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Ethnographic mapping as a critical pedagogical tool in planning and architecture

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Abstract

There is growing consensus within southern urban scholarship that curricula taught at many universities requires radical reform if graduates are to be equipped with the skills and knowledge required to understand and manage the pressing challenges associated with rapid urbanisation. This paper explores and reflects on the role of ethnographic mapping as a critical pedagogical tool that can enable students to ground their learning within local contexts and realities. It draws its findings from a mapping workshop designed for students at NED University of Engineering and Technology in Karachi, which was organized as part of a collaborative research project with the LSE on solid waste management in fast-growing cities. The paper argues that the use of mapping as a pedagogical instrument facilitates methodological and substantive learning, allowing students to read, encounter, unlearn, while discovering links between physical and socio-economic processes, developing new vocabularies, and gaining an appreciation for interdisciplinary learning. While attentive to the limitations of mapping as a method, this paper finds that the teaching of creative mapping methods does not only serve as a building block towards a more socially integrated curriculum, but can actively facilitate two-way learning.

1. Introduction

The increased complexity and volume of solid waste in rapidly urbanizing cities of the Global South is not just a technical problem, but critically a social one. Waste streams, and the technical challenges created by various kinds of waste production, intersect closely with issues of class, caste, labour, gender, and habitation, requiring a deeper engagement with their associated socio-spatial dynamics. Yet, Solid Waste Management (SWM) continues to be seen predominantly as a technical matter, both in dominant policy circles and in traditional planning and engineering university curricula. In this context, SWM and how it is theorized offers an *a priori* case of what the planner Vanessa Watson describes as the ‘significant gap [that] has opened up between increasingly techno-managerial and marketized systems of government administration, service provision and planning (including, frequently, older forms of planning) and the every-day lives of a marginalised and impoverished urban population surviving largely under conditions of informality’ (Watson 2009, p. 2260). Watson argues that it is critical to ‘widen the scope of planning,’ (p. 2261)¹ and planning education in contexts where planning systems have been inherited from colonial periods with little attention to issues of poverty and informality. She asserts that it is crucial to develop new perspectives, methodologies and theories that understand and engage deeply with southern contexts.

The urbanist Gautam Bhan (2019) goes further, and critiques disciplinary silos, arguing that bounded disciplinary registers are insufficient for understanding and addressing the material and social complexity of contemporary urban contexts. He contends that the requirement for broad understanding, analysis and application, is often best derived from multidisciplinary or interdisciplinary research methods.² In the case of SWM, he finds that it is essential to move beyond technical responses, and to focus simultaneously on the multiple, formal and informal arrangements that exist on the ground. These are critical to observe for

as Bhan (2019) remarks, we may need to ‘reframe’ the questions that we ask. He states:

we must begin from existing practices of service delivery on their own terms, recognize the contexts that they come from, understand why they have emerged, and then reassess whether the network is the most feasible (and not just the most theoretically desirable) mode through which to reach the outcomes we want (p. 11).

The complex and dynamic informal supply chains through which urban dwellers access services particularly in southern cities relates to formal and informal processes in various and intricate ways. In this sense, urban systems such as SWM are not ‘formal’ or ‘informal,’ but have components which fall within and beyond various regulatory frameworks, creating highly localised and heterogeneous systems that require fine-grained institutional mapping (Simone and Pieterse 2017). These thick, often precarious, urban systems rely on what Sylvie Jaglin (2014) refers to as ‘hybrid service delivery configurations,’ (p. 182). For instance, informal solid waste collection often operates within the interstices of official municipal services. Equally municipal residential waste collection is often dependent on unofficial systems of collection and disposal.

Over the last two decades, there has been a growing body of work in urban studies on sanitation, waste and water infrastructures that has shifted the focus away from pure technical readings of hard utilities, bringing the focus of scholarship towards the people and practices that shape urban services. These literatures call for better understanding of infrastructure and ‘infrastructure interfaces’ (Ciriola et. al 2021), being the physical connection points where different components of the system meet, as well as the social networks and relationships that sustain them (Amin 2014; McFarlane and Silver 2017; Simone 2004; Von Schnitzler 2013). Despite such welcome reconceptualisations of infrastructure, scant attention has been paid to how these practices may be taught in the context of

¹ She asserts that her aim is not to recommend a duality between planning approaches for the Global

North and the South, but to better understand and ground knowledge from a variety of contexts.

² Also see Beall et al. (2019).

architecture, planning and engineering. There is, however, growing recognition of the need to do so. Bhan (2019), for instance, highlights the need for curricula to educate in southern modes of city making. He writes:

'...what we teach in our universities echoes curricula written elsewhere that rarely reflect – let alone engage with – the conditions in which we live. In a country where a majority live in auto-constructed housing, standard syllabi for architectural education have no courses on repair, which is taken seriously only in heritage and conservation' (p. 9).

