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User Journey Mapping for Library Experience Optimization

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***Abstract* - This paper explores the possibilities that user journey mapping (UJM) offers for creating better library experiences in physical and virtual spaces. Through examining the user actions, feelings, and touchpoints of their library service experience, this paper highlights potential friction points to eliminate and areas for redesign. This study employs a mixed-method approach including: observational study, surveys, and heat mapping analytics, to allow users to visualize common user paths displayed against specific demographic segmentation. The findings from the study provide evidence to suggest that intentional actions such as - intentional signage, mobile guidance, staff assistance, and personalized recommendations - can allow for a greater user experience that leads to satisfaction and overall effectiveness. The UJM framework allows library administrators to align existing and future library service offerings with user expectations. Additionally, the findings can help decision makers allocate existing resources, library space, and technology. The work adds to the discourse surrounding experience-centered library design and offers a repeatable framework for continual service improvement.**

Keywords: **User Experience, Journey Mapping, Library Design, Behavioral Analytics, Service Optimization, Touchpoints, UX Research**

I. INTRODUCTION

1.1 Experience-Centered Library Services

What began as a fairly benign shift from libraries as stores of information to libraries as service environments centered on user experience (UX) has rapidly evolved over the last several years. The rise of digital technologies has irrevocably changed user access to information; thus, physical libraries are competing with online environments for the meaningful, seamless, and pleasurable user experience (Samson et al., 2017). This experience-centered service perspective has encouraged libraries to embrace more holistic approaches for understanding how patrons interact with physical space, digital environment, and human staff at multiple touch points (Babu & Baskar, 2023). Libraries now consider not only the existence of the resource, but also the emotional and cognitive journey the user takes, both onsite and online, throughout a library visit. Libraries increasingly emphasize personalization, accessibility, and responsiveness to user preferences, guided by the design principles found in retail, hospitality, and human-computer interaction (HCI) (Dove, Reinach, & Kwan, 2016). This conception of library services as experience-centered is important not only because it can help with retention and satisfaction, but also for the significance of our purpose as a library service in a digital age (Ogbonnaya & Wai, 2024).

1.2 Limitations in Existing Service Design Approaches

Despite a growing recognition of the role of user experience in library practice, many library systems are still using piecemeal and out-of-date service design approaches, or ways of thinking about library services. Formal assessment of something like user satisfaction is done by performing user feedback surveys, which on their own are insufficient (Dietrich & Knight, 2018). These methods can reflect a user's feelings in the moment (i.e., they were satisfied with the service experience), but only in hindsight after the encounter with the service (i.e., when they fill out the survey) (Mahmoudi & Lailypour, 2015). These surveys do not

capture very specific user pain points (i.e., specific interactions with the service), nor are these approaches able to capture the emotional or behavioral facets of user engagement. Some examples include user concerns about navigation confusion, anxiety over digital experiences, or disorientation in non-staffed areas (Prasath, 2024). Library spaces are still largely determined by factors of logistics and less by behavioral data. This mismatch in the setup of physical spaces and how users experience a library can lead to uncomfortable, disruptive experiences (Bjornen & Ippoliti, 2021; Wilkinson, 2022). Similar limitations are present in the digital realm, for example, differing continuously across the library interface (or catalog) distribution with mixed synchronous and asynchronous access types create interruptions to flows of attention across catalog searching for material, account management, and ongoing digital content accessed outside of the library context (Yeo & Jiang, 2024). Together, these shortcomings significantly limit library capacities to quickly proactively change services and practices to meet the changing needs of exceptional populations of users (Mleh & Klabi, 2025).

