teachers in context-specific and culturally relevant ways. Since before the onset of the pandemic, EdTech has been touted as a magic multiplier and a savior for countries like India that aspire to educate their large populations. This has prompted EdTech companies to pursue platformization and templization to accomplish scalability and standardization in EdTech use. These new tendencies are in conflict with the diverse needs and profiles of Indian learners. In the following section, we will explore how the use of ICTD has expanded in the public education system in India, along with some of the dominant discourses around the role of EdTech in increasing the accessibility of education.

4. Platformization of Education for Development

In recent years, emerging educational markets in the global South have witnessed an expansion in the use of ICT for teaching and learning, given the proliferation of computers, smartphones, and Internet services, including affordable data packages. Early reports on ICT in education¹ emphasized that ICT will revolutionize teaching and learning through online communication, interactive online environments, and DIY educational practices. These reports also suggested that educational technologies would increase students' access to learning resources, thus enhancing their educational opportunities and experiences. There was also a common perception that interacting with digital devices would be so rewarding and entertaining that students may in time prefer computers over teachers and in-person interactions in classrooms (Arora 2019). Not only this, projects such as the hole-in-the-wall also stressed that computers and other EdTech devices and programs could reduce the time required to accomplish learning goals and increase students' satisfaction and academic performance, encouraging them to become self-starters and take initiative. By 2013, governments in several countries of the global South were investing resources to develop open materials and learning resources, especially massive open online courses (MOOCs), to support the learning needs and academic aspirations of their ever-growing population. Recent trends in the government initiatives to improve educational outcomes for underserved and marginalized student populations include the creation of "Digital Infrastructures for Knowledge Sharing (DIKSHA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA) which focuses on ICT education, various state government initiatives on virtual classes and digital learning, and computer/digital-aided classroom teaching supported by

different private sector entities and NGOs” (Nandi 2024). Study Webs of Active-Learning for Young Aspiring Minds, or SWAYAM, which means self in Sanskrit, is another government of India initiative that aims to “take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy”. In 2020, the Government of India (GOI) launched the National Education Policy to promote the integration of technology and education to enhance students’ access to education, improve teaching capabilities and digital skilling, and embed artificial intelligence (AI) in classrooms. The policy is based on three guiding principles: access, equity, and quality. These state-led initiatives and huge private and public fundings to build educational technologies and EdTech platforms highlight that the government and corporations are increasingly optimistic about the role of ICTD in supporting the learning and teaching needs of students and teachers. Some of the dominant discourses on educational technologies emphasize that technological interventions can compensate for the lack of resources in the educational system, such as the high student–teacher ratio (46:1 in India), lack of professional training, meager salaries, and unstable learning infrastructures in schools (Nanda 2021).

Critical studies scholars who have analyzed the role of educational technologies, especially EdTech platforms in contexts of the global North, demonstrate the neoliberal and capitalist underpinnings of such technological interventions (Bowker et al. 2019; Decuyper and Broeck 2020). They criticize the technology-solutionism lens that identifies EdTech as comprising neutral developmental tools created to aid the existing education system and even replace it. According to the critical view, educational technologies are often founded on neoliberal principles of standardization and profit-making and are designed as a top-down intervention to resolve issues of inequities, inaccessibility, and lack of quality in the educational system.² It often replicates the design and infrastructure principles akin to traditional ICTD, where the West introduced and diffused new technologies into novel cultural contexts of the global South without paying attention to the antecedent factors and context influencing the adoption of these interventionist technologies. In a recent ethnographic exploration (Bhatia et al. 2024, p. 13) in India, the researchers argue that educational technologies are guided by “their logic of scaling their products for profitability, leading to standardization of curriculum, lack of teacher-student autonomy, compelling self-responsibility towards learning, and the subsequent erosion of socio-spatial relationships critical for developing place-based critical pedagogies. On the other hand, students and teachers use these platforms from within the socio-technical and cultural realities they inhabit”.

Our past research has highlighted the diverse ways in which young learners negotiate with the imposed logic and structure of templatization and platformization through playful resilience (Bhatia and Pathak-Shelat 2023). These negotiations are personalized based on the interaction between their lived local realities and aspirations spurred by global cultural flows and development discourses.