Responding to these calls, in this article, we consider how more creative pedagogical approaches and socially integrated curriculums can be developed for students of planning and architecture, and specifically explore the role of mapping as a critical pedagogical tool that can enable students to better contextualize their learning in line with local realities. We argue that the incorporation of mapping as a dynamic and critical pedagogical instrument in existing curricula facilitates methodological and substantive learning, offering students a method to read, encounter, discover and unlearn. We draw our findings from an ethnographic mapping workshop organized jointly by LSE Cities at the London School of Economics and Political Science and NED University of Engineering and Technology in Karachi for post-graduate Urban Planning students at NED, with backgrounds in architecture, urban design, geography, GIS, development planning. The workshop formed part of a wider collaboration for the research project 'Rubbish, Resources and Residues (RRR): Waste and Well-Being in Ethiopia and Pakistan,' which explores the intersection of official systems of municipal SWM with informal waste collection and disposal services and related recycling economies in Addis Ababa and Karachi. While the RRR project studies changes in waste generation, collection, disposal, and recycling in recent decades, and examines their impact on workers and low-income urban dwellers, the workshop was designed specifically to introduce students to spatial ethnographic mapping methodologies that can be used to understand waste streams and their movements across official and unofficial delivery systems. Due to the varied

background of the students the workshop also aimed to demonstrate the value of interdisciplinary perspectives and collaborations. We found that the mapping exercises conducted by the students allowed them to view the city from a different epistemological vantage point, and further develop an understanding of, and a new method for, researching interconnected socio-technical processes, relationally connected to specific waste streams. Student findings also altered the research team's conception of 'waste,' further cementing the value of creative methods that facilitate two-way learning.

While any efforts to develop a more socially integrated curriculum require long-term, purposeful collaborations between various stakeholders, this paper aims primarily to highlight a pedagogical tool and method of working that can be used to support contextually relevant, interdisciplinary learning for students in the fields of planning, engineering and architecture. It seeks to contribute to existing scholarship by starting from the classroom and focusing on a specific teaching method that can be used to develop a 'vocabulary of urban practices rooted in the traditions of Southern inquiry,' (Bhan 2019, p. 13).

The paper is structured as follows: section two reviews existing scholarship advocating for new forms of socially relevant (southern) curriculums and pedagogical frameworks in the fields of planning, engineering and architecture; Section three details the pedagogical approach and method used to introduce and teach spatial mapping techniques and frameworks to university students. By outlining and analysing student outputs, section four demonstrates the value of utilising mapping as a critical pedagogical tool. Section five reflects further on learning outcomes, and finally section six concludes with a discussion on mapping limitations, implications and potential of developing socially integrated curriculums, and avenues for additional research.

2. (Re)conceptualising curriculum building: A review of the literature

There is growing consensus within the existing literature that the planning and architecture curricula taught at many universities in the Global South requires radical reform if graduates are to be equipped with the skills and knowledge required to holistically understand and manage pressing challenges associated with rapid urbanisation (Nnkya and Lupala 2008, Diaw et al. 2010, Odendaal 2012, Scholz et al. 2021). Scholars note that education systems in the relevant professional fields – degrees, curricula, teaching methodologies and philosophies – have been inherited from colonial rule, and, while some universities are now beginning to reform their curricula³, much more remains to be done (Watson et al. 2002, Watson 2009, Diaw et al. 2010, Odendaal 2012). For the most part, students continue to be taught design and planning as ideals that are divorced from existing realities and processes of urban change, and contexts of widespread informality and poverty (Wesely and Allen 2019). Scholars assert that graduates lack the ‘vocabularies’ (see Bhan 2019) and training to adequately engage with changing local conditions, and are ill-equipped to holistically address challenges around sustainability, climate change, inequality, pro-poor growth, and inclusiveness. In fact, it is also not uncommon for this to be reinforced when graduates start to work at government institutions (also inherited from colonial systems) that further the interests of more powerful sectors of society and view the urban poor with suspicion and disdain (Odendaal 2012).

As noted by Winberg and Winberg (2017), there is also increasing pressure on engineering programmes ‘to become more inclusive, innovative and ‘relevant’ to social needs,’ (p. 248). Typically taught as a ‘technical’ science, McMillan (2017) argues that it is critical to develop pedagogical approaches that combine both ‘technical and social domains of learning and knowledge,’ (p. 161) if graduates are to serve as ‘socially conscious

professionals,’ (p. 159) who are prepared to manage growing developmental challenges.