Fig. 1 Library User Journey Map – Stage-Based Planning Model

Source: https://shorturl.at/2xTI6

Fig. 1 depicts a stage-based journey map that was originally created for customer engagement, but serves here to visualize a typical user journey for a library client (Tamrakar, 2025). The journey is broken up into five key stages: Awareness, Consideration, Engagement (or "Purchase"), Service, and Loyalty/Expansion (Batch et al., 2023). Each stage includes touchpoints that are specific to library services. The "Awareness" stage might involve things such as finding out about the library through campus events, posters or social media; The "Consideration" stage includes activities such as browsing through a digital catalog, viewing a website or reading reviews that consider library services; The "Engagement" stage reflects actual use- borrowing books, reading etc., accessing databases; The "Service" stage includes reference help sick, mobile app, staff support; and the "Loyalty Expansion" stage may reflect ongoing interaction's such as user surveys, community events or municipal newsletters (Christakopoulou et al., 2023). The dotted lines indicate how users do not necessarily take a linear path and may enter and exit the journey at numerous points (Prabhakar, 2024). Viewing a library user journey this way is valuable because it identifies key moments in the user journey where shifts in emotional or experience interventions can have the most impact, and aligns with a user-centered and UX-informed approach to re-design (Kashfi et al., 2016; Hamidli, 2023).

1.3 Significance of Journey Mapping in User-Centered Paradigms

User Journey Mapping (UJM) is a valuable tool that can address some of these concerns by capturing and visualizing the user's end-to-end experience in the library, at various touchpoints, with several platforms and channels (Figma Resource, 2024; Andrews & Eade, 2013). Journey maps differ from linear process charts in that a journey map

incorporates emotional, cognitive, and behavioral layers and captures what users are doing, thinking, and feeling at each individual's stage of interaction. Journey mapping spotlights key friction points, moments of delight, and opportunities for improving service. Journey mapping reinforces empathy-based design, not through conjecture and comparison, but by being anchored in real user personas and experiences, and allows administrators and designers to make services more in line with real user experience and behaviors and not our assumptions (Kaplan, 2023; Endmann, & Keßner,2016). If user journey mapping (UJM) becomes mainstream in libraries, libraries will be better able to lay out signage, digital portals, staffing patterns, and spatial configurations that mirror and address user needs/wants. UJM also complements a number of iterative service design methodologies in being the real-time anchor for service improvement, adding a dynamic user-centered service improvement capability.

II. Literature Review

2.1 User Experience (UX) in Both Physical and Digital Libraries

The notion of user experience (UX) at libraries has evolved from when it was strictly usability and access, to encompassing the whole emotional, cognitive, and functional experience of engagement with a library (Product School, 2025). UX in the physical world encompasses spatial layout, wayfinding, lighting, acoustics, ergonomics of displayed furniture, interactions with staff, and how the space supports community engagement. Participant-based research has found that intuitive wayfinding, appropriate signage, and comfortable reading spaces can influence user perceptions and engagement with libraries (User Interviews Team, 2025). In the digital library realm, the UX components involve, but are not limited to, catalog search features, digital resource platforms, library websites, account management portals, and support for mobile responsiveness. Notably, Raward (2001) rated user experience elements, and Priestner & Borg's (2016) lens locating UX within libraries references a more complex UX model at its logic, development, and iterative process level. As they suggest, UX needs to consider the ecology of digital interactions as more than just discovery and access, but also as supporting pathways to personalized learning. The user experience is now an integrated, embodied experience, and UX strategies must acknowledge hybridity to recognize user expectations between physical and digital spaces [25].

2.2 Service Design Thinking in Public Institutions

Rooted in disciplines such as interaction design and systems thinking, service design thinking offers public institutions, in our case, libraries, a lens through which to build services collaboratively that are user-centered, iterative, and data-driven. Service design thinking diverges from the conventional "top-down" models of service delivery towards a model that applies empathy, a participatory model, and prototyping. (Brown, 2009) and (Stickdorn et al., 2018) highlight the need for public institutions to transition from linear workflows created by the organization to nonlinear models of services that sustain iterative techniques based on user actions and evolving needs. Service design thinking has been used for redesigning circulation desks, reimagining learning zones, and reconstructing digital platforms to enhance libraries, yet the adoption of design thinking remains halting. Challenges to implementation and use are caused by organizational inertia, lack of training, and insufficient resources. When approached correctly, design thinking allows library administrators to consider the library less as a systemic service and more as a connected series of user experiences that are to be consistently measured and improved upon.

