

TravelTales: Reflecting on Meaningful Travel through Digital Scrapbooking and Journaling

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Travel experiences represent enjoyable periods in one's life, but also offer opportunities for thoughtful reflection and personal growth. To facilitate these insights and enhance self-understanding, we developed TravelTales, a smartphone app designed to support storytelling through scrapbooking and reflection through guided journal questions. The development of the app followed a human-centred design approach, starting from design space formulation to initial formative interviews ($n = 23$) that further explored the concept of meaningful travel. Our initial findings frame travel as a fleeting life experience that challenges one's usual position in space and time, accelerating personal growth. To understand how people narrate their travels to derive such growth, we deployed TravelTales in a probing field study with travellers ($n = 8$), finding that TravelTales fosters promising outcomes related to personal reflection, remembrance, and self-learning. Finally, we discuss the implications of our work in designing to support reflection and enhance travel experiences.

CCS Concepts: • Human-centered computing → Empirical studies in HCI.

Additional Key Words and Phrases: meaningful travel, smartphone application, digital storytelling

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1 INTRODUCTION

Travelling to a different place is often a fun and leisurely pastime, but it can also provide opportunities for meaningful self-reflection in a new setting under a temporary new identity [85]. Travel can generate strong affective feelings and emotions during the moment [50], and travellers document their experiences by taking pictures, recording videos, or writing in journals. In the past, the practice of *travel journaling* involved a mélange of various visual mediums, combining illustrations, pictures, and text to develop a cohesive narrative of the complete journey [5, 114]. Such personal documentation can capture the landscape of the world in addition to the journaler's reflective thoughts at that moment. These journals also provide an artifact for future retrieval – they allow a reader to vividly recount, relive, and reflect upon the sensory experiences during their travels long after the journey has been completed [50]. Reflection on one's travels can help illuminate the broader impact of travel on one's life and personal perspectives [85, 116].

However, few attempts have been made to recapture this essence of travel storytelling and reflection *during travel* in today's advanced technological context. We explore how incorporating concepts of digital storytelling and journaling practices can facilitate such reflective outcomes. *Digital storytelling*, crafting narratives through multimedia digital artifacts, has gained traction as a developmental tool in domains such as education and tourism [52, 90, 91, 94, 121]. The active creation process allows for personal expression, heightening attentiveness and

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fostering prosocial learning and outcomes [37, 43, 90, 92, 94, 121]. *Journaling*, which represents a ‘dialogue with self’ [24], is a well-studied practice that can facilitate self-growth and self-improvement, help derive positive takeaways from challenging events, and offer a grounded perspective on life [9, 21, 35, 101]. We take inspiration from these practices and apply them to travel experiences, which can be challenging yet enjoyable, and meaningful while fleeting.

Altogether, this study aims to address the research questions of:

- **RQ1:** How can a system be designed to support storytelling and reflection on personal travel experiences?
- **RQ2:** How do users interact with their digital travel documents to narrate and make sense of their thoughts during travel through the system?
- **RQ3:** What experiential and reflective outcomes do users gain from engaging with the system during their travels?

We employed a human-centred design (HCD) process to address RQ1. We considered the design space, developed requirements and goals, and performed an initial formative study to understand what makes travel meaningful. These considerations motivated the design of our system – **TravelTales** – a mobile app that enables users to document, scrapbook, and answer questions relating to their experiences during travel. Scrapbooking facilitates ludic narrative creation using various forms of multimedia captured during travels; guided questions facilitate self-understanding through conscious consideration of the motivations and learnings underlying the narrative. We use TravelTales as a technology probe [48], deploying it in an exploratory field study to understand how people curate their travel documents to narrate their experiences (RQ2) and whether TravelTales can help encourage meaningful reflections upon their experiences (RQ3) during travel. We contextualize our findings around past research, outlining the significance of our work within the context of established design paradigms and considering possible extensions for the future.

Altogether, the contributions of this paper are threefold – (1) extending our understanding of significant and meaningful travel, its relation to personal growth, and how people presently review their travels; (2) outlining the development of an app (TravelTales) to support ongoing reflection during travel, highlighting the HCD process and the app’s features; (3) using TravelTales as a technology probe to assess how our app mediates the reflective process during travel and tying these findings towards prior research.

2 RELATED WORKS

2.1 Meaningful Travel and Travel Documenting

Travel is an experience that can foster outcomes related to self-discovery and personal introspection [47, 96, 116]. Wilson and Harris [116] highlight how meaningful travel revolves around the search for self and identity, self-empowerment, and connectedness with a global community, with the meaning and benefits carrying forward into one’s daily life. Extending this point, Kang [50] proposes how meaningful travel supports people in wanting to inquire deeper, explore, and search for more answers. Gill and Packer [85] explored vacations as a ‘source of meaning’. They highlight how travel facilitates connectedness with others and with physical environments, affords reflection on life priorities, and promotes self-acceptance and self-sufficiency. Fayos-Solá et al.[33] and Park and Ahn [86] explored how travel can represent a hedonic motivation – focused on the immediate pleasure and enjoyment – and a more eudaimonic motivation – centred around learning, meaning-making, and personal growth. Extending on this latter dimension, Lengieza et al. [60, 61] developed a scale for travel experiences based on these two characteristics – hedonic measures capture emotions such as happiness or entertainment, while eudaimonic measures reflect processes such as introspective reflection. Thus, prior research has done much to outline the eudaimonic, prosocial outcomes that people can garner through engaging and reflecting on travel. HCI researchers have begun to explore systems that facilitate such reflection, such as PandaLens [16], which uses

a head-mounted display and AI assistance to promote direct documentation in the moment, and ColorAway [20], an aesthetically-focused tool that supports recollection and evaluation on travel moments.

To vividly recall travel stories, travellers often document their trips through photos and videos [85]. Documentation captures the stories of travel for both oneself and for others [30, 45, 63], and is nowadays often captured through smartphones [29, 111]. A potentially deeper connection might be facilitated through classical travel journaling – which uses visual mediums (writings, illustrations, and pictures) to recreate the personalized narrative of the travel experience [5, 114]. This creative, free form of multimedia storytelling influences the design in the present work.

There have been a few technological implementations that have considered digitalizing travel journaling. Wan et al.'s works [108, 110] outline prototype systems for users to reflect on memorable tourism experiences post hoc by connecting photos to psychological needs to find meaning within travels. Wan [13] also conducted a physical workshop to explore people's oral and visual narratives from past travels. At a different modality, Yin and Xiao considered curating travel artifacts for reflection in virtual reality [122]. Contrasted against prior research, our work focuses on the active creation of narratives during travel experiences, which affects perception at the moment (exploring the concept of 'raw' versus 'processed' experiences [106]). Although our research draws inspiration from aforementioned prior work [13, 108, 110], the concept of digital creative storytelling and reflection borne from our design process and evaluated in the field form a novel contribution in this area. Extending upon design, our work further assesses how integrating a reflective practice within people's existing use of ubiquitous technologies during their travels affects the context of usage and user needs. We consider and rethink how the design of such systems can promote introspective reflection even during a leisurely, transient, and location-bound experience.

2.2 Storytelling, Scrapbooking and Journaling

Lewis [62] argued for the importance of storytelling in human understanding, emphasizing how stories form active vehicles for meaning-making from life experiences. Stories imbue lived experiences with structure and meaning, and narratives contain information about personal identity and musings [43, 95]. Bruner [14] discusses how life itself can derive a constructed narrative. Technology has increasingly been used to tell stories, as evidenced through the popular practice of digital storytelling – the creative, playful use of digital artifacts to convey narratives over virtual mediums [94, 121]. This process has empowered nearly anyone to become the storyteller of their own experiences [121], representing a unique way for people to represent ideas, thoughts, and experiences [90, 94, 121]. Digital storytelling as a prosocial practice has aimed for outcomes such as increased autonomy and self-directedness, reflection on learning, understanding of oneself or others, and so forth [120], extending towards remembrance, self-inquiry, and self-discovery.

Scrapbooking is one such practice that allows people to tell their stories [28]. Scrapbooks hold memories built on photographs, memorabilia, and symbolic motifs [28]; they allow people to save, share, and make sense of the ephemeral everyday [106]. Always highly individualized [28, 40, 58], sometimes messy and fragmented [40], scrapbooks hold autobiographical memories and visually document one's personal and cultural identity for the future [22, 58, 87]. Past literature has explored scrapbooking for ethnographic research [66, 106] – Walling-Wefelmeyer [106] discussed how scrapbooking allows one to make sense of their experiences but highlighted tensions between creative freedom and constraint, raw and processed experiences, and therapeutic and intrusive intervention. We draw inspiration from the playful aestheticism and the reflective autobiographical aspects of scrapbooks for people to document the ephemeral, significant life experience of travel. Such interaction's playful, visual aspect is important to aesthetic needs, which can connect to mindfulness [20].

Storytelling and scrapbooking are ways of representing and contemplating a lived experience, but journaling actively compels deeper self-exploration. Cowan introduced journaling as a "dialogue with self" [24] – a way

to establish an introspective intrapersonal relationship through reflecting on the past, present, and future. The benefits of journaling have been well-studied in literature and have motivated its use as an intervention tool [26, 57, 73, 102]. Fritson [35] found that journaling by students can have benefits regarding self-improvement and self-growth, and Chlebak [21] noted that journaling can offer a more calming perspective on one's career and life. Comprehensively, Blake [9] noted the many benefits of journaling, including discovering meaning, making connections, and reflecting on roles.