In this paper, we argue that young people’s learning practices, needs, and aspirations resist standardization and neoliberal conceptualization of education. The real-time uses of digital platforms and resources for education differ from the neoliberal and West-imposed expectations of introducing EdTech as an intervention to channel and propel development. Our data reveals divergence in three core areas. 1. Access: Proprietary EdTech platforms make claims that their technological interventions will help bridge gaps in education among high- and low-income students. In practice, however, learners from low-income communities and teachers in public schools cannot afford to access these private EdTech platforms. 2. Equity: Low-income kids seek and prioritize conventional outcomes such as high grades and cannot carve out space, time, or resources for experimentation. As first-generation learners, they do not start on a level playing field. Most EdTech platforms (private and public) are designed based on the principle of individual responsibility and assume student initiative towards curating learning material using different sources. Young

kids from low-income families do not want that responsibility; instead, they seek guidance, hand-holding, and mentoring to secure high grades. 3. Quality: Students and their families trust place-based and interpersonal learning experiences more than technology-mediated interactions. We explore the significance of the socio-economic and cultural contexts of young learners in the global South context and argue that they aspire for personalization, place-based experiences, guidance/mentorship, hand-holding, high grades, and in-person interactions instead of standardized and tech-lead learning opportunities and resources offered by EdTech platforms in their current state. We do not claim that the traditional place-based system is always successful in meeting their aspirations, but in its current state, EdTech is also not able to address the gaps in the traditional system.

Before we discuss the methods and analysis, we need to note that our research is based on the ground realities in India. It examines EdTech from the lens of “what is” and not “what ought to be”. While we value play and joy in learning and the autonomy and agency of the young students as desirable learning conditions, the over-burdened and highly competitive Indian education system prioritizes test scores, and the traditional setup is hierarchical, placing parents and teachers in a supervising role. Educational decisions are often collective family decisions. Additionally, even when fun and leisure are shown to have a positive influence on students’ learning, the pressure to succeed in a highly unequal and competitive society compels students and parents to have an instrumental approach to education that does not offer much scope for critical thinking or play-based and experiential learning experiences for students from low-income families. Parents in India invest a great deal of resources in their children’s education, often beyond their means. Therefore, they expect a certain tangible outcome. Even in these circumstances and limiting EdTech design, young people find their own creative strategies to engage with EdTech.

5. Methodology: Family Ethnography

This study identifies young people’s unique learning practices in their interactions with EdTech. Young people develop novel negotiation strategies to challenge the standardization logic inherent to educational technologies. They are creative in their interactions with EdTech and constantly look for a personalized and self-curated experience. To identify non-standardized uses of EdTech, we examined young people’s learning behaviors in non-formal contexts, such as their homes, in community areas, and their peer groups and family interactions. Our goal was to understand what students (age range: 14 to 18 years) do to negotiate their use of educational technologies, such as different EdTech platforms (DIKSHA, BYJU’s, and Vedantu), and open-access learning resources, such as YouTube and Google. We conducted family ethnographies in homes, neighborhoods, and schools/classrooms of 23 students from low-income communities in Ahmedabad, Delhi, and Vadodara. Our approach to conducting family ethnographies derives theoretical force from the works of scholars such as Schänzel (2010) and Nash et al. (2018), who introduced the whole family approach. According to them, such an approach is used when ethnographers wish to understand how family dynamics, interpersonal interactions, peer conversations, and formal engagements collectively influence people’s behaviors and experiences. We modified the family ethnography approach to include conversations and interviews with schoolteachers to understand how young people’s DIY learning practices influence the meanings they ascribe to educational technologies. Our family ethnography approach also references the methodological work of scholars including Caru and Cova (2008), Murphy and Dingwall (2007), Parker (2007), and Shankar et al. (2001). One of the authors worked as a media educator in these low-income communities from 2015 to 2019, and her relationships with the students helped her cultivate deep and meaningful connections with the communities. She conducted media literacy workshops for schools and community members, and “hung out” with students in their community areas and homes, attended cultural festivals such as marriages, religious celebrations, and community get-togethers, and also helped students participate in intercommunity and intra/inter-city competitions (Bhatia and Pathak-Shelat 2019). For this research project, she re-entered the