2.3 Journey Mapping Methodologies and Visualizing Tools

Journey mapping is a methodological tool used to visualize the flow of steps a user takes when interacting with a service. Journey mapping joins storytelling with emotional tracking and data visualization to expose the user's underlying needs, behaviors, and pain points. All journey maps typically include stages (for example, discovery, engage, use, resolve), touchpoints (for example, kiosks, web page sites, help desk), emotions (using different scales, satisfaction or emojis), and opportunities for service improvement. Often, other visual tools are used with journey maps, including service blueprinting tools, heat maps, and empathy maps. Quality journey mapping provides a method for documenting and making explicit internal assumptions for multidisciplinary teams to engage in realignment around user needs. This technique is transferable to the library space insofar as documenting a user's physical or digital journey in engaging with reference desks, library catalogue interfaces, e-book sites, or navigation experiences in physical or digital spaces. Leaders can identify inefficiency and unmet user needs that may currently exist in the current digital or physical spaces.

2.4 Case Studies of UJM in Educational or Cultural Institutions

There have been several case studies at educational and cultural institutions that examined the role of user journey mapping in improving the quality of service. The University of Michigan Library used UJM to improve usability and navigation of digital searches and physical signage. As a result of their use of UJM, they could document reduced

confusion and higher completion rates of search tasks, thanks to fewer users giving up on their searches. The British Museum used journey mapping to improve the visitor experience, reporting on areas of high user frustration. They were able to redesign their wayfinding systems based on analytics from the movement of users through spaces. In the library context, the University of Glasgow sought to use journey mapping to improve onboarding for first-year students. UJM provided the opportunity for personalizing support interventions, and the maps improved students' orientation to support services (Andrews & Eade, 2013). These cases provide assurances that mapping journeys, when coupled with observational data and user feedback, can generate knowledge resulting in easy recommendations that will bolster service improvements. However, the library systems are typically limited by their absence of consistent UJM protocols that can offer scalability or allow meaningful comparisons.

2.5 Gaps in UX Evaluation and Innovation in Libraries

Even though interest in UX and journey mapping is increasing, gaps in the ways libraries evaluate and innovate user experience exist. First, many simply do not have the tools or frameworks to collect user behavior systematically and must rely on episodic feedback or anecdotal reports, etc. (Huang, 2024). Second, UX work often concentrates on either when a user is in the physical space or when they are in the digital space, but not necessarily in the hybrid space users encounter. Third, there are libraries where journey mapping has gained traction, but very few have institutionalized journey mapping as part of continuous improvement or strategic planning. In addition, there is a general lack of longitudinal research that seeks to follow the long-term effects of UX initiatives. Furthermore, accessibility and inclusive experience are overlooked in most UX research studies, particularly for neurodivergent users or users with mobility challenges. Addressing these opportunities requires more than just methodological change; it requires a commitment at an organizational level to make hybrid user-centered thinking part of the operational fabric of the library.

III. METHODOLOGY

3.1 Research Design: Mixed-Methods with UJM Framework

For this research project, we will employ a mixed-methods research design using quantitative and qualitative methods; mixed methods research utilizes the strengths of both approaches and tackles the complex issues in understanding human behaviour, such as using library services. The primary method used in this study is that of User Journey Mapping (UJM). UJM serves as both a method of data collection and an analytical tool (Fichter & Wisniewski, 2015). This study employs a methodology using structured survey instruments, observation methods, and also employs digital interaction viewer applications to allow multilayered journey maps to be developed to engage with users' interactions with both library services in-person and digitally. The purpose of mixed methods is to balance subjective user perspectives with objective behavioral data and to acknowledge the library experience as a complex user experience. The use of a mixed-methods methodology allows for simple triangulation methods applied across multiple sources of data to help establish reliability when exploring insights gathered from librarians and a variety of users. The intention is to provide the ability to refine journey maps based on user feedback and experience testing.