Responding to inadequacies within existing education systems, a growing number of scholars have advocated for the decolonization of existing curricula and ideals (Miraftab 2009, Winberg and Winberg 2017, Sunderasan 2019, Wesley and Allen 2019). As shown by McMillan (2017), this is a task not without its challenges. She contends that the ‘strategies, processes and programs’ (p. 161) required to effectively decolonize curricula remain unclear. Simply including additional content that focuses on local contexts is insufficient as it is equally critical to introduce new pedagogical approaches and outlooks that transform and challenge existing forms of knowledge production.

Relatedly, scholars have argued that it is critical to ‘develop new concepts, ideas, vocabularies and practices from southern perspectives,’ (Mukhopadhyay 2021, p. 9, see Yiftachel 2006, Roy 2009, Watson 2009, 2013 and 2016, Bhan 2019). Such perspectives, it is suggested, can be strengthened by paying attention to existing ‘empirical configurations’ and practices (Bhan 2019, p. 5), which are rooted in place, beginning with ‘what is rather than what should be,’ (Odendaal 2012, p. 174). Authors suggest that curriculum reform should prioritize ‘experiential learning,’ (Watson and Odendaal 2012, p. 102). It should train graduates to better understand local conditions and environments; informality, poverty, and marginalisation (Nnkya and Lupala 2008, Odendaal 2012, Watson 2009); effective forms of spatial planning along with equitable access to land for housing (Odendaal 2012); climate change and disaster risk management (Scholz et al. 2021); sustainability and interdisciplinarity (Bina et al. 2018; Beall et al. 2019), while also regarding the teaching of planning as a political practice (Odendaal 2012). McFarlane (2018) argues more broadly that the question of learning is itself critical, as the tools through which one learns about the city are intricately tied to one’s understandings of

³ See Watson and Odendaal (2012), for instance, on the collective efforts to revise planning education systems in Sub-Saharan Africa.

everyday realities, politics, and the sources of knowledge deemed to be legitimate.

Likewise, a strand of emerging scholarship lays stress on the importance of pedagogical frameworks and approaches that can be used to better train graduates for their ‘particular socio-cultural and ecological contexts,’ (Kassam 2010 as qtd. in McMillan 2017). In a special issue on pedagogical encounters in Architecture in the Global South (see Salama 2018), for instance, authors reflect on the use and effectiveness of various pedagogical techniques and methods (including community outreach, interdisciplinary/multicultural teams, workshops) to facilitate active learning (Khan 2018, Nelson et al. 2018, Tenorio et al. 2018).⁴ Likewise, Sundaresan (2019) reflects on pedagogical initiatives taken while teaching at the Indian Institute for Human Settlements (IIHS) that relied on the use of multidisciplinary approaches, a diverse composition of faculty and students, co-construction of resources, new forms of assessments, imaginations and learning. McMillan (2017) writes of her experience of teaching a course on Social Infrastructures as part of an engineering curriculum at a South African university. She finds that the deliberate pedagogies that combine both ‘classroom-based learning and reflection with community engaged, experiential learning through learning exposure visits,’ have the potential to help students connect the social and the technical, appreciate new forms of knowledge ‘outside’ the university, help challenge biases and stereotypes, and reflect on reciprocal partnerships. Yet, she argues that significant additional work is required to create spaces for ‘immersed learning’ and incorporate new pedagogical approaches that prioritize engagement, particularly given existing practical constraints and power dynamics within and outside the university. In similar vein, drawing on the experiences of the networked schools of the Habitat International Coalition in Latin America, and the IIHS, Anand et al. (2021) demonstrate how their use of critical pedagogies, which are ‘iterative and dialogical,’ (p. 20) comprising diverse faculty and learners, varied sites of learning, and attentive to ‘power relations within academic and non-academic

faculty’ (p. 20), help position the university as one of the many sources of knowledge production, while contributing to new understandings of southern urbanism.

Although there is growing debate on pedagogical approaches that incorporate studios, workshops, and community engagement as means to facilitate more contextual learning, there is less scholarship on the specific role and use of drawing and mapping as tools to create a social consciousness amongst students of architecture, planning and engineering. Notable exceptions exist. Reflecting on the pedagogies used as part of the four-year co-learning alliance between Bartlett Development Planning Unit at University College London and various community-based groups in Lima, Allen et al. (2018) refer to the critical role that maps and mapping exercises played in ‘provoking new framings of urban change, linking epistemological, ontological and methodological questions,’ around collective learning of the city (p. 361). Similarly, Awan et al. (2015) highlight the ways in which mapping exercises can help students connect the ‘political with the spatial’ (p. 131). In her piece on subaltern architectures, Tayob (2018) finds that drawing itself can help uncover ‘unseen spatial practices,’ (p. 203) and spaces.