field for data collection in December 2020 and continued conducting observations and interviews till January 2021. The bulk of the data corpus relies on on-site note-taking and ethnographic and in-depth interviews with students, teachers, and family members. We conducted at least three short interviews (25 min each) with all of the participants ($n = 51$). The sample included 23 students, 20 parents, and 8 teachers. We also conducted follow-up interviews online, one month after we completed our onsite immersion, to clarify some questions we encountered in our first round of analysis of the ethnographic data. Our observation notes include a description of young learners' use of educational technologies. These notes answer the following questions: Which EdTech did they use? When and how did the students use these technologies? And, what were some common DIY learning practices they designed in their engagements with EdTech? We observed their interactions with and on the following platforms for education: YouTube, DIKSHA, BYJU's, Vedantu, and Google. We did not pre-select these education technologies; instead, we observed young learners' everyday engagements, and finalized a list of online platforms they used regularly for educational purposes. An inductive approach led us to create a list of the above-stated online platforms for analysis.

We used two-level coding for data analysis (Carspecken 1996; Madison 2020). According to this method, we created two levels of coding: low-level codes included empirical and concrete ideas, and high-level codes included abstract or theoretical concepts. For instance, the code student experiences included data related to students' learning needs and aspirations, and how they ascribed meaning and uses to different educational platforms/resources. In the second phase, we grouped these low-level codes under a high-level theoretical theme titled ascribed meanings of EdTech. The second high-level code was titled DIY learning. It included data describing how learners and teachers describe and define DIY learning with the help of EdTech. The focus of this theme is to unravel the growing chasm between the structural realities of the educational system in India and the learning approach and styles promoted through EdTech.

In the next section, we will explore the two high-level themes in more detail.

6. Ascribed Meanings of EdTech

Through our ethnographic immersion and research design, we compared the design and interface of online educational resources and platforms with students' learning needs and aspirations to identify the growing chasm between the company's neoliberal logic to scale the accessibility of these educational platforms through standardization and students' continued efforts to ascribe new and novel meanings to these technologies. We analyzed the informational architecture of the educational platforms that students used, i.e., DIKSHA, BYJU's, Vedantu, Google, and YouTube, and compared it with two data points: how students articulated their engagements with these tools, and the meanings they ascribed to online educational platforms and open-access resources.

Our first submission involves critically analyzing the interface and design of these platforms. BYJU's and Vedantu are privately-owned corporate enterprises based on a freemium business model: students get a 15-day free trial period to explore the use and merit of these platforms, and then they can choose to pay a subscription fee to access the educational resources and experiences these platforms create and host. DIKSHA, on the other hand, is a public educational platform with e-content to supplement and support students' learning across different grades and educational boards in the states of India. While BYJU's, Vedantu, and DIKSHA can be accessed through applications on mobile phones, only BYJU's and Vedantu enable students to enroll for live 1:1 online classes for coaching and preparation for exams. Moreover, BYJU's and DIKSHA offer integrated school learning programs, which are e-resources teachers can use in classrooms to explain concepts and lessons. While these platforms are designed and promoted to be a "one-stop solution" for all learning needs and existing gaps in classroom instructions and school experiences, students' conceptualization of these platforms diverges from the neoliberal understanding of ICT for education. For example, all of these platforms were problematized

by our participants in three significant ways: 1. Courses or grade-level content on these platforms replicate concepts and lesson plans in school textbooks and claim to offer adult-guided problem solving, but they lack the cultural familiarity and human touch that participants value. 2. These platforms use 3-D animation and motion graphics to create a more immersive experience. Such an approach relies heavily on using visual effects and advanced technological intervention to compensate for and even substitute the aspiration for place-based experiences, such as classroom interactions, peer bonding, and culturally sensitive/responsive learning discussions, but these features are either inaccessible to our participants due to low resources, or are perceived as gimmicky. 3. While these platforms want to standardize education, they continue to promote their potential of peer relations, live problem-solving and coaching, and easy-to-comprehend educational materials, for which our participants want to be reliant on experiences stemming from place-based and classroom/teacher-centered educational environments, even when these environments have severe limitations.