3.2 Data Collection Tools (Interviews, Surveys, Heatmaps)

In order to obtain substantial and usable data, multiple forms of data collection tools were utilized in this study. Semi-structured interviews were conducted with library visitors from student, faculty, and general public cohorts to learn about their goals, feelings, and expectations regarding their library experience. Surveys were administered electronically and in-person to capture quantitative data with respect to a variety of satisfaction levels, task completion successes, and perceived ease of navigation. Questions designed were categorized at each journey stage, so authors could begin making some connections with respect to specific journey experiences associated with user sentiments. Subsequently, heatmap analysis was used with a digital collection tool as well, using a web session recorder to document library users' interactions with the website and motion sensors to map how library users physically moved and interacted with library zones, including where most traffic originated in the library and where users might encounter bottlenecks, such as the most visited shelving areas. The tools were used together to ensure that journey maps were based on real actions taken by users versus inferred behaviors.

3.3 Stages of the Journey and Touchpoints

The user journey was broken into five stages:

- Discovery,
- Entry/Access,
- Navigation/Interaction,
- Resolution,
- Exit/Reflection

Drawing on earlier observations and literature models. Each stage was mapped with relevant touchpoints within the

library, i.e., library websites, signage, service desks, self-checkout machines, mobile apps, study spaces, and virtual chatbots. It was also important for us to identify the emotional state, such as confused, satisfied, or frustrated, that accompanied each touchpoint in identifying friction points or opportunities for redesign for the process. Our mapping of the user journey identified both visible touchpoints (e.g., help desk interaction concern) as well as invisible touchpoints (e.g., web searches performed before the physical visit or mobile navigation attempts after entry), resulting in the identification of the need to design the journey for continuous end-to-end flow. These observations contributed to the journey mapping templates used for the future stages of this study (Rosenbaum et al., 2017; Mucz & Gareau-Brennan, 2019).

3.4 User Personas and Segmentation

In developing user journeys that covered a range of user needs and behaviors, the study developed five user personas segmented by demographics, frequency of usage of the library, and service type: First Time User, Frequent Researcher, Digital-Only User, Casual Drop-in User, and Accessibility-Focused User. Each persona was built with different segments of respondents in the survey responses, interview transcriptions, and behavioral data that illustrated user motivations, pain points, levels of digital literacy, and emotional profiles. Developing user personas allowed us to contextualize the user journeys and build user-centered strategies for optimization based on different user groups. For example, the Digital-Only User was primarily concerned with seamless access to e-resources and a remote help desk, while the Accessibility-Focused User was mainly concerned about navigating the physical environment easily and sensory comfort. By linking curiosity personas by journey phases, we avoid not only tracking what type of issue occurred but also who it mattered to the most.

3.5 Validation: Usability Testing and Iterative Feedback

In validating the accuracy of the journey maps and their usability, usability testing and iterative feedback loops were part of the study. Selected users were invited to interact with updated service interfaces and physical environments as recommended. The researcher initially observed users' real-time interactions as a researcher, examining task success rates, time taken to complete each task, and emotional expressions while completing tasks. Concurrently, the researcher conducted follow-up interviews to determine if the proposed changes addressed the issues identified in the journey mapping. The recommendations were again thematically analyzed as described in Chapter 2 and used to inform the potential journey models and improve design. Library staff were asked to participate in workshops in which journey maps were used with staff to collaboratively assist in decision-making. This two-way validation, from users and service providers, allowed for demonstrable confirmation that insights were both accurate and capable of being implemented in the work environment of their library.