The anthropologist Andrew Causey (2017) distinguishes between ‘looking and seeing ... looking is a kind of scanning and tends to be passive, while seeing is a kind of scrutiny and tends to be active ... [which] requires visual engagement’ (p. 12); as disciplines of sociology, anthropology and ethnography evolve and adapt in a rapidly changing world, it becomes evident that methodologies of observation and analysis must keep pace, and he argues for the ability of maps to create knowledge. As graphic representations, they can be ‘shorthand’ for complex problems and can narrate convincing stories (Krupar 2015). When it comes to the use of maps to assimilate concepts and ideas, it has been suggested that this process facilitates critical thinking in students of different age groups (Rye et al. 2013, Sadler et al. 2015), and helps students create

⁴ Here, they seek to build on the ‘discourse advanced in the Global North,’ and use the opportunity to

reflect on pedagogical frameworks used in the ‘contextual particularities of the Global South,’ (p.2).

connections between cause and effect; presenting a holistic picture within one frame.

Predominantly, however, scholarship focuses more broadly on the potential of mapping as a critical visual practice that helps uncover key patterns and processes, bringing to light new ways of seeing and imagining (Awan and Langley 2013, Corner 1999, Saldarriaga et al. 2017, Lee et al. 2015, Rose 2014). Less attention is paid to the use and experiences of *mapping as a pedagogical tool*, which enables students to ground their learning within local contexts and realities. This paper, therefore, seeks to build on, and contribute to, existing scholarship by drawing from the experience of teaching critical mapping methods, and reflecting on its use as a pedagogical instrument to contribute towards a more socially integrated curriculum.

3. Mapping as Method

This section describes the process, content, and pedagogical approach used to teach university students the role of ethnographic mapping as a critical visual practice in social research. For this purpose, from December 2020 through to February 2021, staff at LSE Cities and NED University co-organized a series of online workshops and group work with post-graduate urban planning students at NED University. The workshop was organized entirely online and comprised of three sessions: a lecture with a Q&A component, a meeting with student groups to discuss choice of waste streams, and a meeting for group presentations and feedback. The first session of the workshop began with a lecture delivered by the first author and was split into two parts. The first part introduced questions of solid waste in southern city contexts, specifically drawing on methods used by the first author to research, design, and deliver a piece of low-cost, low-tech sanitation infrastructure in Delhi, India previously (TEDx Talks 2019). The second part of the lecture demonstrated that mapping methods can be used not only to represent a condition but can also be used to draw out the possibilities for change. Three types of mappings were introduced: (1) systems (such as the distribution of resources); (2) effects (for instance, the effects of resource distribution, such as inequality), and; (3) perceptions (how the city is experienced and understood). For each type of map, an inspiring

precedent from a range of contexts was discussed, followed by a mapping used by the first author, in practice, on waste issues in Delhi, and concluding with general comments. This way the students could be inspired by a wide range of precedents, but equally gain practical take aways linked to SWM, including examples from similar contexts, to help them actualize their own maps.

Starting with system maps, the students were shown 'shit-flow diagrams,' (or excreta flow diagrams) which are wonderfully powerful maps which diagram the flow of waste in the city (Bhan 2019, p. 10). In development circles these are known and accepted tools used to understand and communicate how excreta physically flows through a city or town. These drawings usefully break down the percentage of effluent that gets treated and that which doesn't. It is a simple, yet powerful visual tool used to argue for targeted investment. The practical example showed fieldwork mappings of waste flows in a peripheral informal neighbourhood in Delhi drawing the various ways in which effluent left houses into three different systems: drains, soak away pits, and pit latrines. This kind of mapping is useful for understanding basic flow patterns, but not spatial relations.

To discuss how to map the effects (of a system), the students were shown Booth's poverty maps, constructed in the 1880 and 1890s in London. These maps were arguably the first large-scale maps developed of any urban structure. Booth was able to demonstrate that one third of Londoners lived in relative poverty - and by implication - the scale of intervention required. His maps resulted in fundamental changes to pension reform and child labour laws. However, Booths maps used a moral code to categorize people: This code correlated poverty with moral deprivation rather than structural conditions such as low wages, and thus influenced how poverty was understood (Vaughan 2018). The practical example showed fieldwork mapping of an informal settlement in Delhi which attempted to connect spatial process (the incremental development of housing) to social ones (the resultant changes in behaviours as houses grew and infrastructures were installed). Charting incremental housing growth, the maps demonstrated connections with income generation, greater privacy, and the ability to integrate services.