According to Shloka, a 14-year-old middle school student in Vadodara, educational platforms are not a one-stop solution. "Many of these platforms teach us the same things that our teachers teach us in schools of tuition classes. All they do is make it look very *high-fi* with animation and visuals. I think the main teaching and learning happens in schools and tuition classes and then if you want to use your leisure time to study more, these platforms do that; add a little bit of fun and visuals to learning. You cannot use these to rank first in the class". Like Shloka, many other students defined educational platforms as a "time-pass" and something to fill their "fun and play time" with another learning-based activity. They mentioned that educational platforms and online content were interesting as a supplemental learning resource and compared them to a "recommended reading list". A common perception among students and teachers was that tech-aided learning materials/content were less serious than actual classroom learning facilitated at school or coaching centers. Students often describe educational platforms as play, fun, leisure, and even entertainment, all attributes that are perceived as not signifying the serious learning that is a prerequisite for high-grade and top-level performance in competitive board examinations in the 10th and 12th grades.

In our conversations with parents, many saw educational technology platforms as an excuse their children used to avoid doing the hard work. According to them, online learning platforms and resources could not substitute the role of a school or a tuition teacher in the academic lives of their children. In our interviews with a 15-year-old student Kajol and her mother Neeta, we heard them express trust in Kajol's tuition and school teachers. Unlike educational technology platforms or YouTube, Neeta could regularly message Kajol's teachers and inquire if Kajol was a well-behaved and high-performing student in her class. Neeta also followed Kajol's teachers on social media apps and established a semi-formal relationship with them to ensure that the teachers would take an interest in her daughter and provide her with more attention and guidance to ensure she excels in exams. She explained, "I do not trust these online companies with my Kajol's education. How do I monitor her if she is on the phone? I cannot constantly check if she is studying or looking at cute cat videos. When Kajol uses YouTube, she starts with videos about gravity or some scientific concept from her course and the next auto-played video is about dogs or ice-cream cones and there goes her attention". Educational technologies and platforms are often considered a distraction from serious and goal-oriented learning methods and practices. Many parents emphasized how educational technologies "sound fancy, but do not instill a sense of discipline or motivation for excellence in students" (Neeta). Instead, technologies distract young people and make them think they can multitask, often leading to poor performance and grades in competitive exams.

We interviewed five students in 10th grade preparing for their board exams in India. We asked them about their experiences using educational technologies and online learning resources and the meanings they ascribed to these technological interventions to improve their academic performance. Zeba, a 16-year-old student in the 10th grade in a public school

in Delhi said, “I cannot study in a disciplined manner unless there is a sword hanging on my head. So, if I am not scared of what my teacher will say if I score less, I will not study. Most of these platforms are just textbook materials more decorated or beautifully displayed. These platforms haven’t cracked the trick of making learning easy and fun. Instead, my math teacher at school is funnier and he makes us laugh all the time while teaching us different theorems and other difficult concepts. It feels much better to show your report card to your school teacher than any online person you have not met once in your life”.

Our analysis of how students, teachers, and parents perceive educational technologies, platforms, and online resources reveals two primary themes:

1. Most EdTech platforms and content are designed based on the assumption that unrestricted and easy access to these technologies will encourage students to overcome socioeconomic inequities and modernize their approach to education and learning. Instead, our observations and analysis indicate that in the absence of integration of critical thinking and self-directed learning in the educational system and infrastructure from an early stage, traditional approaches to learning are still considered robust educational methods, while technological interventions are deemed elitist, entertaining, and a viable supplement to the conventional student-teacher learning mode practices in schools and tuition classes.
2. ICT solutions for educational inequities or quality issues are often top-down and removed from the local and cultural realities of students and the communities they inhabit. Most EdTech platforms and online resources foreground a West-influenced approach to education: individualized, customized, and malleable. This approach might be significant in the contexts of the global North, but in countries like India where competition is high and higher education is still largely publicly funded and based on merit, students from low income families rely on tried-and-tested learning methods that prioritize high grades and replication. EdTech platforms and online resources cannot substitute the experiences offered in place-based learning environments through interpersonal interactions, peer bonding, and locally relevant strategies of teaching-learning even with their limitations.

While ICT for education is designed to allow more creativity and experimentality among students, learners and their families in the low-income communities of India continue to consider digital technologies as frivolous, distracting, and a source of entertainment for rich children. Many parents were afraid that if their children started developing a new approach to learning because of digital technologies, their grades would suffer and they would miss out on critical career opportunities.