TABLE I PERSONA-BASED FEEDBACK ON FRICTION POINTS AND IMPROVEMENT PRIORITIES

Persona	Top Friction Point	Improvement Priority
First-Time Visitor	Building entry confusion	Signage clarity
Frequent Researcher	Limited reference support	Expert staff hours
Digital-Only User	Cluttered digital portal	UX simplification
Casual Drop-In	Finding quiet space	Acoustic zoning
Accessibility-Focused	Unclear signage	Accessible pathways

Table I gives a qualitative summary of feedback collected from five different user personas around the most friction encountered by that group, and their improvement priorities. For example, First-Time Visitors experienced confusion at the building entrance and wanted to clarify the library's signage, while Digital-Only Users were confused by the cluttered online portal and recommended a simplified UX. Accessibility-Focused Users described challenges with physical navigation and wanted more available pathways and signage for accessibility. This analysis by persona helps identify actions tailored to the user's needs, and ensures that design decisions are driven by data and positively align with the different users' experiences in both the physical and digital library contexts.

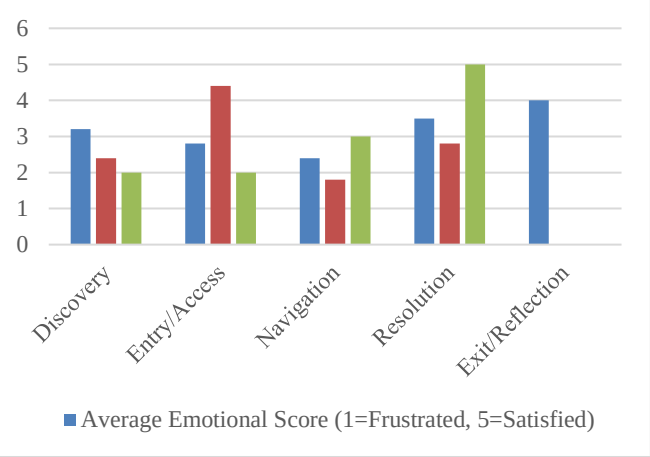
IV. Results and Discussion

4.1 Typical User Journeys and Associated Emotional States

The analysis resulted in five different user journeys that were associated with an emotional trajectory, including a baseline emotional state (neutral to slightly positive) during discovery, and negative variations during entry and navigation when signs were unclear or the person was grappling with a cluttered interface. Emotional states improved during the resolution phase if the individual successfully accomplished a task or received help from someone, and peaked during exit/reflective moments, if the experience was seamless.

Graph 1 depicts the average emotional state of users at each step of their journey through the library, marked on a scale of (1 = Frustrated, 5 = Satisfied). The curve reveals that users typically start with a reasonable level of confidence during

the discovery phase (3.2), but there is a noticeable decline in emotional satisfaction during entry/access (2.8) and navigation (2.4) stages; most likely related to confusion or the usability of signage (or interface when accessing an online resource).



Graph 1: Emotional State Curve Across Library User Journey

There is a significant uptick in the resolution phase (3.5), when users are engaged in completing their tasks, and the satisfaction score peaks in the exit/reflection stage (4.0), corresponding to an overall positive impression when the interaction concludes successfully. The graphical representation of the average emotional state provides points for interventions; improvements during navigation and entry, which are likely to have a significant influence related to user satisfaction.

4.2 Points of friction in physical navigation and digital access

The research study identified numerous elevated friction points. Physically, users routinely had issues finding restrooms, silent zones, or staff help, particularly among multi-level libraries that lacked directional signage. Digitally, users experienced friction through outdated and poorly designed interfaces and with inconsistent search filters, as well as poorly integrated and designed mobile platforms. Individually, these friction points caused longer completion times and dissatisfaction, especially among first-time users and digital-only patrons.

4.3 Behavioral Insights and Demographic Types

Behavioral mapping showed that students (and other casual visitors) engaged in more exploratory movement patterns, and were routinely influenced by their surroundings (e.g., signage, where they could sit in groups or not, where to stash outdoor gear, display boards). On the other hand, frequent researchers almost always followed an expected series of movement patterns around finding physical reference collections and booked workstations as a priority. Digital-only users had high bounce rates on the library portal when things loaded too long or didn't work at all. Users needing accessibility emphasize physical ease of movement, but they identified spaces to improve tactile guidance and visual contrast within the signage.

