We're the problem: mapping our way out of printing purgatory

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This is the tale of a behavioural mapping exercise that revealed some uncomfortable truths about our library's role in the student experience, and the journey that got us there; how we followed the data to discover the many ways our service design exacerbated student printing troubles, and how divergent UX helped us chart a course out of this mess.

Introduction

It began with signage. In the winter of 2023, I decided to do some observational studies to help assess the placement of our aging library signs. At first, I didn't have much of a plan. Our library serves a student population of around 7,500 FTE on a dense, busy, urban campus. This community affords a lot of direct contact with users, so it is easy to assume that we have a good handle on our strengths and weaknesses. For us, data is a tool for starting, framing and supplementing conversations, but rarely a catalyst for something completely unknown or misunderstood.

So I kept a light touch, aiming only to produce something a smidge more than anecdotal. With the assistance of our talented social media czar, Sydney (who at the time of writing has her own plush office in the Student Recruitment department), I began observing user behaviour in the space. The goal was to create a few basic maps that could be shared and discussed with others; something tangible I could point to and say, "Signs go here."

How it started

Behavioural Mapping is an observational method, a fancy way of monitoring and tracking how people move through a space. It is a useful tool in the divergent stage of UX research, when the goal is to remove yourself from a situation and explore the

problem before developing a solution (Priestner, 2021). Divergent practice is generally used to build avenues for investigation and help prevent you from *assuming* that an issue is well understood. It is supposed to help articulate and calibrate a problem, not solve it.

I'll be the first to admit that I wasn't thinking of our mapping project as an instrument for divergent investigation. At best, it was an expedient tool for moving my signage project forward, and I didn't put much planning into the beginning stages. For one hour at a time, Sydney and I discretely observed the main service area near the front doors. We began by tracing routes taken by users onto a print map of the library, one at a time, counting groups of people walking together as one unit. Almost immediately, we ran into several issues with this approach.

First, overlapping routes quickly saturated the page. These popular pathways were important, but their function was glaringly obvious – main thoroughfares leading deeper into the facility. Tracing these routes took up valuable space, made the maps difficult to read and contributed no new information to the dataset. There was also a problem with indicating direction. Despite attempts to add arrows and use different coloured pens, it was very difficult to discern a reliable start and end point for any individual route (see Figure 1).

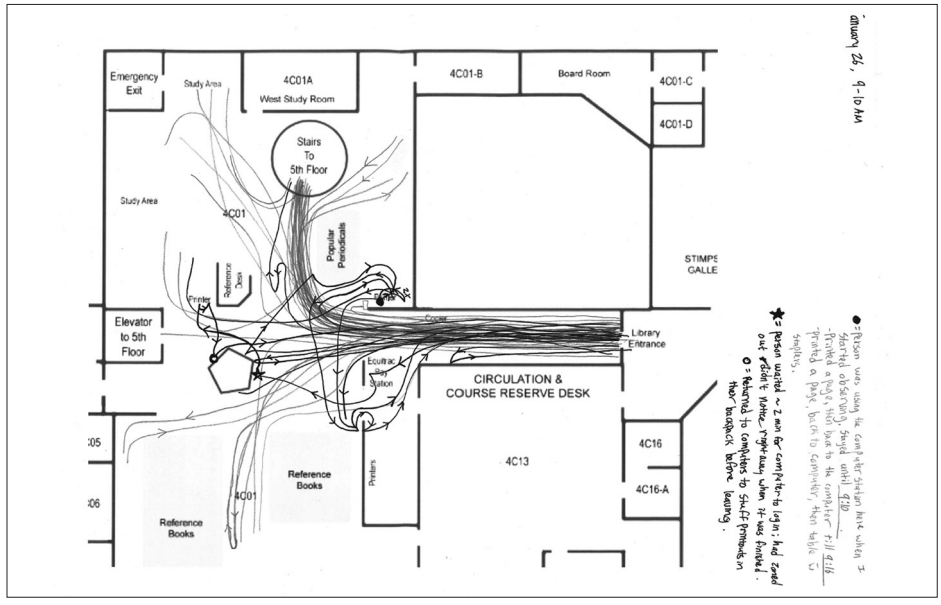

Figure 1 Early mapping attempts.