Ultimately, we draw from established practices such as journaling and scrapbooking to consciously elicit and reflect on the travel experience. Travel inherently follows a narrative, and integration of these narrative-conscious methods into our design helps foster deeper engagement with reflective dimensions. These practices represent existing ways that people already reflect on their daily lives, providing us with a metaphor for UI design [80], and we consider how to translate and transform these practices into an embedded mobile application.

2.3 Technology for Meaning-Making and Reflection

The process of meaning-making – deriving personal meaning from life events – is a fundamental human pursuit. It aids in rediscovering oneself, understanding personal value systems, fostering connectedness with others, and developing resilience [49, 69, 99, 117]. Steger [97] associates the search for meaning to an eudaimonic pursuit, while Mekler and Hornbæk [72] discussed a framework for experiencing meaning in HCI, tying to connectedness, purpose, coherence, resonance, and significance. Storytelling plays a crucial role under this framework, as it provides a hermeneutic interpretation lens [17, 75] through which life events are ascribed narrative roles, genres, and metaphors. This facilitates personal explanation, understanding, and intuition, and ascribes significance to one's experiences. In this work, we encourage meaning-making regarding travel experiences through storytelling and reflection. This involves thoughtful consideration and self-inquiry about motivations and behaviours [8].

Technologies that support reflection have been heavily explored in various subfields of HCI, such as ubiquitous computing [64] or virtual reality [34, 104]. We review examples of reflective technology developed for mobile systems. McNaney et al. [70] developed StammerApp, a mobile application that supports people who stammer, allowing them to practice, set goals, and monitor their speech (reflect) within specific situations or settings; they also discuss the extent to which the app supports the self-identity of the target demographic. Fuad et al. [36] created Dysgu, which supports students in self-reflection on their learning progress in class, serving as a motivator for engagement and performance. Aragon-Hahner et al. [2] presented FindMyself, which supports career decision-making through personal challenges and reflective guiding questions. Their research found that users reflected on the content in their profile and their progress, with many participants highlighting the extent to which it supported them in learning something about themselves. Lastly and most relevantly, Karaturhan et al. [51] developed a journal-logging smartphone app that encourages momentary reflection on everyday experiences. Similar to our work, they developed a photo journaling app that encourages self-reflection on people's lived experiences. We appropriate similar design concepts regarding visual journaling and reflective questions, but with a distinct focus on travel experiences.

Insights from previous designs for meaningful, reflective experiences inform the design of TravelTales in this work. Meaningful design pertains to need fulfillment [46] and personal expressiveness [77], and we aimed to provide such characteristics through active engagement of the user in a ludic storytelling process. As we translate traditional analog practices into digital tasks, we recall Arnera et al.'s findings on the importance of the medium – that digital translations of analog tasks can show a positive effect on self-reflection [4].

Our focus on reflection aligns with the paradigm of third-wave HCI, which acknowledged the widespread contexts of technology within everyday life and the significance of technology for reflection and meaning-making [10]. We develop a system that supports the continuous *processing* of an experience rather than solely

documenting it. Travel is inherently meaningful and a source of self-learning. Thus, we aim to draw out this self-learning through ongoing reflection, leading to potentially positive prosocial outcomes.

3 SYSTEM MOTIVATION AND DESIGN PROCESS

We followed a human-centred design (HCD) process to design and develop TravelTales (Fig. 1). HCD is a common approach for system design across different academic disciplines, such as healthcare [41] and education [103]. Norman defined HCD as an approach that prioritizes human needs and behaviour and designs around them [80], and Giacomin considered the process as involving the end users themselves in design through communication, interaction, and fostering empathy [39]. HCD is adaptive – it comprises a toolbox of techniques applied flexibly to the specific problem, design space, and designer needs [39, 80]. Our design methods were inspired by the double-diamond model [55, 80], which iteratively diverges to understand the design challenge, and then converges towards the development of a system.

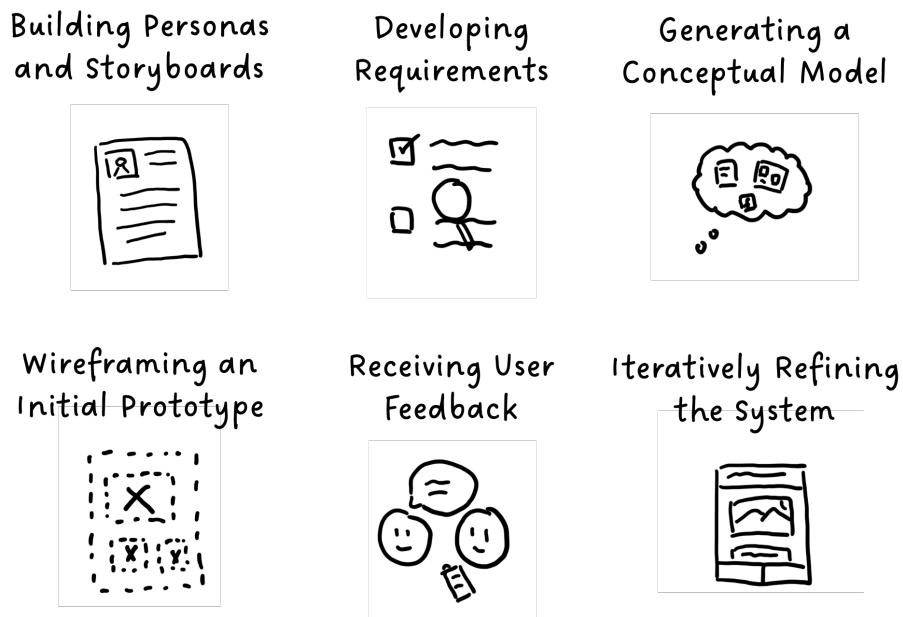


Fig. 1. The general human-centred design (HCD) process that we followed. HCD is iterative and adaptive, involving constant back-and-forth to understand the question and build up the prototype.

HCD provided a structured approach for engaging and understanding users, as well as for rapidly incorporating their feedback. Building primarily upon background research and our own experiences as travellers, we initially identified the initial design challenge and requirements. However, user contributions were integral beyond these initial steps – we tested prototypes with users while continuing to understand their needs to iteratively refine the system. We more specifically detail our design process in the following sections.

3.1 Defining the Design Space — Users, Task Examples, and Storyboards

In defining the design space, we were motivated by prior research findings that 1) travel is a meaningful experience that can impact people's perspectives and outlooks, and 2) storytelling, journaling, and the formation

of narratives can have eudaimonic outcomes from reflection. The design challenge in this space arises when we view how storytelling applied to travel narratives can support people's reflection and facilitate insights into these new perspectives. Although this space has been explored in academic settings after the travel has finished [107, 108, 112], we were interested in understanding and designing for reflection during travel, probing into how reflection occurs in "real-time". To reiterate, we consider reflection as involving a breakdown of an experience, self-inquiry, and then transforming that experience into learning [8]. Reflection on prior events informs meaning-making, in creating personal significance from lived experience [7, 54]. Altogether, this ties into eudaimonic well-being – the state of human flourishing [93] – as a potential outcome.

We hypothesized, based on prior research on meaningful travel and our own travel experiences, that the subject of reflection may focus on traveller identity, positionality in their environment, and understanding of and connections with other people and cultures. However, tied towards the tension between the 'raw' and 'processed' temporal constraints [106], we aimed to understand how the 'real-time' aspect might affect reflective experiences – the content of the reflection, where and when a user engages in the process, how a user's relationship with the process might be affected, and so forth.

To better elucidate this potential design space, including understanding user motivations, we developed personas and employed them in task examples (developing storyboards for illustration, Fig. 2a). These personas were first drawn from our own experiences as travellers, as well as informal conversations with peers. They provided an initial grounding for context and motivation, but we refined our envisioned audience as we continued to improve our understanding of the circumstances and motivations regarding travel through subsequent studies.

We note that in our task examples, the motivation behind reflection and storytelling is largely self-driven – engagement is driven by a personal, self-motivated desire for growth and a better understanding of self-identity; there are no gamification or tangible reward motivators behind the reflective process.

3.2 Developing Requirements and Goals

To develop requirements, we reflected on the personas and storyboards and examined prior research on reflective technology. We considered that the main goal of the system was to encourage expressive, thoughtful reflection during travel through storytelling techniques. As such, the requirements, system development, and evaluation revolved around the development of an on-the-go application that users can use at their convenience to document, review, narrate, and reflect. The main requirements in development were:

- *Encourage Reflection through Storytelling* – The system should encourage thoughtful reflection through the traveller's developed stories during their travels. The system should encourage the traveller to ponder upon how their travel experience situates within their perspectives and routines and consider their thoughts and emotions about the various documented artifacts along the journey. For instance, the system could ask guided questions to the traveller after they have developed the story to reflect upon its themes, the characters within the story, etc., following narrative reflection practices [2, 76]
- *Flexible Methods of Expression* – The system should provide flexibility in documenting methods to fit user desires. Past journaling systems use a variety of visual mediums such as illustration and notes [107, 109]. Thus, we want to make it possible for people to express themselves in creative, ludic manners, providing freedom in how a user might reflect, develop a story, and document their travels. Furthermore, we want to integrate mediums that are unique to digital systems, such as audio and video, within the storytelling mechanism.