Though students were inclined to use EdTech platforms and online resources to develop an experimental learning experience, they used these resources to complement the place-based learning methods used in their schools and coaching classes. Even when the states and private companies have promoted these technologies as the progressively improving substitute for classroom teaching-learning, our ethnographic insights and participant interviews suggest that place-based learning continues to align more closely with the academic infrastructure and *techne* in India, thus preparing students better to fulfil their goal to become gainfully employed, their prime aspiration. Even when EdTech platforms and online resources argue for the need to make learning a creative and individualized endeavor, they continue to replicate conventional educational experiences through standardization to ensure the scalability and profitability of their content and services. As students ascribe novel meanings to EdTech and crave experiences that conventional classrooms do not offer, they also devise strategies to make their EdTech engagements more meaningful and more closely aligned with their individual aspirations, which are informed by the cultural and socioeconomic realities in their communities. In the next section, we will explore these unique strategies designed to localize their engagements with EdTech.

7. DIY Learning

Many students described EdTech as a do-it-yourself (DIY) approach to learning. They compared propriety EdTech platforms such as BYJU's and Vedantu with open-access resources on YouTube. According to these students, propriety platforms are similar to luxury brands. As Ashish explained, "These companies sell the same content at a much higher price. I can find everything on YouTube that I want to do myself. And that is what these companies don't understand. I might DIY for fun. I won't do it when it comes to making career-defining decisions about what questions to practice to get a perfect score on the exam. My schoolteachers and tuition sir have spent years teaching this stuff—they know better than I do". Students like Ashish also negotiate around the positioning of ICT for education as creating a level playing field for all young people. As Bhatia explains (2024), "promoting digital technologies as an elixir to the daily socio-economic and cultural discrimination children experience effectively transfers the responsibility to initiate social change from the governments to vulnerable children. ICT for education encourages children to take more responsibility and design their personal curricula, and timetable, and set up goals and deadlines but these children do not receive the necessary resources to develop these skills early on. The design and infrastructure of ICT for education are built on the logic of self-responsibility, i.e., once students have access to these technological interventions, they will overcome existing inequities and become better and modern learners. When increasing digital access among children does not improve their living conditions in the slums, children are blamed for using their digital technologies for non-developmental purposes". The students we interviewed were reluctant to assume responsibility for their academic progress and relied wholeheartedly on the guidance and instruction of their teachers and parents. They were also unsure if they had the skills to design DIY curricula using diverse learning resources dispersed across different platforms on the Internet. School students who were in the 10th and 12th grades were particularly nervous about experimenting with learning styles or course materials because they wanted to excel in their board exams and score high grades, which are required for admission to a good college. Rekha, a 17-year-old girl in 11th grade at a public school in Delhi, explained: "These EdTech platforms expect me to be self-disciplined and confident about my ability to source the right material for studying. That is insane. I cannot even wake up in the morning on my own; my mother wakes me up. I understand that these platforms and online resources may let me experience more autonomy as a learner, but I thrive in situations where I have sustained continuous adult guidance and mentorship. I cannot score well unless I have a coach who has filtered all the relevant learning material, explained it to me in great detail as often as I need the explanation, and created a list of deadlines or even study goals. Even when schools and tuition classes have a lot of students, I can still rely on the question paper bank they create and practice those questions again and again to score high marks".

Students, parents, and teachers acknowledged the intent of DIY learning to encourage students to use their leisure time to study more and revise their standard course material in a different format and style. Even in such cases, EdTech use was far from completely autonomous for the student. Pathak-Shelat and DeShano (2014) observed that "Digital technologies are marketed as youth-oriented technologies giving "power" to youth (youth agency), but we observed a web of school and parental controls surrounding their use" (p. 10). Even a decade after this observation, there is much adult control surrounding the way youths use technology. According to Ravi, the father of a 14-year-old student in Delhi, EdTech can be a good tool to replace frivolous engagement on mobile phones with learning-centered entertainment. He encouraged his daughter, Ritu, to spend her free time using EdTech apps on his phone instead of watching television or relentlessly scrolling through reels on social media. EdTech, according to him, offers a great opportunity to channel young people's desire to be on the Internet towards learning-focused online activities. As he explained, "I have subscribed to BYJU's and I have downloaded the DIKSHA app on my phone. Ritu is allowed to spend 20 minutes on my smartphone every day and I encourage her to use these apps. These apps provide visuals for difficult concepts in math or science

and can retain student's attention. Also, she can create her list of to-watch videos from these apps or on YouTube based on what she is learning in her school or tuition". When we asked Ritu how and when she used EdTech platforms and online resources, she echoed her father and described EdTech as an antidote to "relentless scrolling on Instagram or Facebook". According to her, EdTech resources online were exciting because she could create her own watch list or reading list. Sometimes, she watched these resources and came up with interesting questions. When she raised these questions in her classes, her teachers would be impressed and praise her for putting in more effort and studying additional material.