However, it was stressed that both these mappings – Booths and the first author’s – were time sensitive, requiring extensive fieldwork. Using both examples, but particularly Booth’s maps, students were introduced to the idea that drawing is both spatial and relational. In other words when connecting processes and people in a place, a drawing is never simply technical, or innocent of how the drawing-maker looks at and organises the world.

Finally, perception maps were presented to the students using the work of Kevin Lynch, an Urban Planner and scholar who in the 1960s developed a mapping technique which was, and still is, a very influential planning tool around the world. His method relied on five prompts (path, edge, district, node, and landmark) to assess the spatial conditions when interviewing people who lived in a city. However, when rolled out in practice, planners would often drop the interview dimension relying on their own perceptions only, and in doing so, risk reducing spatial analysis to often default (male) perceptions. This would reduce complex experiences like urban safety – which is experienced very differently across lines of age, race and gender – to singular universal ideas.

The practical perception maps used the Lynch method to produce a map of waste management in a low-income neighbourhood in Delhi. Producing maps with communities is commonly used as part of co-design processes aimed at empowering those who live in an area so that they have a say about possible interventions. Lynch and the author’s maps were discussed in their attempt to engage with social problems and the possibility of transformation, where the mapping leads to some kind of design or planning intervention.

Following the lecture, students were asked to select a type of solid waste that they saw around them, in their workplace/ house/street/neighbourhood, after which, in another online meeting, they were asked to explain the reason for selecting that specific waste stream. This allowed for a general discussion on what constitutes waste, where it can be found, the methods that could be used, and the challenges they expected to face. Students were asked to avoid

designating the subjects of their research based on their own class and ethnic backgrounds, and a discussion held on the process of ‘unlearning’ deeply seated assumptions.

Group choices of the type of waste to study opened additional avenues for conversation and challenged some of the framing of the RRR project, as well as assumptions about the kind of mappings the students were expected to conduct. For example, students expressed an interest in studying cash waste⁵ - a waste stream which would sit outside of the RRR project remit, nonetheless raised interesting questions. The need for currency recycling is consequence of a high amount of cash flow, linked to a largely cash based economy and the practice of folding notes. It served as a useful means for a dialogue about the relationship between culture, social practices, and waste. Other groups picked more typical examples of waste such as plastic.

Subsequently, the students undertook mappings of their chosen waste stream in groups. They were also asked to decide on the appropriate scale for this study with safety in mind as this exercise was undertaken in between COVID lockdowns. Students were asked to make their own maps identifying who was moving waste, how it was being moved, the architecture of that, and the urban spaces through which these waste streams moved. Working in interdisciplinary groups, with backgrounds in a wide variety of disciplines, they were asked to bring their individual disciplines to bear on the method. Nearly all students made use of notations or categorization of waste and waste flows, a method which was introduced in the mapping lecture taking inspiration from Lynch’s five prompts. The process of thinking and deciding on the notation became a part of the analysis - a way of examining and then evidencing the observations. The groups developed different forms of notations for different phases of the research: recording, documenting, analysing and finally presenting, which was done virtually in a final online workshop with each group giving each other feedback and receiving verbal and written feedback from the RRR team of academics.

⁵ The process by when a bill or note has been defaced, torn, or worn to the point where it is no

longer identifiable or useable, it is taken out of circulation for destruction by shredding.

4. Findings and analysis

This section describes and analyses the work produced by student groups, finding that students were able to (1) discover the efficacy of mapping as a method to trace waste streams, (2) develop new (southern) waste vocabularies, and (3) learn the value of interdisciplinary work to identify complex waste flows. These findings are described in more detail below drawing examples from the group work.

4.1 Mapping methods: tracing waste streams

The students all engaged with the question of how the movement and transformation of waste products can be traced, and understood these streams as physical and socio-economic processes, often drawing multiple maps at different scales from small-scale local observations to large-scale city-wide networks. These can be gauged through two examples described below.

One group studied the recycling of bank notes in Karachi, focusing on a practice in Pakistan where bank notes are regularly collected by the state at the local level, as new notes are put back into circulation. The group mapped the process at various scales: first, they mapped the location of national and state banks in Karachi. Second, they mapped the paper mills and kilns in the city, where the bank notes are sent for incineration (Figure 1). They concluded with a process diagram showing the destruction of currency in the kilns, highlighting the architecture of this process and the specific material elements and by-products. The students also documented the flow of the cash economy at the level of the street as an essential starting point for the journey, foregrounding cultural practices such as the folding of notes. Over multiple maps the group traced the note connecting city dwellers (and the practice of folding notes) to incineration sites on the outskirts of the city.