Being a system that we would like users to use often during their travels, we highlighted additional requirements – being quick and convenient to use, accessible during travel, etc. The requirements altogether motivated the design decisions behind our system, e.g. tying into the requirement of convenience and ubiquity, we considered the smartphone as a suitable medium for development.

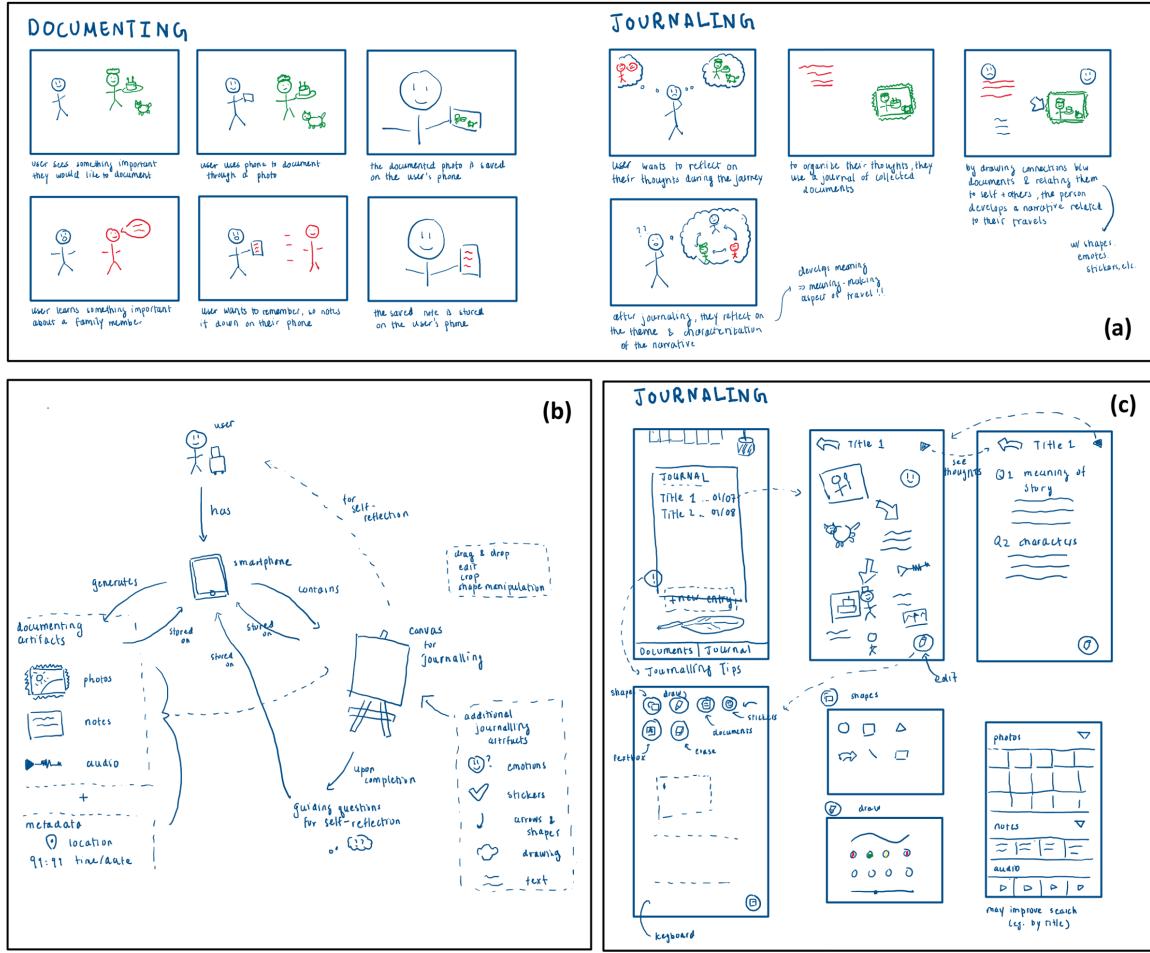


Fig. 2. Snippets from the design process. Subimage (a) shows storyboards, outlining the contexts in which people might document and storytell their travels. Subimage (b) shows our initial conceptual model of the app: the app is represented as a blank canvas in which the users can curate to tell a story with their documents. We later came up with the metaphors of a scrapbook, journal, and a timeline to represent this storytelling process. Subimage (c) shows some early-stage sketches of the app for the initial prototype.

3.3 Conceptual Model — Timeline, Scrapbook, and Journal Metaphor

We drew from the concept of metaphors [80], by considering the prevalent physical and digital tools from our experiences that satisfy similar needs. For example, social media-style timelines are almost ubiquitous as a method for documentation and expression. Journaling, likewise, is a well-established reflective practice in literature and is used in our own practice. Scrapbooking emerged as a fitting metaphor for expressive storytelling through our reflection and engagement with literature regarding creative storytelling and travel journaling. We built on top of these intuitive design metaphors to develop our conceptual model (Fig. 2b).

- **Timeline** — The timeline metaphor represents a system for the organization of travel documents. Inspired by social media sites such as Twitter¹ or Strava² which keep a chronological view of your relevant documents (i.e. posts and activities respectively), this timeline allows users to chronologically organize their multimedia digital travel documents — most commonly photos and videos, but also writings, audio clips, etc.
- **Scrapbook** — The scrapbook metaphor represents the creative digital storytelling element of our system. Inspired by travel journals of old [5, 114], this scrapbook allows people to use a variety of digital mediums to illustrate their travel story onto an initially blank canvas. This process takes inspiration from the potential of creativity and art in developing growth and reflective outcomes [119].
- **Journal** — The journal metaphor represents a mechanism for critical self-reflection and inquiry [8] upon the scrapbook and its narrative. Journaling as an isolated activity has historically enjoyed success as an interventionist tool for self-introspection and understanding, helping in creating a guiding sense for personal meaning and direction [35, 73, 102]. Self-reflection through guided questions captures journaling's potential for self-improvement and growth [35], as the user ponders upon the takeaways of the experience [101].

3.4 Prototyping and Improvements through Iterative Feedback

Based on requirements and inspired by background research, we first sketched (Fig. 2c), and then developed an initial workable prototype for smartphones using React Native using Expo Go³. We deployed this prototype for initial exploration as part of the following formative study, which allowed us to iteratively improve the usability of the system, incorporate user-suggested feedback, and find bugs. This initial prototype formed the first version of TravelTales.

4 FORMATIVE STUDY

4.1 Motivation, Study Protocol, and Participants

The formative study consisted of a semi-structured interview about travel experiences followed by a system demo. The interview aimed to help us better define meaningful travel — what specific aspects affect significant travel experiences, how people document their travels, and how people construct identity during travels. We did this by listening to and probing about people's recounted stories of various past travel experiences through a semi-structured interview. Insights from this study informed our understanding of people's reflective outcomes of travel, helping guide our evaluation of the system, motivating its high-level design, and assessing our design decisions in building it.

After conducting this interview, we wanted to get rapid feedback and impressions on our initial design by providing a short, informal demo of the application. We did this by sharing a workable version of the application with them on their phones and walking through the various features and ideas with them. During this time, we asked them questions related to the system: what were their impressions, what they thought could be improved, what might be motivators to use the application, etc. This initial feedback helped dig into usability and the desired feature set of the system, which we took forward into subsequent development.

The recruitment criteria for this study were generally broad; we simply looked for participants who had travel experiences, wanted to share them, and were willing to download our demo application. We were able to recruit 23 participants. At the start of the study, participants were asked to fill out an initial survey to collect demographic information. The participant sample consisted of 8 male, 13 female, and 2 non-binary participants, with an average age of 24.9 (ranging from 19 to 48). Regarding travel frequency, 6 participants indicated that they

¹<https://twitter.com/home>

²<https://www.strava.com/>

³<https://expo.dev/>

travelled approximately once every few years, 6 participants indicated that they travelled approximately once a year, and 11 indicated that they travelled a few times per year. Before the study, all participants were asked to review and sign a consent form regarding ethics, data collection, and data usage. The studies were performed over Zoom, and audio was recorded with participant consent. All participants completed the interview component of the study, but 1 participant was unable to engage with the developed app during the demo due to a technical compatibility issue.

4.2 Data Analysis

We analyzed the qualitative interview data from the audio transcripts through a reflexive thematic analysis approach [12] performed by the primary researcher. The researcher maintained reflexivity during the analysis process through consideration of their own positionality within the project — as a researcher, as a traveller, and as a designer. The thematic analysis started with data familiarization and initial coding. Our initial codes captured both the semantic meaning of the text, but also more latent interpretations regarding travel significance and meaning. Some sample codes included ‘Cherishing Shared and Ephemeral Time’, ‘Distorted Sense of Time’, and ‘Sharing Travel Vicariously’. The researcher then explored the coded representation of the data through visual mapping techniques to form relationships between the codes associated with people, space, time, emotions, and so forth (see supplemental material for the visual representation). This helped in developing the final three themes, which form the basis of our distilled qualitative findings on travel experiences, discussed in the following section.

Contrasted against the deeper qualitative analysis performed on the interview study, the findings and feedback from the demo were more straightforwardly derived from participants’ expressed semantic statements. These aspects were less subject to interpretation and could simply be extracted directly from the data. Based on this feedback, we made targeted adjustments to our app, prioritizing changes that were most relevant to the research question and requirements.