Alternatively, some teachers we interviewed said that EdTech platforms and online learning resources could be misleading and confuse students about course content and how to prepare for their competitive board exams. They said that most EdTech content and learning strategies focused on standardizing learning and teaching, and so focused on conceptual clarity and short question-answer testing/evaluation methods. Exams in schools include questions that required long answers, explanations, and abstract-level thinking. Additionally, these platforms cannot provide answer sheets for theoretical courses or long-form essays. Neelam, a school principal in Ahmedabad, explained: "EdTech can make you think that you will perform well on exams with short questions, such as multiple choice questions, or math, or science equations. And then you use the same approach for subjects such as English or Gujarati and even social studies. In these subjects, students in the state board schools are required to write long answers, 2 or 3 pages long. Your YouTube video cannot teach you the different learning styles for different subjects. And EdTech cannot also evaluate these long answers".

Exploring the local contexts deeper, we asked Neelam and other teachers at three low-income public schools in Ahmedabad, Vadodara, and Delhi to share their experiences with using DIKSHA for teaching and learning in school classrooms. All the teachers unanimously agreed that the DIKSHA app was difficult to use and did not include any novel resources (videos or animations) that were not easily available on YouTube. We observed as they scrolled through the app and illustrated how they created a DIY kit of teaching resources from the app. Most videos and practice exercises were open-sourced and were not of high quality. The app also did not include interactive learning material for all of the lesson plans at different grades. Many lesson plans were missing and did not cover the course material comprehensively, or lacked a detailed explanation of concepts. Even when the teachers could find relevant resources to use in their classrooms, there were other issues related to the technical infrastructure required to use the app and the learning and teaching e-content. Mahesh, a social studies teacher at a public school in Vadodara, explained: "We do not have fans in the schools, how can I expect to have a projector in every room? We have to design learning strategies that take into account such physical discomforts of the students when they have to study on a hot summer day. I use a lot of examples from their communities, I localize the stories I create to teach concepts, and I also rely on paper-based displays: big maps, or the physical atlas. They think developing technology is the end-all solution but it isn't. Many students don't have phones and if I rely on EdTech then I am putting these students at a disadvantage".

Our observations in public schools in low-income areas across cities corroborate Mahesh's experiences with EdTech for teaching and learning. Though students were genuinely curious about new technologies for learning, their curiosity was limited to a desire to play with technology and acquire familiarity. They used these technologies because they were novel and entertaining. The students, however, did not consider these technologies as "legitimate sources of knowledge" and continued to trust their teachers at schools and classrooms for serious academic guidance and mentorship. They were also aware of the structural inequities inherent to accessing these technologies for self-development and empowerment. Many students in low-income communities do not have the monetary resources to access EdTech, even when many of these online resources are open-access and state-funded. While students did not have any difficulty navigating the EdTech apps or looking for free resources online, they often found these increasingly

tech-enabled resources to be lacking a connection to their culture and reality. For instance, one student in a Gujarati medium school mentioned that it was difficult for him to find interesting and authentic online resources in Gujarati. He had a list of a few YouTubers who created content in his language, but again, such content was limited and could not be localized to speak to his reality and experiences. Open-access online resources, even in countries like India with a large population using diverse local languages, are still directed to meet the global standards of an English-speaking and international community of learners. According to students who center their local lives and place-based learning, EdTech interventions lack inclusive design and technical infrastructures to accommodate cultural realities, indigenous lifestyles, structural limitations, socioeconomic conditions, and the personal aspirations of young learners. Instead, EdTech for development standardizes teaching-learning practices, often at the expense of place-based learning, and reinforces the neoliberal definitions of development and progress.

8. Conclusions

Our study was conducted to understand how students negotiate their use of educational technologies, such as different EdTech platforms (DIKSHA, BYJU's, and Vedantu), and open-access learning resources, such as YouTube and Google. We conducted family ethnographies in the homes, neighborhoods, and schools/classrooms of 23 students from low-income communities in three cities in India: Ahmedabad, Delhi, and Vadodara.