4.4 Effect of Design Interventions on User Satisfaction

Following the adjustments made, which included improved signage, visual exposure to product zone/department staff, reduced interface complexity, and seating zone changes, subsequent survey participant ratings revealed an overall increase in user satisfaction, with +17% between the two survey points. Emotional dips were reduced in the entry and navigation phases, with the task of wayfinding decreasing errors by -22% lower than the baseline. Usability testing confirmed that modified digital & physical experience touchpoints provided better task flow and less help seeking.

4.5 Implications for Library Space and Service Design

Findings suggest the use of evidence-based design of space and digital environments and recommend that libraries consider the placement of staff help zones, implement digital maps that update visitors' movements, integrate mobile assistance, and zone quiet spaces based on the movement analytics. Libraries should implement responsive design digitally, begin using federated search for tools, design a system for recommending content uniquely to users, and develop creative and engaging play spaces. Journey mapping demonstrates one model for libraries to implement scalable and ongoing UX enhancement and change their service model from a reactive process to a progressively designed experience framework.

V. PROPOSED USER JOURNEY OPTIMIZATION MODEL

Drawing on what has been learned through journey mapping and behaviour analysis, this section introduces a comprehensive User Journey Optimization Model for library settings. The objective is to improve user experience as a consequence of integrating journey visualisation, user emotional feedback, responsive mediated opportunity, and inclusive design as a systematic process. The model will provide a sequence of systematic actions that library administrators, experience designers, and facility planners can explore and use to enhance service delivery continually through opportunities available in real-time user interactions and feedback loops.

The basis of the model is the Visual Journey Template. The Visual Journey Template maps out the user's experience of

the library journey through its discrete phases - Discovery, Entry, Navigation, Resolution, and Exit - against defined library-specific touchpoints. For the purposes of the proposed User Journey Optimization Model, touchpoints may include both physical elements - such as where users enter the library, library signage, help desk, quiet area, checkout area - and digital elements, which may include library web pages, mobile apps, library catalog search systems, virtual chatbots, etc. Every touchpoint is interpreted and tied to common user actions and expected outcomes; the shape, size, and configuration of the template provided an opportunity to detail user movement and perceived opportunities for interaction. The template is open and allows customization and reflection of the library's size, physical layout, and service provision.