Another group traced wood waste, revealing how this intersects with informal and formal economies and settlements. The mapping relied on original drawings, photography, several maps, and qualitative interviews. They selected wood waste by thinking of objects in their own homes, in this case high-end wood furniture (mostly tables and chairs). Subsequently, they traced back the origin of the furniture to a factory and found where off cuts went.

The maps, which, in the first instance, connected the objects in their homes to manufacturing, thereafter, revealed the connections between associated ‘waste’ from furniture making, which is used for high-end domestic products, and residents of informal settlements who buy and upcycle the wood cuts. The mapping of the upcycling revealed the by-products, such as sawdust and how it is recycled, the urban spaces used in this process, as well as the various formal and informal stakeholders involved therein (Figure 2). The process of mapping reflected upon the architecture of waste collection, involvement of human agency, informality, precarity, wellbeing and safety. The mapping process quickly revealed complex urban systems that are both luxurious (high end furniture) and precarious (upcycling saw dust) and held both these realities in one drawing.

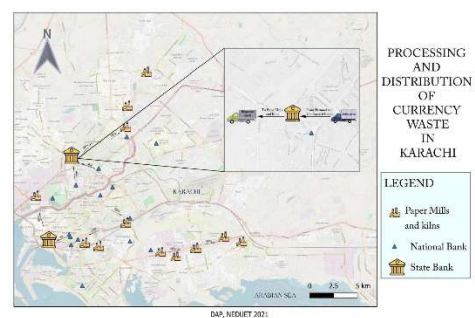


Figure 1. Processing and distribution of currency waste.

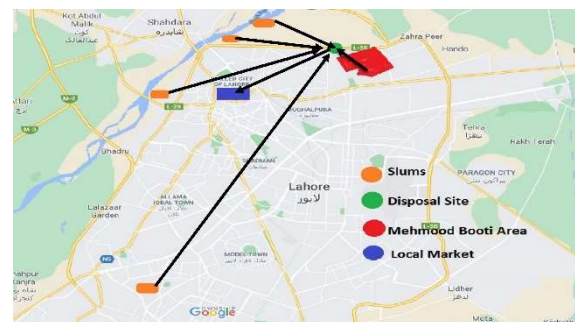


Figure 2. Sites of recycling sawdust waste.

4.2 New vocabularies: conceptualizing waste

Alongside the tracing of waste, all the groups attempted to further their reading of ‘waste,’ and in doing so, critiqued the (western) conceptualization of waste as something unused or unwanted, of little to no value. All the maps revealed value in their waste streams where material was collected, upcycled, or reformed into things of value, even if in small ways challenging the idea or designation of

something as waste. For example, a group exploring 'tyres' as a form of waste, connected urban components of labour, enterprise, and land between the various scales at which the recycling of tyres happens. The maps documented the localized processes taking place at neighbourhood markets (which collect unwanted tyres) and then demonstrated how the tyres then move into large scale processes on the edge of the city (which upcycle the tyres). This group managed to reveal the complex arrangements which underpin these processes from the use of occupied open public land used for dumping, storage, and sorting purposes, and connecting these with warehouses and scrap markets often privately owned or on rented or formalised land. The group mapped six ways in which waste tyres – once no longer car worthy – were upcycled concluding that tyres with so much material value were not waste at all.

Another group mapped gold waste – the residue of gold filaments and shavings found on the shop floor of jewellers. The study mapped what they described as the 'hierarchy of gold waste,' and the interconnected nature of the shops, refineries, and labs. Connecting various intersecting waste flows in their maps, the groups called this process 'hyperactivity' where even the smallest particles of gold dust are attempted to be captured and are of value. The study revealed huge inequities in the 'hierarchy,' with those at the bottom of the ladder working for minimal amounts of money whilst not far up the chain, agents reap financial rewards. In doing so the mapping identified the informal and formal ways through which gold waste is valued; from high-tech machines to a jerry can of dust which gets collected over the course of a year with its value pegged to the GDP of the nation⁶. The group concluded that even dust and dirt on the floor is not waste but someone's livelihood, and at a scale across a city, incredibly valuable. Hence, mapping techniques adopted by both groups allowed them to reconceptualize waste and develop new vocabularies in the process.

4.3 Interdisciplinarity: variegated and complex waste systems

The groups were asked to reflect on mapping as both a technical tool for city and project planning, but also as a tool to reveal the social dimension of waste flows. We found that mapping for the students became a method to integrate a variety of data collection techniques (interviews, photography, observations etc), and traverse disciplinary silos (architects speaking to urban planners). Interdisciplinary student groups fostered the idea of a reciprocal knowledge practice, which served them well. The examples below further illustrate the value of interdisciplinary learning.