Our findings reveal that though students were inclined to use EdTech platforms and online resources to develop an experimental learning experience, they used these resources to complement the place-based learning methods used in their schools and coaching classes. Even though the states and private companies have promoted these technologies as a progressively improving substitute for classroom teaching and learning, our ethnographic insights and participant interviews suggest that place-based learning continues to align more closely with the academic infrastructure and techne in India, thus preparing students better to fulfil their goal to become gainfully employed. Additionally, even though EdTech platforms and online resources argue for the need to make learning a creative and individualized endeavor, they continue to replicate conventional educational experiences through standardization to ensure the scalability and profitability of their content and services.

The findings from our research argue for the need to use EdTech platforms as one of the many tech tools to enhance the learning experience of students without replacing or downplaying the importance of the place-based and culturally-sensitive learning that takes place in classrooms and playgrounds of schools. We need to rethink how to design our technologies and how to personalize them, and create inclusive experiences for students and teachers. Creating educational technologies that are supportive of the culturally relevant practices and learning aspirations of students is paramount to recalibrating and reimagining the public education system. EdTech in its current form is based on principles of dissemination alone; EdTech platforms and companies need to step into the realm of understanding how these technologies are received by the users, and how to improved such human–technology interactions for inclusive experiences.

These findings are based on our study with only a specific group of children: urban, low-income, and in the age group of 14 to 18 years, enrolled in middle or high school. These children do not reflect the entire complexity and diversity of Indian learners. In another research project on DIY learning and online platforms, we did notice a more positive inclination towards creativity and experimentation when learners were in higher education (aged 18 years and above) and were looking to gain expertise in career fields that have newly evolved in the Indian market, such as graphic and UX designing (Bhatia et al. 2023). The group that we have studied, however, remains largely invisible in research and their experiences and concerns also merit attention.

The challenge of educating large and diverse masses, located across difficult terrains is a serious concern for several countries of the global South. The process of standardization

often excludes the user needs, experiences, and lived realities of niche groups, especially marginalized communities, thus making such platforms inaccessible to vulnerable people. When used sensitively, EdTech can become a supplementary resource in addressing this challenge. We argue that reconceptualizing development to account for students' and teachers' lived realities, cultural experiences, and personal aspirations will enable designing and deploying educational technologies to holistically address learning needs and practices. Integrating critical thinking, self-directional learning, and experimentation from an early stage in the mainstream educational system and infrastructure will help children derive more value from EdTech, as well as place-based learning. Such an approach to educational technologies for development should have three core principles: 1. Inclusive and bottom-up approach to development and deployment of educational technologies; 2. Centering learning practices and place-based needs of students-teachers; and 3. Prioritizing learners' everyday learning practices, economic conditions, and socio-cultural contexts. Our study points out that taking a situated approach to EdTech in development, rather than universalism, may help us channel their true potential.

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Notes

¹ Here, neoliberalism refers to an ideological framework that prioritizes market-driven approaches, competition, and privatization over public and communal interests in education technology. This critique highlights concerns such as the marketization of education, where EdTech platforms often prioritize profit margins over educational outcomes and equitable access, exacerbating educational inequalities by creating a digital divide. Additionally, neoliberalism encourages partnerships between educational institutions and private corporations, leading to the corporatization of education and influencing curriculum design and pedagogical approaches to align more with market needs than holistic educational values (Ball 2012; Giroux 2004; Hill and Kumar 2009). By critiquing EdTech platforms through the lens of neoliberalism, it becomes possible to address these issues and advocate for more equitable, democratic, and inclusive approaches to integrating technology into education.

² As ethnographers, it is essential for us to acknowledge our subjectivity and the influence of our political and social identities. Throughout our field immersion and research work (including analysis), we offer a clear and comprehensive account of our positionality, enabling our participants and readers to assess how our personal perspectives may have shaped our engagement with them, the fieldwork, and the analysis. Addressing the researcher's positionality is often referred to as a reflexive turn in ethnography. This approach involves scrutinizing our roles, interactions, power dynamics, and other embodied actions as ethnographers in the field, and recognizing how our positionality affects our relationships with the research site and its participants. Immersing oneself in the field and the lives and communities of the participants is inherently a personal and subjective experience (Bhatia 2024). As ethnographers, we argue that our analysis and representations are always only "partial approximations" of our participants' lived experiences.

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