4.3 Findings

4.3.1 Travel Disrupts Personal Bubbles of Space-time. Travel uniquely transports travellers into a different space, both figuratively and literally. When one travels, they are exposed to a different setting with different people, and they experience a new culture with fresh things to do. Many participants remarked on the difference between their travel setting and their usual environment:

“We did Belgium, France, and Italy... [All those places] looked and felt very different than what was here, and everything we experienced in our day-to-day was seemingly unique and novel.” - P15

“[Tokyo] was weird and crowded compared to [here].” - P23

Being in a new place also more abstractly transports a traveller into a uniquely isolated world, one that provides a distorted sense of time and place evoked based on the ephemerality and impermanence of the constructed world:

“We almost like fell off the face of the planet... just like we’re in another world.” - P11

P13 states that travel is special because “*it is like a relatively small chunk of your life or experience*” which makes it “*dream-like*”. Tying this into the embedded abstractions of a detour and a portal as thoughtful metaphors [1], this ephemeral change in space-time marks a meaningful detour sandwiched between the usual routine of the past and future. This affects the traveller, who temporarily adapts to the new dimensions, exhibits appreciation and admiration, and adapts to new changes and routines. One participant, for instance, spoke on how they feel different when their perception of free time has changed during travel.

"It's a very abrupt change... I get used to the hustle and bustle of everyday life, and then sometimes it's that change to 'OK, I'm doing nothing'." - P5

Supported by participant responses and their depictions of travel, we frame travel as an experience that **forms a distinct yet fleeting bubble of space-time in one's life**. This bubble of one's travel experience also represents the compartmentalization of thoughts separate from one's daily routine:

"I can give myself permission to just feel like [I'm] somewhere else, therefore I don't need to think about [school, friend stuff]." - P11

4.3.2 Travel Facilitates Personal and Social Change. Participants recognized the fleeting nature of travel and wished to make the most out of their limited time:

"There's all that stuff that I have never seen before, and probably won't ever see again." - P11

"It was more memorable for me to do something and push myself outside my comfort zone, because I probably wouldn't have [back home]" - P15

We find that the perceived ephemerality (of time) mixed with the novelness (of setting) of the experience could contribute towards the traveller's penchant for personal growth, shifting perspectives, and increased independence. For example, P1 stated that seeing famous places imbued a sense of how "*my own personal growth can be mirrored with this famous place – I can slowly start to build up my own life and that I can aspire to do great things*", and P15 stated that travelling has helped them "*come back as a much more independent person*".

As people travel, their bubble of space-time uniquely intersects with others – either other travellers or locals. Interactions with strangers fostered learning, as seeing the perspective of others enhanced appreciation of one's privilege. For P10, conversations with others during a shared trip allowed them to value their own situation:

"What these people are facing in terms of the financial crisis, health issues, in terms of accessibility, sustainability... that's when I realized that I need to really value things that I have." - P10

Several participants juxtaposed their lives against those of the locals, finding that "*it gives you a whole new perspective to living, [knowing] people that don't have the privilege [to travel]*" (P2), "*there's that aspect of staying humble by knowing that you're able to travel, because it's an entitlement*" (P22). Even interactions with close people can change during travel in meaningful ways, as participants forge closer bonds with (often) their familiar family members within a challenging new environment. This was best illustrated by P11, who indicated that travelling across Europe with their dad "*freed us to sort of just bond in an unstructured way*", extending that:

"When you're in a place together where neither of you knows anybody, neither do you know more than how to say 'hi' and 'thanks'..., you're both a little clueless." - P11

This challenges the hierarchy of existing relationships, as both parent and child become equals in a shared experience. Throughout the stories of our participants' travels, we constantly find that **travel facilitates rapid personal growth, which is almost necessitated through the characteristics of the experience**.

4.3.3 Documentation Captures a Snippet of Ephemeral Space-time. Through documentation of travels (most commonly photos), people can capture a personally significant snippet of their unique bubble of space-time. Most commonly, people felt a desire for recollection – to remember and relive their travel experiences in the future, as well as to share their travel experiences with others.

"[I want to] get to peek back into my life." - P11

"I feel that sometimes as humans, we like to re-experience things. If you had such a good moment, you had such a good experience... You want to relive it." - P2

In particular, these documents typically capture happy memories, as people might prefer to relive and reflect on the positive – "*I think those memories are like, they're always fond memories*" (P18). The personal significance of

the documentation can manifest through the context or stories surrounding it, which may not always be apparent without context; thus, documentation is unique to each person – it captures a story or narrative mediated through the medium. For example, P13 recounts an individualized story that would only make sense to them in context:

"I keep receipts of things, like 'oh yeah we bought fish sticks or something'. It's something that I think makes me laugh and makes me smile and remember the people that I love." – P13

Emotions surrounding the experience further add to the individualized characteristic of travel documentation, for instance:

"[My] paintings are usually done in moments where I'm incredibly calm and everything is very restful for a while." - P13

"Anything that made me especially happy, I think, would make me happy reading about it again... or laugh or [feel] wonder or surprise or [have] a revelation" - P3

To build upon this aspect of individuality and uniqueness, some participants indicated that they wanted to document their travel as “*proof that [I] was there*” (P12, P14). Thus, travel represents, optimistically, an individual personal accomplishment; existentially, a fragment of their proof of existence [38]. All in all, however, **travel documentation captures a very individualized narrative of the experience for future remembrance and reflection**, allowing people to connect with their past and affirm their presence in the world. However, the actual revisiting of these narratives did not have any standardized trigger. People would look back based on emotional triggers (e.g. “*if I'm feeling down or stressed... I would be more inclined to look back on photos when I wasn't as stressed or I was having a really great time*” - P5), social triggers (e.g. “*the trigger was also being together, if that makes sense... I was finally back with my mom and dad*” - P1), relation to current events (e.g. “*sometimes if I see on the news there's like news about Hong Kong*” - P9), but also just random chance (e.g. “*randomly when I'm waiting for something and scrolling through my photo album*” - P2).

5 TRAVELTALES – DESIGN AND FEATURES

The formative findings extend prior research into meaningful travel and inform design feedback that we incorporated into our prototype. Participants emphasized the significance of being in a different environment that feels different in space and time – we provided users with a way to document and preserve these experiences as they occur. Participants highlighted how travel can facilitate personal growth – we aimed to elicit conscious reflection on these insights. Finally, participants highlighted the individualized narrative of travel reflection – we aimed to provide users with the capabilities to re-create and personally narrate their travels through ludic, playful storytelling, which can possibly connect to mindful outcomes [20].

We present **TravelTales**, a travel documentation app that supports scrapbooking and guided journaling for reflection and meaning-making. TravelTales aims to support the prosocial outcomes of travel during travel in a deliberate manner, rather than relying on serendipitous remembrance. The scrapbooking element aims to help travellers consciously consider how they use multimedia elements to tell their travel stories, and the guided questions support deeper reflection into how these stories may lead to personal growth and reflective outcomes. While travel documentation is often done for outward-facing social purposes [30], we aimed to focus on its potential as an inward-facing, reflective activity. Thus, we distinguish its design intention from social media sites such as TikTok. Here, we briefly detail the design of TravelTales.

Firstly, the *Travel Documents* page represents the timeline metaphor discussed prior (Fig. 3a). This page captures people’s documents in a chronological timeline. To support the most common forms of documentation discussed in the formative study, users can take pictures and videos (or upload them from their camera roll). However, to take advantage of digital multimedia and to represent some of the added mediums of documentation from the interviews, we also provided options for the user to draw, record (or upload) audio, or write. The main goal of documentation is for people to capture snippets of their travels at any time. From our formative study, we

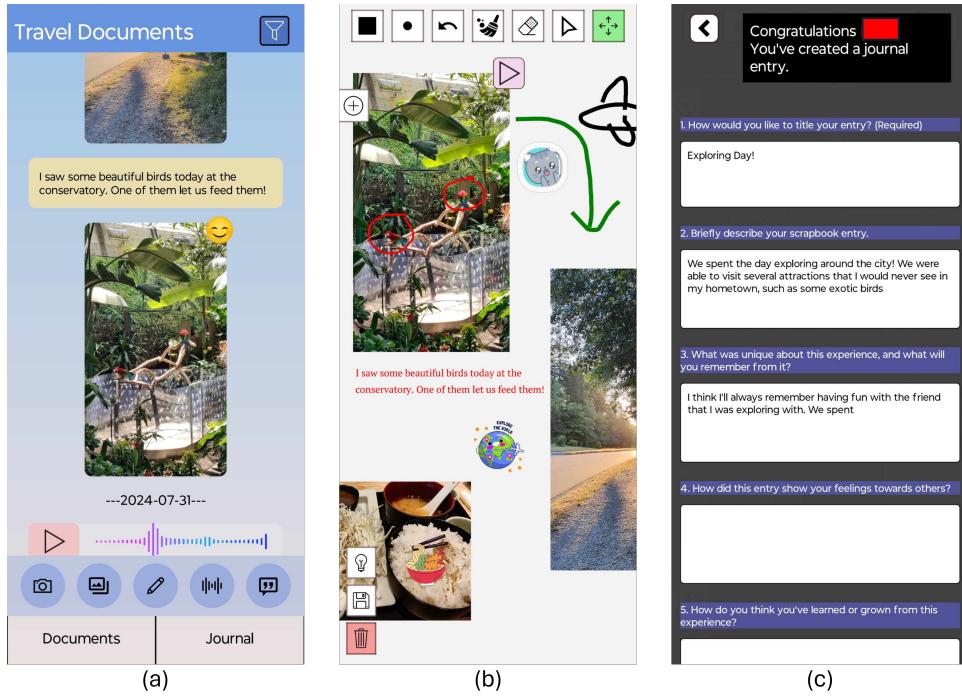


Fig. 3. Screenshots from TravelTales. Subimage (a) shows the Travel Documents page, where users can keep a timeline of their travel documents. The timeline contains photos, videos, text snippets, etc., which users can associate with an optional caption, tag, and emotion. Subimage (b) shows the scrapbook, in which users can use various forms of uploaded multimedia in a creative way to tell a story about their travels. After finishing this scrapbook, users are guided to a screen in subimage (c), where they can answer guiding questions to reflect on their motivations and learnings. Images were taken from the researcher's phone.