The mapping of paper (by one group) and plastic bottles (by another) focused more than the others on the lives of waste pickers. Both groups relied on ethnographic methods when working with marginalized communities, and this raised important ethical concerns. Primarily, the groups grappled with how a researcher designates someone as a waste picker, which risks further marginalizing, or even stands in contradiction with how that person sees themselves. This resulted in conversations and reflections about important ethical considerations when doing work grounded in the messy politics of everyday lives. When discussing impartiality and ethics with students, there was further deliberation on the idea of "unlearning" through mapping. The groups quickly discovered that plastic waste streams intersected with issues of migration, marginalization and precarity among the lowest paid, and entail the most insecure work for people responsible for collection and sorting at a local level. Both these mapping exercises relied on qualitative interviews, photo documentation and transect walks (Figure 3). Combining ethnographic work more comfortably undertaken by the social scientists in the group alongside a technical reading of recycling systems undertaken by the engineers allowed for a rich reading of the impact of chemicals in this process and the experience of those involved. The requirement to map the relations between these readings encouraged an interdisciplinary dialogue

⁶ The students found this out during their interviews. The understanding was the higher the

GDP of the country the higher the value of the gold dust.

and led the students out in the field, immersed in the issues at stake.

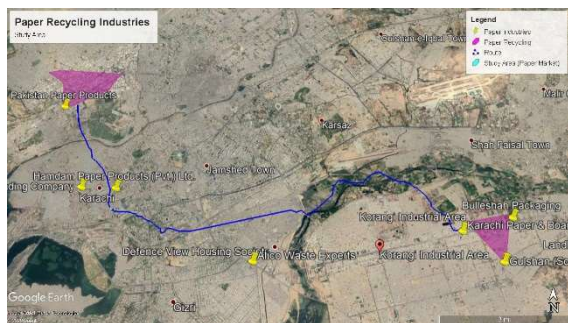


Figure 3. Paper recycling industries.

Another group mapping plastic waste focused on their own neighbourhood, mapping critical features, such as dustbins, and the specific processes by which waste gets collected. Highlighting some impressive statistics on the tonnes of solid and plastic waste produced in Karachi, and paying close attention to details such as volumes, mechanisms, systems, and industries, they showed how all form part of Karachi's plastic recycling system, connecting macro data to their local case study. This group concluded their study with an overlay of a proposal exploring how plastic in Karachi could be upcycled into eco bricks connecting desktop research with their flow maps. The group looking at paper also compared the theory on recycling (framed largely by research in the Global North) against what they found on the ground. The role of water in paper waste streams also revealed specific insights into pressure points specific to the kind of availability of other infrastructures such as water which could be very different in other contexts. For these groups the maps became a tool to critique theoretical assumptions about how waste gets recycled. Again, the act of seeking to reconcile different forms of investigation onto one map engendered the different disciplines to critically reflect together on waste from multiple sources, and not have siloed conclusions.

5. Reflections

This section offers further reflections on workshop-based student learning. For their spatial analysis and visual ethnography, all groups relied on qualitative and quantitative research methods. They engaged with different sources of material, putting Google earth maps in conversation with local planning

documents and locating ethnographic fieldwork within that. The method of working *through* mapping as a tool to record, document and understand the kind of 'heterogenous systems' referred to by Jaglin (2014) was fruitful. All the groups identified and drew dynamic supply chains that are neither formal or informal and often operate within and outside of various regulatory frameworks.

In mapping waste streams all the groups discovered institutions and systems from banks to cleaning methods that are central to waste flows. In this sense, mapping waste flows required the students to engage with 'fine grained institutional and system mapping' (Simone and Pieterse 2017: 145). From the location of jerry cans in a gold shop to the distribution of kilns in the city and open land in the periphery, all the groups explored relations of gender, class and caste, while connecting human bodies to distribution of land and even cultural systems in the city.

As outlined in section four, all the presentations challenged the notion and vocabulary of waste. Often a pejorative word most of the processes revealed waste being of value through upcycling, recycling, or transformation. In challenging the notion of waste as framed by northern conceptualisations the students also engaged with Watson's call to expand their frames of reference (2014), moving away from theoretical positions on, for example, plastic recycling in theory to actual recycling on the ground. This led to insights not found on Google or in a Wikipedia page.