Most importantly, Sydney flagged a troubling pattern after the first few sessions – knots of repetitive traffic between our computers, printing equipment and service points. We have long lamented that our campus printing system is outdated and fails to meet the basic expectations of our students, but the act of observing it systematically was making us feel weirdly uncomfortable. The messy map data, combined with many confused stares and anxious behaviour observed in person, made it clear that there were some serious problems. Critically, we were starting to see that it wasn't just 'the printing system' – we were starting to question the layout of our service area. As Sydney put it during a meeting, "We've created a labyrinth of mayhem and despair." Misquoting Taylor Swift I replied, "Hi. We're the problem," and thus a great paper title was born.

A critical pivot

There are lots of ways to perform behavioural mapping – such as using binary codes, grid systems or phone/wifi data – all of which I had previously dismissed as too cumbersome for the task at hand. But the task had changed. I returned to my initial reading on the subject to consider adapting a method that would work for our case. Credit should go to the work done by Lauren Mandel (2010) and Jeibei Luo (2018), whose thoughtful and comprehensive articles ended up shaping many of the solutions we adopted here.

Over several courses of iteration, Sydney and I developed a set of short codes assigned to points of interest in our space – computers, printers, service desks, bookshelves, study areas, etc. (see Figure 2). For example, the reference desk was coded REF; the black-and-white printer BWP. Each line in the spreadsheet repre-

Date	ID	Time	Researcher	WP1	WP2	WP3	String
20230126	LP1	09:00	SN	EN	SS	BWP	ENSSBWP
20230126	LP2	09:01	SN	EN	ST		ENST
20230126	LP3	09:03	SN	EN	ST		ENST
20230126	LP4	09:04	SN	EN	ST		ENST
20230126	LP5	09:04	SN	EN	EQ	CP	ENEQCP

Figure 2 Sample data structure.

sented an individual route, and each column indicated a stop – a 'waypoint' – along that route. Combined with some metadata and a notes field, each route became far more than a simple line on a map.

In addition to superior data fidelity, this waypoint system addressed one issue that we didn't even know we had; after some practice, Sydney and I were able to track multiple users at once and enter codes into the spreadsheet without looking down. This allowed us to capture significantly more data with greater efficiency and accuracy while maintaining a broader awareness of the space at large. With our eyes freed up to observe the space, we could better document complex or unique behaviour that we otherwise might not have had time to catalogue properly.

Sydney and I continued observing until we felt we had reached a saturation point – where the data started to look repetitive, and few new or interesting routes were being observed.

Drawing insight

Analysis started with sorting the data to explore any obvious patterns. Interestingly, the saturation issue we encountered earlier resurfaced here; we found that two common pathways (or minor variants of them) accounted for 85% of our 1400 routes. Thus, we focused on the 200 remaining routes and turned to creating visual representations of these pathways. Each route was manually drawn into one of three layers in Photoshop, with one layer dedicated to each printing station. While an automated solution may have been faster, drawing these routes manually helped us absorb and process the data (see Figure 3).

Once completed, our "labyrinth of mayhem and despair" virtually leapt off the screen. Our maps displayed a ragged mess of users bumping into one another and traveling long distances, often stopping and starting multiple times as they encountered unexpected difficulties. After reviewing the visual representations, Sydney and I had a few outstanding questions. So we performed some guerilla interview sessions with 20 users after the fact. These interviews were used to check some of our initial assumptions, clarify outlier behaviour, and do a little proactive empathy-building with students.

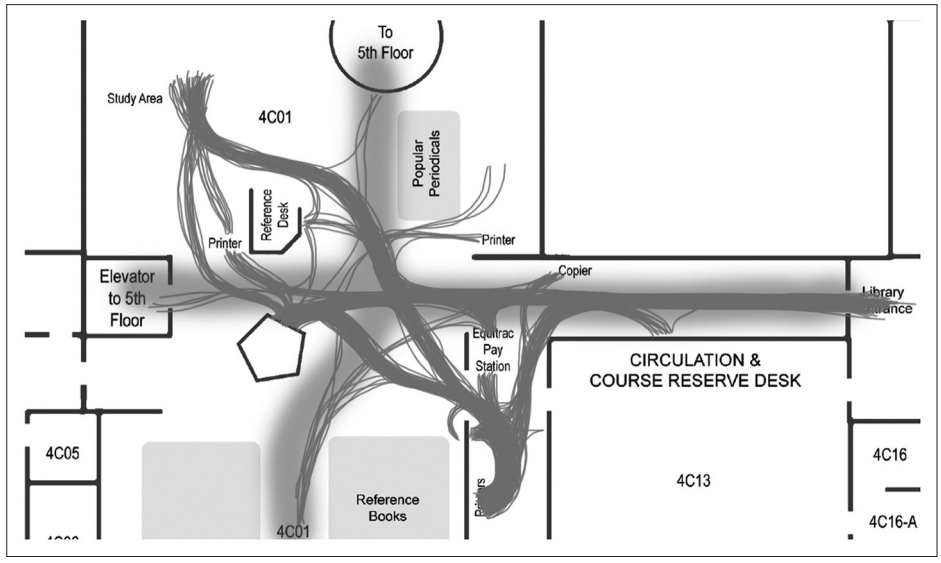

Figure 3 Routing map.