found that documentation often can be associated with an emotion or a broader story. Thus, we added optional selections for users to write a caption, add a tag, or assign an emotion (based on Ekman's 6 basic emotions [42]) to recorded documents. The Ekman model was selected as a similar, easily understood, and broadly applicable model. The purpose of the emotion assignment was to encourage users to begin thinking about how snippets of travel make them feel, potentially tying into deeper thought and reflection [74] through emotional resonance. This idea was also inspired by participants' emphasis on emotion relating to their travel documents from the formative study.

The *Journal* page encompasses the scrapbook and the journaling metaphors, which offer the reflexive exercises for users to engage in their aforementioned documents. The scrapbook provides an infinite canvas with tools to arrange documents, add writing or text, freehandedly draw, use stickers, as well as undo, clear, and erase (Fig. 3b). Its goal is to transform the user's travel documents, which may contain individual emotions and a fragment of a story, into a more coherent personal narrative about travel through ludic, creative storytelling. The scrapbook's infinite canvas provided an unbounded area to explore, and users interacted using finger-touch input, using familiar smartphone gestures such as pinch-to-zoom, drag-to-move, and touch-to-select. We do highlight that adapting to a mobile interface creates constraints relating to limited precision and small screen size.

The journal offers guided questions to support each individual scrapbook **entry**, probing the user on what they did and why they told their specific story. Our formative study revealed that travel stories can have broader themes and lessons, and journaling through guided questions aims to encourage conscious thought about these aspects (Fig. 3c). Drawing from prior research, we believed that a few guiding questions (contrasted against an unstructured journaling approach) would help provide people with a place to start reflecting [18, 31, 53]. Six questions guide people in their reflection, which were deeply grounded in the formative findings regarding significant travel – the questions focus on the novelty of the new setting, the uniqueness of travel as a microcosm of life experience, prosocial growth, and emotional resonance. We subjectively considered six to be balanced – enough to inspire thought without being overly intrusive during travel. For simplicity in initial testing, we chose to use this standard, static set of questions informed by significant travel qualities. Understanding how people use this set can inform more nuanced future development of reflective questions, once usage patterns and preferences are better understood (e.g. through AI integration [16]). Nonetheless, this initial set represents an authorial interpretation of background research and participant data in artifact generation, as in prior work [2, 108].

The questions were:

- (1) Briefly describe your scrapbook entry.
- (2) What was unique about this experience, and what will you remember from it?
- (3) How did this entry show your feelings towards others?
- (4) How do you think you've learned or grown from this experience?
- (5) How do you think the setting / place affected your experience?
- (6) How did you feel while piecing together this scrapbook?

To reiterate the flow, users document their travels at any time on their *Travel Documents* page. The reflective step takes place on the *Journal* page, where users create a scrapbook entry, offering narrative creation. Once completed, the users are prompted with reflective questions regarding their scrapbook. This final step of transforming scrapbooks into implicit understanding is supported by methods from prior research, as users process their experiences to make sense of them [105, 106]. TravelTales was deployed on Android as a standalone APK, built using the Expo framework for React Native. It accesses the Internet once to attempt to resolve the phone's GPS data into location metadata, but other than that, it works completely offline. In particular, all the user's documents, scrapbook, and journal data are stored locally. This was largely to respect data privacy and security, but also due to the consideration that people who travel might not always be connected to the Internet. Thus, the app works even without online connectivity. Full images of usage, including a usage video, can be found in the supplemental materials.

6 EXPLORATORY FIELD STUDY

To gain initial insights into how our app addresses our goals of facilitating reflection and growth, we performed an exploratory field study with people who were travelling, aligning with the engineering and design goals of technology probes [48].

6.1 Study Protocol and Participants

Participants attended an initial briefing meeting with the primary researcher, who introduced the study, disseminated information regarding ethics approval and data usage (all participants signed a consent form), and distributed and provided a tutorial to the TravelTales app. Participants were encouraged to regularly upload timeline documents, build a scrapbook, and answer the associated journaling questions at a minimum once a week. Participants provided proof of completion at the end of the study by sharing their phone screens or providing screenshots.

After the briefing, participants were given the freedom to use TravelTales in their travels. Upon their return, participants were asked to attend a debrief session, where they filled out concluding surveys and participated in a short semi-structured interview about their experience using the app. The surveys contained Likert-scale questions composed of two scales. Firstly, the R2T2 scale focuses on questions about technology-supported reflection, rumination, and self-focused thinking [65]; the reflection subscale in particular seemed pertinent to our considered outcomes. Despite the scale's relative recency (meaning interpretation and comparison require future insights), it is the most promising scale regarding reflective outcomes that we found. Secondly, the self-knowledge subscale of the eudaimonic technology experience scale (ETES) [118] focuses on addressing the eudaimonic pursuit of understanding oneself, which we consider an important outcome of reflection. These scales offered us initial qualitative insights through initial descriptive statistics for exploration, which we paired with a semi-structured interview that probed people's experiences with the app, dug into specific travel stories supported by their scrapbooks and question responses, and investigated to what extent the app supported reflection and self-discovery.

Participants were recruited from our institute's paid studies listings page. The eligibility criteria were to travel for a minimum of 1 week and to have an Android phone that could run our app to document, scrapbook, and answer questions regarding their travel experiences. This was a rather difficult population for us to recruit, given the timing-specific nature of travelling. Furthermore, 3 participants' data points had to be excluded due to the following reasons: forgetting to use the app, failing to follow instructions correctly, or running into compatibility issues. In the end, we were able to collect data points from a sample of 8 participants (2 male, 5 female, 1 non-binary; ages ranging from 22 to 46 with a mean of 28.0), which we still subjectively deemed to be adequate in terms of the exploratory nature of the study – full information about the participants, including travel routes, can be found in Table 1. The average duration of usage was 14 days, and participants were compensated at a rate of \$50 CAD per week for their involvement in the study.

Table 1. Participant Demographics

Participant ID	Age	Gender	Travel Destinations
1	25	Female	Los Angeles, Las Vegas, Arizona (USA)
2	26	Non-binary	Etherington Trail (Canada)
3	46	Female	Haida Gwaii, Masset, Tow Hill, Port Clements (Canada)
4	24	Male	Tokyo, Kyoto, Mt. Fuji (Japan)
5	26	Male	Guangzhou, Shenzhen, Hong Kong, Chaozhou (China)
6	27	Female	Calgary, Banff, Kananaskis (Canada)
7	28	Female	Toronto, Ottawa, Montreal (Canada)
8	22	Female	Tokyo, Kyoto, Hakone, Osaka (Japan)

6.2 Data Analysis

The data analysis followed a largely deductive thematic analysis approach [12]. Given that most of our analysis instruments targeted specific aspects of the app (e.g. people's experience with the app, its capabilities for storytelling, etc.), the qualitative data was mostly structured. Given its focus on an *experience*, we performed our thematic analysis from a more experiential, semantic paradigm. We began with an initial round of semantic coding of the interview transcripts; the codes were iteratively grouped and refined during this process. Some of our final codes were 'Documenting Emotions', 'Aestheticism', and 'Remembrance and Reprocessing the Moment'. We then grouped codes into categories through affinity diagramming (see supplemental material) to form a

hierarchical relationship, which helped us develop our final three themes. These themes inform our findings, supported by qualitative and quantitative metrics, the latter coming from an exploratory data analysis performed on the survey data. The primary researcher conducted the analysis, but with discussion with the research team.

6.3 Results and Findings

Generally, TravelTales was positively received. People enjoyed using it, despite some minor bugs.

"I think it was fun... I feel like when I was doing the scrapbooking, I was like 'Oh, I could really get into this'. I could see myself doing this more often, and this is fun." - P2

"I thought it was a valuable experience and I didn't really see it as 'I have to do this [for a study]'." - P4

Here, we delve deeper into how people integrated TravelTales into their routine, the impact of each of the features, and how TravelTales as a whole encouraged reflection during travel.

6.3.1 Integrating TravelTales into Travel. All participants indicated that TravelTales was a practice they would primarily do during periods we termed **downtime**, which we define as the periods where participants were not engaged in high-energy tasks, such as sightseeing, activities, walking around, etc. Rather, it includes periods of rest (e.g. at the end of a day or after a meal), sitting in extended transit, and so forth — the microcosms of time where they are still in a travel context, but not necessarily fully mentally or physically engaged in travel activities. Thus, although we have in prior sections referred to TravelTales as being “reflection during travel”, a slightly more accurate description would be “reflection in the midst of travel”.