Requiring the students to talk to, and understand how local waste pickers collect, clean, compress and sell their recycling on, facilitated what Watson and Odendaal (2012: 102) describe as 'experiential learning.' It also made visible important connections between the scale, challenge, danger of various types of waste management with marginalization and worker precarity. Such maps revealed an understanding of Tim Ingold's (2011) notion of 'graphic anthropology': 'forms of line-making, from handwriting to the drawn sketch, to understand the material world not as being composed of completed objects but rather as part of an unfolding cultural process interwoven with articulating behaviours and actions' (Causey 2017: 14). Ingold's call foregrounds mapping less as an instrument of representation and

more as an exploratory process. This often entailed the combination of difference sources of information and creating a conversation on the map. All the groups reflected on the value of mapping but recognized that it was time intensive. The time commitment had been discussed with the precedents – Booth's poverty maps famously took 17 years to complete. Some students found value in the time spent, particularly in mapping on site as part of their fieldwork. They found that the value was not so much the final production of the map, but the time spent producing the map on site which forced a process of close 'looking' (Causey 2017, p. 12).

The emphasis on curriculum building includes the role of critique and feedback as critical to the learning processes allowing researchers to reflect on how to further the method. Reflections on how the process could have been improved can be drawn from the feedback itself. For example, much of the feedback suggested that the amount of time spent upfront on desktop-based research should have been reduced, and more time spent on the original (empirical) work conducted by the group. As this kind of mapping was new to most students, it was clear they felt more comfortable researching waste from their laptops – largely relying on Google - than researching waste through observation and fieldwork. This speaks to the difficulty of stepping away from the desk into the complexities of everyday life, particularly enhanced during COVID when so many of us had been told to stay indoors. Student feedback also highlighted that they were more comfortable using photography than drawing. This is understandable as drawing as a method for communicating is less practiced, while photography, particularly with the advancement of phone technology, is a well-versed medium for communicating. It would have hence been beneficial to spend more time on building mapping skills and confidence. In addition, more time could have been spent developing communication skills including the use of photography which can be a powerful tool used in mapping or as a complementary visual language. Much of the feedback suggested how to make more analytic use of photographs through the use of captions to highlight key points, and how to supplement the photo with basic diagrams, and / or annotating the photographs with key aspects making photographs points of analysis rather than representation.

6. Conclusion

This paper explored the role of mapping as a pedagogical tool that can further efforts to develop more socially integrated curriculum for students of planning, architecture and engineering. It endeavoured to respond to emerging scholarship that advocates for alternate, radical pedagogies to narrow the gaps between planning education and changing urban realities. Shifting from southern practices to southern curriculums has, in this case, revealed some important considerations for further research. Foremost the positionality of the students – or the author of any map – cannot be separated from the map. 'Seeing', as Berger suggests (1972: 8), is a highly selective act, 'the way we see things is affected by what we know or what we believe. ... To look is an act of choice. As a result of this act what we see is brought within our reach...'. If we accept this, the process of drawing or mapping risks reducing complexity to what is known, the expertise of the map maker(s), which raises important ethical questions. The western research canon, with its emphasis on object quantitative fact, suggests that the role of the researcher cannot alter or impregnate the work, and the idea of objectivity is central to the idea of professional ethics. There is a long history that counters this position, famously by the sociologist Howard Becker in his piece 'Whose side are we on?' (1967). Becker argued that it is impossible to conduct research 'that is uncontaminated by personal and political sympathies,' (p. 239) suggesting that it is inevitable that all researchers will take sides. Does this mean that a southern urban practice requires knowing 'Whose side are we on'? In deeply contested and complex contexts, how do we resolve questions of research impartiality and objectivity? When map makers can 'contaminate' (p. 239) maps so easily with their own prejudices and perceptions, how should ethical considerations be addressed? How do we as researchers reconcile inbuilt hierarchies of power that can alter what is being presented? These remain critical questions to consider when incorporating ethnographic mapping components in existing curriculums.

Finally, waste research risks designating those research subjects who might not be politically empowered enough to embrace waste identities that render them as lower class or caste. The question here isn't how the construction of a research object

can be avoided, but how to limit the risk of reducing the subject to particular roles based on personal and cultural assumptions, which in the case of waste research, can further stigmatize certain groups of people. An acknowledgment of unlearning in the teaching process can add to the value of interdisciplinarity work where it isn't the combined expertise which is at play, but the combined benefit of conflicting and alternative viewpoints, actively seeking to break through disciplinary siloed thinking and disciplinary echo chambers. The workshop demonstrated that students found designations such as waste to be widely out of touch with ground realities. Terms, with origins elsewhere, are hence sites for unlearning. Calls for scholarship that are rooted in place (Bhan 2019:5, Odendaal 2012: 174) draw out key power tensions in ethnographic drawing which need to be addressed when developing methods for socially integrated curriculums. How to teach students to learn *how* to see (or look) and depicting people 'as they are' rather than projecting onto them preconceived notions requires much more thought.

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