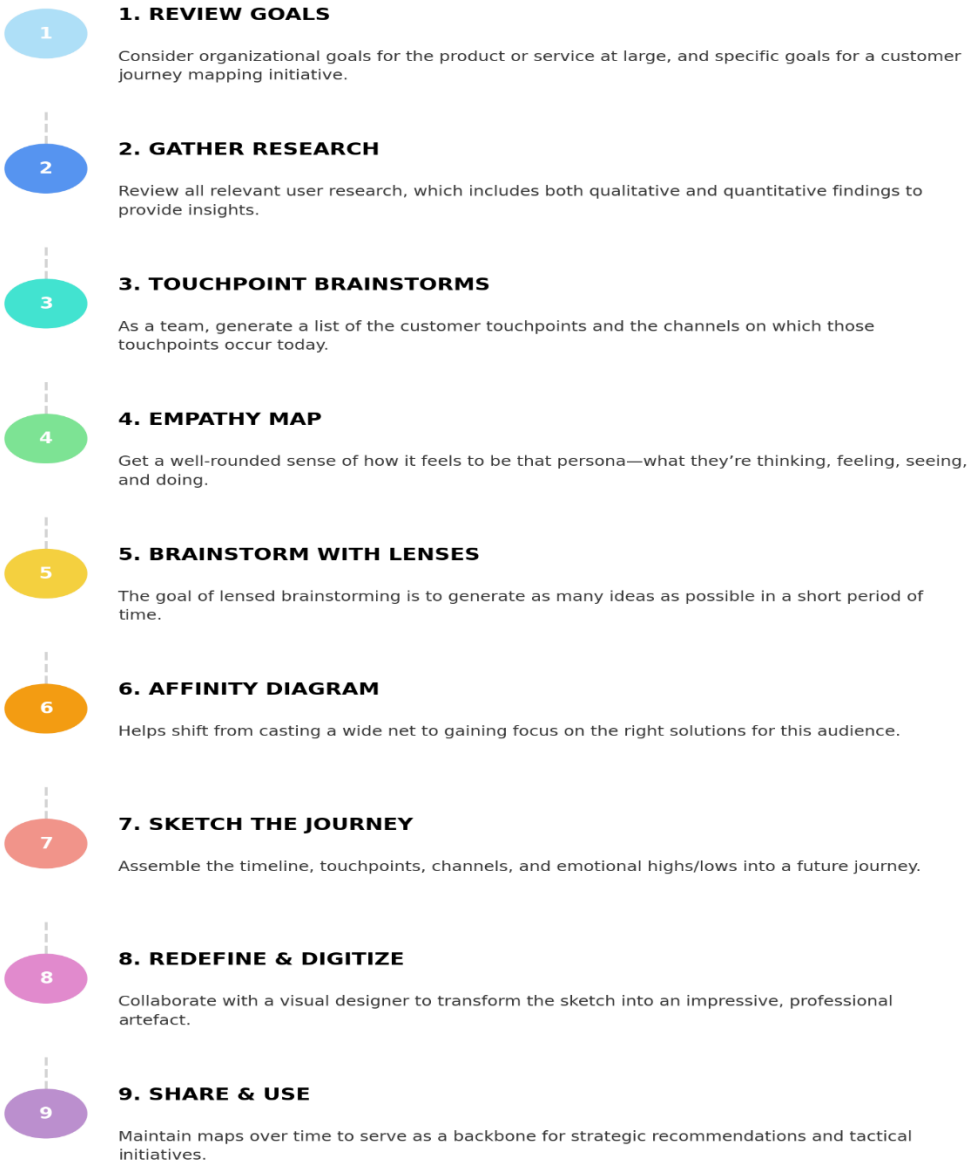


Fig. 2 Timeline-Based Library User Journey Map with Stages and Emotions

Fig 2 represents that this infographic, which takes the shape of a timeline, allows for the user journey to be divided into stages that are sequential (Awareness, Entry, Interaction, Problem Solving, Exit) and represented visually as 'nodes' that exist in linear or horizontal flow. In the context of library use, these 'nodes' can be mapped to the key user actions that might occur as they discover the library through a website or a (campus) orientation entry point and enter the library and navigate around the space, then access either a digital resource or a physical resource, seek help from library staff, and complete the process if steps. Each of the nodes could have a range of icons, descriptions, and emotional indicators (smiley/ confused/ frustrated) associated with that aspect of the user journey to show how they feel at that point. This format can easily show where users have smooth transitions and where they have bottlenecks, which will assist

administrators in identifying improvements to service. The linear format can be very effective for delivering clarity on complicated processes in presentations or discussions for stakeholders.