"I wanted to be there, and then come back home to my hotel room and [use TravelTales]." - P1

"After me and my group had made lunch and everything, I sat down and just sort of reminisced about the day." - P2

Participants contrasted the fast, restless nature of travel, against the slow, deliberate nature of reflection, which might also apply to their preferred temporal and physical setting — P1 indicated how they *"I've always like prefer to, you know, come back to on my own space"* to use TravelTales, P4 indicated that they used it while *"taking the train from like one city to another... I'm just kind of reflecting on some things"*. This contrast was key in regards to actually encouraging and supporting storytelling and reflection.

Firstly, periods of mental and physical rest during downtime helped people compartmentalize their travels, splitting the entire travel experience into segments or (more narratively) chapters. By splitting a long period of travel into manageable segments, people were able to process individual events and highlight the specific importance of segments of their lived experiences retroactively:

"I'd just think about the procession of the day or how the past two days have processed and what things got me really excited." - P2

"Every time I sort of finish a segment of my journey... I would put together what I thought were the notable images of the section." - P5

Secondly, the slow nature of downtime grounded the participant in the present moment, encouraging mindful reflection and highlighting takeaways. This contrasts with the more restless periods of travel, where there is not as much time to think and synthesize the takeaways of travel. For instance:

"[TravelTales] did help kind of ground me in the present... [Travel] can be really fast, and you can pack a lot into your itinerary... Having those moments of reflection, I think, that was key" - P4

P1 stated that *"My travels are really hectic... it gives you a sense a peace when you look back to [your captured moments]"*, and P7 indicated the importance of slowing down *"we live in such a busy, fast-paced world... it could be a tool for people to slow down and build in more mindfulness... which is really important for mental health and well-being"*.

Thus, although the memorable moments of travel are the more active, lively parts of travel, we find that downtime amid travel can be just as important, serving as ideal times for people to reflect and engage with their travels in a more introspective manner. As such, TravelTales' use was contextualized around the situational and temporal conditions for reflective practice.

6.3.2 Features of the App. Regarding the app's specific features, most people positively reacted to documenting, creating, and selecting artifacts for their timelines beyond the standard baseline for their travel documentation. The primary way of documenting was through visuals, and P6 liked how the timeline allowed scrolling through the artifacts to see everything:

"as almost like a journal to some extent, and that you could just scroll through your pictures" - P6

People also wrote about exciting things that appeared as text snippets, for example, P2 wrote about how they *"learned how to read maps and compasses, and how excited I was about that"*; P3 discusses that the moments they recorded were *"the really exciting ones, because then it was like... I could write a little caption about this, or I could write a little journal [text] entry"*. Audio was also used as a way to rapidly mark down moments:

"[I] audio recorded conversations about like some random joke... it's sometimes just too hard to write so much." - P1

Generally, participants were able to use various multimedia to chronologically document positive travel memories on the timeline.

Regarding using the documents to build a scrapbook, we found that participants could aesthetically group documents to tell a story, primarily through visuals – e.g. *"using a picture to tell the story"* (P5). Participants used different ways to tell their stories using the scrapbook, for example, P2 discusses how their scrapbooks contain *"pictorial with words"* and tells a story in a way that was *"more chronological"*. They outlined how the pictures and notes worked together when considering the *"procession of the day"*, documenting their travels in a more narrative structure. On the other hand, P1 themed their scrapbooks around a central place:

"I went on a Universal Studios trip, so I actually made a Mickey Mouse drawing and put all my pictures in it. Another was like a hike... I made like a scenery/mountain kind of thing, and then I arranged my pictures inside it." - P1

Using the scrapbook, participants could more clearly illustrate a story about their travels. However, P3 and P5 noted that scrapbooking could also feel extraneous and add additional work since they felt that they had already documented on the timeline, e.g. P3 stated that it *"almost felt redundant"* because they had already added pictures and written captions. These participants felt that they were reminiscing on experiences they had already reflected upon through documentation.

Finally, rethinking their experiences through guided questions was also well-received, especially in terms of deeper reflection. This was especially apparent as participants started pondering their learnings and their takeaways from travel. As P1 indicates, *"we learn a lot from travel"*, and the questions gave them a start to think about and save these outcomes. For P5, this extended their existing travel musings, as *"I feel like the questions force you to think about things"*, addressing an issue in which *"maybe you want to reflect, but you're not actually sure what you're supposed to actually say"*. Participants expanded on how the questions, comparatively:

"added more layers to the experience and helped with reflection... helping organize thoughts regarding those feelings more." – P4

"made me think about reflecting on things instead of just posting it." – P3

"made me think about the themes of the experience... in the sense of you're examining your thoughts." – P7

While travel is a meaningful experience that people naturally consider and ponder, the guided questions enabled participants to consciously engage with and preserve the deeper essence of this meaning through reflection. With the static set of questions provided, participants noted that some of the questions were not always relevant to their documented experience, which we had previously assured them could be skipped at their discretion.

Table 2. Summary Statistics of the questionnaire questions. The mean (standard deviation in brackets) for each question is presented. The Likert scale questions were presented on a scale of 1 = strongly disagree to 5 = strongly agree. For the question ID, REF = reflection subscale, RUM = rumination subscale, THK = self-focused thinking subscale from the R2T2 scale [65]. SK = self-knowledge subscale from the ETES scale [118].

Question ID	Question	Mean (Stdev)
REF1	Using this technology made me conscious of my behaviours	3.38 (1.19)
REF2	This technology helps me to be able to reflect more easily on my actions	3.88 (0.83)
REF3	This technology supports reflecting on my behaviours as an ongoing activity	4.00 (0.76)
RUM1	This technology can put me in a negative thought cycle	2.62 (1.30)
RUM2	This technology makes me more likely to ruminate about a past situation	3.12 (1.64)
RUM3	Using this technology can make me ruminate or dwell over things that happened for a long time afterward	2.75 (1.49)
THK1	This technology makes me feel that it is important to me to understand what my feelings mean	3.62 (1.19)
THK2	This technology supports me in usually knowing why I feel the way I do	3.38 (0.92)
THK3	This technology makes me feel that it is important to me to be able to understand how my thoughts arise	3.50 (0.93)
SK1	When using this system, I felt a connection with my deepest feelings	3.25 (1.04)
SK2	When using this system, I felt like I was in touch with who I truly am	3.00 (1.07)
SK3	When using this system, I felt that my choices expressed my 'true self'	3.88 (0.64)

6.3.3 *TravelTales and Reflection.* Participants indicated how TravelTales was broadly able to support them in eliciting reflection and self-inquiry from their travel experiences. This was primarily related to two specific outcomes. Firstly, TravelTales was able to help people reprocess and remember key aspects of their travel experiences, for instance, the relation of travel towards personal identity and the impact of travel over time. P4 discussed how they were able to record things that were “*really incredible that I experienced or that was something sentimental*”, they enjoyed being able to slow down and “*just takes things in*”, tying back to the importance of times for slow, reactive reflection within a fast, hectic experience. Beyond remembering what they did, P5 was able to tie their travel experience to their childhood growing up and agreeing that TravelTales allowed them to (re)connect with their past.

“*I think a lot of it was for me... it was like reminiscence because I've lived in China before*” - P5

As a more specific example, P6 discussed how they were able to use TravelTales to write about their interactions with their cousin while travelling, allowing for “*reflecting on like how far we've come as like cousins*”, outlining how travel can also impact people’s relationship with familiar others rather than simply their relation to the new

setting. Remembrance and reprocessing of key events were important because they helped people affirm their learnings from travel:

"If I learn something, I have it stored. So I still remember right now, I can just look back to it. Otherwise... I'm sure I would have forgotten" - P1

"You get to process it again and organize your thoughts... rather than just sitting and reminiscing, which is more passive. So I really like that interactivity and how it helped me remember and go over what I experienced... it was really cathartic and reassuring, reaffirming that I had fun and I'm really proud of myself because I did this" - P2

TravelTales was able to help people remember and reflect consciously. Several participants described how the experience of using TravelTales encouraged them to more consciously think about their actions and understand the what and why of their actions:

"It made me actually think about what I was posting and if it was actually affecting me... it made me kind of think about myself more." - P3

"I was trying to take everything in and just be very conscious of the present, so I do think it helped" - P4

The results of the questionnaire (see Table 2) generally indicated positive scores along the subscales of reflection and self-focused thinking for the R2T2 instrument, with the highest scores for the question *REF3 – This technology supports reflecting on my behaviours as an ongoing activity* (mean: 4.00, std: 0.76). Other questions that scored highly were *REF2 – This technology helps me to be able to reflect more easily on my actions* (mean: 3.88, std: 0.83), *THK1 – This technology makes me feel that it is important to me to understand what my feelings mean* (mean: 3.62, std: 1.19). The positive results towards self-focused thinking indicate that people were able to connect their use of TravelTales to their personal selves and identities. This was also reinforced by *SK3 – When using this system, I felt that my choices expressed my 'true self'* (mean: 3.88, std: 0.64). Positive results towards reflection suggest that TravelTales was able to encourage understanding, insights, and increased awareness. In contrast, negative rumination did not appear to be a major problem. This is likely because travel memories are primarily happy and positive; many of the emotions that participants recalled were feelings such as excitement and joy. All in all, however, our use of questionnaire data is purely exploratory; future studies can use them for deeper statistical comparison.