Finally, with data, maps and interviews in hand, we organized the difficulties, errors and issues we discovered:

- **Scattered Equipment Deployment:** The layout of our service area, encompassing the printing equipment, service desks and computer workstations, lacks a clear, intuitive workflow.
- **Inconsistent Features and Affordances:** The library has deployed a variety of devices, options and features that confuse users and counter expectations.
- **Ineffective Feedback Mechanisms:** It is very difficult for users to prevent, diagnose and recover from errors, and the service layout is a major contributing factor.
- **Staff-Centric Systems:** The printing system is primarily designed for staff use; it has been adapted for student use with little consideration for the student experience.
- **Minimal Communication and Training:** Users do not receive adequate information before or at the point of need.

These observations then led to a series of recommendations for action:

1. **Create a 'Print Centre' in the Library:** Consolidate all printing infrastructure in a single location with good visibility and a thoughtful layout.
2. **Improve Device Consistency:** Only deploy print stations that share affordances and hardware that appropriately implies the intended use.
3. **Update Printing Communications:** Remove jargon from printing instructions; reconsider the timing of communciations; and ensure the language used matches the experience.

At the time of writing this, I am pleased to report significant progress. We implemented the first of these recommendations over the summer, a process that involved consulting with both admin and frontline staff, getting new network ports approved and installed, and moving printers, furniture, and equipment into position. Anecdotal feedback from students and staff has been very positive – a general feeling that the layout "just makes sense" and that we've greatly reduced the friction in that area. I am already planning a follow-up study to examine the new workflow, assess the findings and tweak if needed.

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The costs of improvisation

While an excellent example of divergent UX, this methodology was messy, full of surprises and existentially draining. My professional instincts told me that I was onto something good, but my sense of accountability screamed that this was a fool's errand. While I am privileged to have supportive leadership and thoughtful colleagues, I nonetheless felt real dread at wasting six months' work just to report that "printing is awful." What I had anticipated would be a simple mapping exercise has turned into a multi-year project, and now it is up to me to maintain momentum for something that was never built into my workplan.

Also, it has not escaped our notice that we have yet to address our original problem – signage is still a mess. While I think we need to fix larger printing and service issues before we can adequately tackle signage, this is a difficult fact to accept, let alone communicate. Frontline staff are quick to point out that this remains unaddressed, and I feel like I am dissembling when I insist that we fix core issues first. It's one of those strategic decisions that has negative consequences on a day-to-day level, but it is necessary to focus resources on the root cause instead of the symptom.

The value of divergent practice

Like a good Taylor Swift song, our UX outputs tell a compelling story in relatable detail. The combination of hard data and visual mapping is persuasive, recognizable and mutable, and allows stakeholders to engage on a level that works for them. If someone looks at the map and has a question about the relationship between two points, we can turn to the waypoint coding data for more context. I'm very proud of the work we've done; its quality manifests in how useful it has been for informing decisions and its effectiveness at influencing change.

A lot of UX assets inform a situation and then wind up in the metaphorical dustbin. But through this process, we've developed a scalable, reusable toolkit for use in future projects. We're already planning to do another round of observation to test our new layout, and this dataset can be appended, refined and expanded as necessary. The space or service design can be changed without contaminating or rendering the old data useless; if anything, it only tells a richer story as time goes on.

Most importantly, this project got us out of printing purgatory (or at least charted an escape route). Despite some doubt and frustration along the way, embracing the

divergent narrative allowed us to identify and fix a root cause instead of treating the symptom. The value of this approach can also be seen in the way it has boosted staff engagement and changed our perspective. Rather than approach the issue with a sense of apathy, we've identified the factors still within our control, prioritized them, and developed a response, allowing us to break an immovable object into small, actionable chunks.

That's all to say that no matter how well you *think* you understand an issue, there is always more to consider. Remember: spending time identifying the right problem is far more valuable than developing the perfect solution. And if that problem is *you*, it will be impossible to tell until you take a step back, reflect, and listen to some Taylor.

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