The model also incorporates Emotional Metrics and Action Triggers based on journey mapping. Emotional metrics, such as frustration, confusion, or satisfaction, can be collected through surveys, facial expression analysis, or using an app that asks questions while users engage with a digital product. Emotional metrics are used alongside plan-of-action steps, which are used to identify the emotional state. For example, if patrons remain somewhat frustrated in using a digital kiosk, the plan-of-action response by the model may be to trigger an automated redesign of the kiosk interface or suggest notification to staff. Emotion-enhanced journey maps enhance understanding of user behavior through a multi-sensory interpretation, and aid stakeholders in identifying and prioritizing changes that can have the greatest impact on user satisfaction and engagement. Within the framework of the model, the Dynamic Update System integrates as a feedback-and-behavior loop, with the added user insights being collected using this format, it continues to feed back and recycle through the system to inform future interactions with design engagements. The loop can be augmented with real-time data outputs, such as heat maps to chart station usage, capturing user sessions (observing them in practice), utilizing QR code surveys for patrons to complete with their phones, and using the IoT sensors that are embedded in physical places. The model, using machine learning algorithms, could preempt high-friction incidents and engage the user in designing the interface, or service, process in the appropriate context to mitigate friction. The digital interface would continue to stay up to date and adapt with a continually changing user expectation and experience to be at the very least reactive in venture service design practice. Ultimately, the User Journey Optimization Model supports the UX Design Principles of clarity, consistency, minimizing, feedback, and accessibility. It further adheres to Universal Design and Accessibility Standards, including WCAG 2.1 and the ADA. In addition, the model is inclusive and equitable in optimization by considering the needs of users with varying physical, cognitive, and sensory experiences. For example, high-contrast signage and screen-reader compatibility with simple, easy-to-use mobile layouts are in the journey template alongside multilingual navigation, which means no user cohort will receive a seamless and supportive library experience. In more succinct terms, the User Journey Optimization Model truly provides a way to translate sporadic, abstract user data into clear, actionable changes that improve operational efficiency and human-centered design in libraries. Providing this model as a regular component of libraries' planning and service evaluation cycles allows libraries to meet user needs more intentionally, eliminate friction, and reliably provide higher quality experiences that support their educational and civic purposes.

VI. Conclusion and Future Work

This study has shown the potential of User Journey Mapping (UJM) as a multifaceted tool for comprehension and optimization of the library experience in both the physical and online libraries. By continuously analyzing the user behavior, emotional state, and general interaction quality, the research project provided meaningful insights into generalized friction, user personas, and emotional experiences in library use. Use journey maps to represent the user cycles throughout five key stages of their journey: discovery, entry, navigation, resolution, and exit. The study has also indicated that satisfaction and frustration, as emotional aspects, fluctuated through these key stages. Although the user journey mapping was exploratory in nature, the data and resultant processes were sufficient to develop a User Journey Optimization Model, which provides a practical path for library services to be aligned with user needs based on emotions, adaptive actions, and inclusive design. The findings have led to recommendations for library service policy and training of library staff. First, we suggest that journey mapping is institutionalized as an evaluative methodology, as opposed to being a one-time process, and integrated into library strategic plans. Second, staff training should include empathy-based service design, data literacy, and journey mapping designs as modes for enabling library staff to act actively on behalf of the library patrons in order to foster a proactive library environment. Library staff should act as touchpoint monitors by observing user behavior and making iterative notes of user feedback for improving the user journey. In addition, mappings of user participation must be made formal in policy frameworks, to compel users into service design, incorporating co-creation workshops and participatory feedback designs focused on maintaining the centrality of user voice in innovation.

The paper acknowledges several limitations despite providing important contributions to the field. While the sample size provided some diversity of types of users, it was within the confines of a particular library network, and this can affect the generalizability of findings to larger populations. In addition, users' behaviours and emotional reactions are constantly moving targets, dependent on numerous contextual factors, as academic calendars, building renovations, and the ways in which technology is networked together to provide services. While emotional meters provided insight, how we decide to interpret different cohorts

of people's feelings is dependent entirely on the context in which they are, and likely many subtle forms of emotion were lost in user survey methods. Furthermore, there are challenges to maintaining current journeys in library services, and user expectations will continue to change with the speed of developments in digital library services. Moving forward, future research and development activities should design and adopt AI-driven contextual UX prediction and real-time journey feedback systems. AI and machine learning models can sift through, incorporate, and reference affective behavioral data to be predictive of user needs, detect anomalies in journeys, and suggest a set of possible recommendations for design forethought. These systems can be tightly integrated into either or both the digital systems or buildings through IoT sensors to provide monitoring of traffic.

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