7 DISCUSSION

Our initial deployment of TravelTales was generally successful in supporting meaningful storytelling and reflection on travel. Although it is possible that some level of novelty effects grounded initial use, sustained use throughout gave rise to the fun, introspective, and reflective outcomes that might not otherwise have come about. The integration of TravelTales into travel changed the usual temporal rhythm of reflection, and we believe our themes reflect findings beyond task compliance. Recalling Section 4.3.3, TravelTales seemed to support people's remembrance and reflection beyond the baseline – for P8, TravelTales represented a "*space that is dedicated to being reflective*". Using TravelTales, users were able to attain the outcomes of documentation – e.g. connecting their travels towards their identity and affirming their learnings from travel – in a much more conscious and guided manner rather than relying on serendipitous revisiting.

Here, we first highlight how our specific design decisions – of building TravelTales as a combination of documentation, scrapbooking, and journaling – shaped the system's impact on reflection and mediated participant usage. We tie these design decisions in the context of broader design research on designing reflective technologies and the slow technology paradigm. We also outline more general potential future explorations, based on the longer-term impact and social motivators for travel.

7.1 Meaningful Travel and Eudaimonic Outcomes

Our findings showed how TravelTales was able to support meaningful travel, as contextualized through prior research [85, 116]. TravelTales facilitated reflections and emotional connections between one's identity, the setting, and other people. Recalling the travel eudaimonia scale [60], TravelTales facilitated times when the user could self-reflect – in considering the impact of the trip and its contribution toward self-growth and learning. Such self-reflection is important, as it helps people better understand their experiences and their relation to such experiences; it is a prerequisite to meaning-making as well as eudaimonic outcomes when participants use these learnings for active change. Mekler and Hornbæk's [71] work revealed why aiming towards such eudaimonic outcomes is important, as they relate to longer-term positive psychological consequences focused on personal achievements and development, and this aligns with Bødker's third wave of HCI [10]. TravelTales exemplifies the potential for technology to facilitate meaningful interactions with one's lived experiences. Our study contributes to a broader discourse of developing technologies to support self-growth and inquiry, highlighting the potential of digital storytelling and journaling paradigms in doing so.

Contextualizing within Elsden et al.'s work [32], TravelTales acts similarly to a smart journal by supporting the seamless integration of photos with written accounts, providing a personalized way for people to mix and combine different media. TravelTales' combination of direct documentation and mediated journaling was well-received, following a multiple-feature approach similar to Ardoin et al. [3]. Furthermore, the visual plus captioning aspect of documentation helped people both capture and affirm their experience, similar to Karaturhan et al [51]. We find that TravelTales supports reflective outcomes and usage patterns [8] – participants transformed a more objective record of an experience into a significant takeaway. TravelTales supported the breakdown, inquiry, and learning-transformation from their travel experiences, which are all key aspects of the reflective process [8]. We infer that participants began meaning-making through this practice – constructing personal significance of their travel experiences to better understand themselves and the world around them. This is expected, as TravelTales is a synthesis of prior learnings applied to meaningful travel. Supporting self-understanding and potential growth reflects the eudaimonic aspirations we initially aimed to foster through TravelTales through our features and design decisions, even if the long-term effects of such outcomes extend beyond the scope of our study.

However, we highlight how the reflective experience is highly mediated by individual motivations and efforts. While our system was designed to support diverse modes of reflection through the various metaphors, the multi-pronged and guided approach towards reflection sometimes felt like it was trying to force the outcome, rather than it occurring naturally (relating to a similar finding in Karaturhan et al [51]). Scrapbooking in particular was singled out – and we consider this exercise as being the most time-consuming and possibly the most “interpretative” approach in TravelTales. Whereas journaling and documenting were more straightforward in what to do and what to consider, scrapbooking is more of an open-ended, transformative activity that puts the onus of interpretation on the user – yet this adds a level of effort, which may not always match user motivation. Eudaimonic-supporting technology may have positive introspective outcomes [72, 118], but focussing solely on this aspect fails to capture the also hedonic enjoyment factor of liking and wanting to use the system [71]. Mekler and Hornbæk's examples [71] of eudaimonic experiences – learning and working towards a goal – primarily put the onus of effort on the user, deriving motivation from satisfying needs and future importance. The effort required for TravelTales was not only shaped by user-dependent motivation, but also the inherent limitations of the medium – a small screen size (participants expressed desire for larger screen sizes, aligning with more space for creation), and the multi-tasking demands of touch inputs (as the touch input modality was used for drawing, editing, typing, and so forth). This highlights an important but subtle tension that designers must consider when developing reflective experiences – how can technology encourage reflection without feeling imposing and overwhelming? When we design to make reflection conscious and deliberate, how do we not make it suffocating? How can we apply hedonic principles to make reflection something people want to do?

According to expectancy-value theory [115], motivations to pursue an activity are mediated by the value of an action and the expected cost (effort in this case). The value of reflection on travel comes from the subjective, individual desire of wanting to reconnect with the past and affirm a ‘lived’ experience (Section 4.3.3), agreeing with [32]. With different personal attitudes toward the value of reflection, designers must consider how technology can be built to support diverse motivations. Section 4.3.3 also suggests that individual motivations are fluid over time as well, mediated by internal factors such as emotions and external factors such as setting and social context. The occasionally perceived redundancy of our study’s standardized approach to reflection suggests that a one-size-fits-all approach does not always sufficiently account for these diverse, fluid motivations. To adapt to these factors, we suggest that reflective technology should match human behaviour, both when considering the ‘when’ and ‘how’ people want to reflect. Our suggestions include personalization and customization of the reflective process, with promising explorations being AI or LLM-based approaches. To prompt reflection based on emotional cues, emotions can be interpreted through both textual input [59, 113] and user gestural input [16, 23] or (in the case of TravelTales) user self-reporting. Aligning reflective timing with emotional factors could prompt active reflection on happier travel memories when the user seems sad – reactively offering reflection when the criteria seem appropriate. Furthermore, to adapt the process towards diverse user motivations during reflection, we consider co-creation as a form of personalization, such as in Nepal et al. [79] and Kim et al. [53]. In both studies, participants found the adaptable, conversational approach to journaling more enjoyable, expanding the scope of reflection beyond generic, standardized prompts and processes.

Beyond supporting a reflective mindset, AI-supported co-creation could also lighten cognitive load. We consider the limitations of manual input exacerbated by mobile device limitations, in that repeated and precise movements and keeping track of all the features through primarily a single input modality (touch) can be tedious. Other reflective systems for travel have explored the use of head-mounted displays [16], yet we wanted to develop for mobile, being the most ubiquitous travel device. Thus, adapting to mobile limitations might require a reconsideration of the core functions [56], perhaps delegating other parts to automation.

To address this, we envision potentially automatic content selection (e.g. based on user-provided keywords), so the user does not have to individually pick each picture or video. This could leverage existing content such as location and time metadata, or even use more advanced sentiment analysis and image understanding. This could help scaffold potential initial designs, where the user can then select and refine. This would smoothen the organization pipeline and ease the cognitive load, but still maintain the creative journaling aspect from building on top of this initial template. Tuning this balance in AI co-creation is an important topic that would also require future exploration to balance user expectations and agency [16, 84].

7.2 The Time and Space of Travel Reflection

Beyond individual characteristics and attitudes, reflective technology also needs to be cognizant time and space. These concepts were an enduring theme throughout our findings – starting with our formative study, we found that travel creates a prominent yet ephemeral bubble of space and time. In the field, participants mentioned that travel in a new setting can feel rushed and hectic; in contrast, people retreated to their personal, slower spaces for remembrance and reflection. We consider how this change of pace – this measured, conscious pocket of time for more deliberate introspective engagement – ties towards past research on *slow technology*. Coined by Hallnäs and Redström, slow technology contrasts the efficiency often heralded by technology, rather focusing on slowing down perceptions of time to encourage conscious learning and understanding [6, 44]; such design exposes technology to encourage reflection and thought. Strauss and Faud-Luke [98] highlight how slow design considers expressions of technology beyond the semantic, encourages contemplation, and allows for active participation. Even though we did not initially design TravelTales around the slow technology design philosophy,

we found that people used it in a manner that resembled ‘slowness’ - people slowed down the rushed pace of travel to actively document, create stories, and respond to questions about travel [98].

Unlike both documentation during the moment (e.g. through taking photos) and reflection afterwards (e.g. in Wan’s various works [107, 108]), we tie TravelTales’ temporal positionality as mimicking the key concept of ‘temporal drift’ in slow design – as an ongoing convergence on a ‘slower’ activity between times of rapidness [81]. We interpret this unique placement as being indicative of people’s relationships with their reflective practices. People viewed these relationships through microcosms of travel rather than as a whole. Thus, the intermittent use of TravelTales helped evaluate the impact of smaller time periods (usually a singular day or a group of days). Whereas this might help in highlighting more temporally- or location-specific reflective details, it may potentially be more difficult to make broader connections relating to the impact of an entire trip [107, 108], understanding how travel as a whole can shape identity and highlight growth. As a related point, the compressed reflection period can make reflection less detached from documentation, not providing enough time for reflective learning [11] to take shape. Returning to the discussion on how scrapbooking sometimes felt redundant, P5 from the field study stated that the scrapbook did not feel different because it was just “*a big collage of things I’ve done basically*”, highlighting the lack of the transformative, interpretative step that they felt compelled to do. This ties to the challenges of scrapbooking in general i.e. the tension between freedom and constraint [106], but also highlights the importance of time in translating from ‘raw’ to ‘processed’ experiences [106]. We tie this into the ‘implicit slowness’ of journaling in general – the key dimension that modulates pace is the fundamental need for time and space for reflection [81].

We highlight slowness as an important future consideration for improving the future design of TravelTales. When we view reflection as a precursor to prosocial change, one of the dimensions of change that Rapp describes is its speed [89]. Travel facilitates rapid growth due to its compressed time, and perhaps people had a desire to decelerate during introspection. Such technology can form a reflective space and could help fill the downtime when people “*have nothing else to do or think about right now*” (P8) with an introspective practice. We consider that future work could explore designing for slowness more explicitly, incorporating concepts such as ‘explicit slowness’ (e.g. restricting the pacing of use) or ‘pre-interaction’ (considering the time and space directly before interacting with TravelTales) [81]. These could take the shape of pre-interaction rituals that prepare and ease users into a slower, reflective mindset, or time-shifted interactions that invite users to edit and reflect on top of their existing scrapbooks over an extended travel period, perhaps even after the travel has finished.

Extending on this, for TravelTales, the temporality and spatiality of its usage are solely user-determined, which is important. This contrasts with similar work in PandaLens [16], where the system’s interpretation influenced the temporal dimension of reflection. In PandaLens, moments in which the system compelled participants to reflect on the actual moments exerted feelings of temporal pressure. Furthermore, fleeting moments of strong emotional response were sometimes uncaptured, conversely, not all system-determined moments were suitable for participant reflection.

Overall, we highlight the critical importance of time in reflective practices, extending Section 7.1. We do note that the effects discussed in both this and Section 7.1 are influenced by the fact that we had asked participants to use the features regularly for this study. Motivations to reflect fluctuate over time, and future extensions should acknowledge the importance of this temporal scale, perhaps loosening usage requirements and letting motivations evolve naturally.

7.3 Travel Documentation; Sharing and Revisiting

In our field study, we focused on TravelTales as a tool to enhance reflection amid moments of travel. People were able to compartmentalize the learnings and experiences as they happened. Past work on travel documentation has outlined the importance of revisiting one’s travel documents in the future. For example, Wan’s work [108] relies

on reflection on past travels to explore individual character strengths. If travel can be an expression of identity [85], and that identity can change over time [15], then it is important to understand how people's reflections, meaning-making, and perception of their travel change as their identity evolves. According to the R2T2 scale, reflection on behaviours as an ongoing activity is a key dimension of the reflective subscale [65].

However, in our study, this was only explored during the periods of travel, whereas our prior discussion sections have highlighted the importance of time scales in reflective practices. Thus, how can we develop and evaluate a system to support travel reflection as a continuous process throughout one's life, even when people are not actively travelling? For example, we may extend the guided questions over time, asking people to update or extend their answers through comparison, e.g. asking them if their response to the question on potential self-growth was actually realized. Even travelling back to the same place can introduce tensions regarding feelings of belonging, loss, and nostalgia [68, 100]. To evaluate the longitudinal impacts of travel documentation, we would need to perform a longer-scale study over perhaps several years, as we aim to explore not only how people re-create and update their scrapbooks and journals, but also how they revisit, remember, and reflect on them in the future. To facilitate time-shifted reflection, design tools could prompt delayed, slowed reflection in the future (e.g. [108] upon immediate microcosms of smaller reflective moments — exploring different gradations of time [83]). This could evolve periodically as people age and go on different travels, shifting towards changing user positionalities and encouraging iterative decision-making reflecting upon change over time [15, 82, 83]. Walling-Wefelmeyer discusses the editing and deletion processes within a reflective practice in scrapbooking [106]; such changes over time could be ascribed to shifting attitudes and personalities. Even though TravelTales was studied in the context of singular trips, it could be extended to inspire a lifetime of reflection.

Finally, sharing is an important aspect of travel journaling [30], which was not emphasized in this work. Future work could look at the potential of sharing people's experiences by sharing their created documents, scrapbooks and personal reflections. Although sharing can be done for more self-indulgent reasons such as affection, attention, and status-seeking [63], it can also be viewed positively as a way of spreading happiness through novel and joyful experiences [30]. This latter motivation was also indicated by participants in our formative study, e.g. sharing so "*they can kind of live through our experience*" (P14), "*it's just about sharing joy that I have with others and hope they can find that for themselves*" (P19), representing the travel sharing as a way for others to live vicariously through one's happy moments. This study heavily focused on individual reflection, i.e. doing it for yourself. Prior work has indicated how sharing on social media (Instagram, TikTok), can often be motivated first by hedonic factors, such as social status, enjoyment, etc., but often have an aspect of eudaimonic lean as well, in terms of remembrance of a meaningful experience and perceived positive outcomes [27, 30, 78].

TravelTales highlights these latter motivations, and future research can take a shifting focus towards designing for a more social form of reflective travel documentation, and explore how this additional social dimension affects remembrance and reflection. Some possible ideas would be to extend one's documents, scrapbooks, and question responses to be shareable or to have a collaborative means of documenting with loved ones (e.g. a shared timeline or scrapbook, for instance). However, beyond simple sharing, collaborative meaning-making and reflection are a potentially underexplored area with rich considerations. Cranshaw et al.'s work [25] explored how logging travel journals in a communal digital space supported personal reflection as travellers become more conscious about themselves and the world around them, and considered how they express this to others. Chang et al.'s work [19] found that people became more willing to visit unplanned points of interest *because* of others' check-ins, and that their system could serve as a sort of travel logging tool. In both works, the social aspect creates a communal culture of travel and reflection around it. Applied to TravelTales, multiple participants could work together to co-create meaning within a reflective space. In a more intimate setting, friends or family could document and build a shared timeline together, bring their personal aestheticism to create a shared scrapbook or express personal journaling perspectives in a shared space. This allows for the collaborative and reciprocal sharing and

probing of perspectives inspired by prior work [67, 88]. In a more public setting, reflective artifacts could be made visible to a broader audience, potentially inspiring others to travel and reflect on similar experiences.

8 LIMITATIONS AND FUTURE WORK

We highlight some of the limitations regarding our work. Firstly, for both our formative study and our field study, we recruited primarily locally, and the sample demographic also skewed young. This may bias the responses towards a very age-centric or region-centric perspective on travel. Extending on the latter, the destinations for the field study were predominantly situated in either North America or East Asia. Thus, future work could extend our work by attaining perspectives from a broader population that would better reflect the importance of travel at different ages, and include individuals from and travelling to a diverse set of cultural contexts to better reflect the varied significance of travel.

We did not explicitly collect data about participants' experience with travel journaling or their underlying motivations for travel during the field study, which would be imperative for the future. However, participant responses indicated that this sort of journaling was a novel experience for them that encouraged them to think in ways that they had not before. Participants discussed objective (often fun) things that they did during travel, and through TravelTales, were able to connect these to introspective insights. While we did not gather explicit data on travel motivations (tied towards Shin et al.'s [96] spectrum of hedonic, eudaimonic, and engagement experiences), the journaling process was often tied towards thinking about eudaimonic outcomes. Still, it is important to acknowledge that novelty effects or the study-driven motivation of using TravelTales may contribute to such effects of TravelTales. However, rather than dismissing them as ephemeral, we position novelty as an entry point towards a more intentional practice. Novelty can help participants be more conscious of their reflective actions and think about how it fits within their existing travel experiences.

The field study's sample size was rather limited due to the rather specific and time-sensitive criteria of needing to travel for a specific length of time. We deemed this fine for an initial exploratory probe, as we were not aiming for generalizability but rather to explore insights. Through this probe, we were able to position TravelTales within prior design research and suggest concrete directions for future extensions. We envision future work as incorporating these suggestions and expanding towards a more widespread, comparative experiment, e.g. through a large-scale, longitudinal public deployment. This large-scale deployment of an improved version of TravelTales (or multiple different versions in A/B testing) could also allow for quantitative testing to bolster the qualitative data. Statistical evidence could offer further insights into how TravelTales can improve reflection and usability.

Lastly, much of the qualitative analysis in this work was performed by a single researcher; this single-coder approach can introduce bias. Future research could benefit from triangulation and discussion among multiple researchers to collect a diverse set of perspectives regarding the data.

9 CONCLUSION

This work focused on the development and assessment of TravelTales, a smartphone application that supports 1) documentation of multimedia travel documents through a timeline, 2) creative visual storytelling of the travel experiences through scrapbooking, and 3) reflection on the meaning, motivations, and lessons of the experience through guided journal questions. We outlined the developmental process of TravelTales, starting from understanding the design space, requirements, and goals, to the development of an initial prototype. Through formative studies, we solicited initial feedback on this prototype while also learning more about meaningful travel, extending prior research into how travel facilitates growth and how people presently document their memories. After finalizing the design of TravelTales, we deployed it in a field study with 8 participants, all of whom successfully used the app amid their travels. We found that TravelTales was able to encourage conscious

and continuous reprocessing and reflection on travels, grounding people amid their hectic travels. We discuss how these findings underscore the importance of reflective design for travel and ways of inducing eudaimonic outcomes, and we offer guidelines and suggestions for future research.

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