

# On the Design of Quologue: Uncovering Opportunities and Challenges with Generative AI as a Resource for Creating a Self-Morphing E-book Metadata Archive

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## ABSTRACT

People can highlight text on e-books via many devices and applications, generating metadata that precisely captures and stores passages of interest in their personal digital archives. Despite the rising popularity of e-books, little research in HCI has inquired into the potential of these digital traces as a design resource for creativity and self-reflection. In this paper, we present Quologue, a web application that allows users to reconnect with their e-book highlights through ongoing dialogue and interactions. We aim to reimagine e-book highlights as design materials for creative self-expression instead of static records of past interactions. Through a design-led approach that combines research through design and autobiographical design, we reflect on three design events revealed through our process that illustrate alternative ways of interacting with one's e-book metadata through first-hand manipulation shaped by generative AI. We conclude with implications for future HCI studies and practice.

## CCS CONCEPTS

• **Human-centered computing** → Interaction Design;.

## KEYWORDS

Research through Design, Autobiographical Design, Metadata, E-book, Slow Technology, Generative AI, Large Language Model

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## 1 INTRODUCTION AND RELATED WORKS

For over nearly two decades, electronic books (e-books) have offered an alternative way for people to read books on digital platforms and devices, e.g., smartphones, laptops, tablets, and e-readers [36]. E-book reading platforms offer features that simulate the annotative affordances of paper, such as creating highlights, making notes in the margins, placing bookmarks [37], and the ability to record these actions as digital metadata. These types of in-book annotations offer "basic and often unselfconscious way[s] in which readers interact with texts" [36], generating potentially valuable resources because they offer traces of people's thoughts, markers for future actions, and lenses into their past [51].

The rising popularity of e-books has been captured by the e-book sales on Amazon exceeding the print book sales for the first time in 2009 [1]. As e-books continue to gain traction, the growing archives of readers' interactions with e-books pose interesting challenges for the HCI community. When these archives grow larger, they become increasingly invisible, making it challenging for people to engage with or re-visit them over the course of their everyday lives [47]. And, because they lack a distinct presence, it is challenging for people to grasp how big their e-book metadata archive is and the memories, associations, and emotions that might be bound up in these digital traces. More broadly, there is an ongoing concern in the HCI community to develop new approaches for people to experience their personal data in more rich, creative, and expressive ways [10, 17, 35, 41, 60].

In parallel, a nascent and growing strand of HCI research has argued that, while underexplored, metadata traces encoded into personal devices and data can operate as valuable resources for self-reflection, exploration, and growth (e.g., [26, 32, 34, 41, 47]). For example, studies under the slow technology [27, 42] paradigm have investigated the reflective potentialities of metadata with temporal records of people's digital actions, such as digital photo archives [10, 11] and music archives [46], in supporting renewed experiences of re-visitation and reminiscence over time. However, the use of e-book metadata drawn from personal archives remains underexplored as a design resource, and there is a potential to uncover a rich design space.

In previous HCI studies, randomness has been used as an effective resource for creating engaging experiences with large personal digital archives, (e.g., *Olly* [45], *Photobox* [43], *Reflexive Printer* [57]). Generative AI (GAI) also relies on non-deterministic processes, and as Benjamin et al. [2] argue, the unpredictability of GAI can be leveraged as a design resource to engage with personal data. GAI, however, can also take direct input [38] from the user, which can then influence what is generated by the system. For instance, large language models (LLM), which are GAI models that are pretrained on substantial amounts of textual data, can take in an input text and generate an output text that is likely to follow the input text based on probabilities [30]. Many LLMs such as GPT models [68] , BARD [50], and MPT-7B [69] can execute this through

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multi-turn conversational interactions. By building an LLM system that takes in one's own text-based e-book metadata, a user could potentially have dialogue-like interactions with their own metadata and creatively produce new data—in effect, extending beyond simply revisiting randomly selected past instances in one's personal archive. The interactive quality of GAI has been explored in the context of self-reflection [6, 7] and co-creation [12, 55]; however, using GAI for navigating digital archives remains as a new and underexplored design space.

With the growing use of e-books, and the rapid acceleration of the development and integration of GAI into daily life (c.f., [38]), it is timely to consider the potential of e-book metadata as a design resource for creative self-expression. *How can an archive of e-book highlights serve as a resource for creative expression and self-reflection? What opportunities, challenges, and tensions might emerge from working with generative AI as a design material?* To address these research questions and ground our own thinking in this emerging space, we designed *Quologue*, a web application that allows users to have an ongoing dialogue with the highlights they make on e-books via a personal GAI model. Each week Quologue generates three keywords that the AI creates from a randomly selected highlight from the user's archive. Upon first viewing, no other contextual clues are offered (e.g., the novel the highlight originally was marked within). The user is prompted to craft a short written reflection using the keywords over the course of the week. Once the user has completed and entered their reflection, the Quologue AI synthesizes it with the selected highlight, effectively morphing the original highlight into a new quote. Over time, as more syntheses accumulate in the Quologue users' archive, users are able to morph their e-book highlights archives into an archive of creative self-expression by taking their own metadata as its material. See **Appendix A** for an example and detailed descriptions of the system. Our objective in this paper is not to elucidate every decision we made during the design process of Quologue nor present Quologue as a finished artifact. Instead, we report and discuss findings from three key frictions (or "design events" [48]) that took place in the early stage of the design process that involved exploring with GAI and e-book metadata and living with the prototype. Next, we interpret implications emerging from our design research process for future HCI research and practice.

## 2 DESIGN RESEARCH APPROACH AND PROCESS

We describe our methodological approach as Research through Design (RtD) with an emphasis on design-led research in HCI (c.f., [19, 20, 23, 54, 67]). We adopt a *designer-researcher* position to generate artifacts that investigate and respond to our research questions [8, 17, 44, 59]. Designer-researchers often function as a small team that is reflexively focused on the creative, experimental, and novel outcomes of the design process that are critically and reflectively arrived at through design practice [17, 18, 44, 59, 61]. This approach gives prominence to first-hand insights emerging through the creation and lived experience of real things that materially ground conceptual ideas through their actual existence.

Our position builds on Oogjes and Wakkary's notion of "design events" that focus on interweaving first-person narrative accounts of pivotal or thematic moments within a design research project [48]. Our approach draws inspiration from first-person approaches such as design-led [8, 16] and autobiographical design [14, 39] that allow for making adjustments to prototypes as they are lived with. We determined autobiographical design approach would be appropriate for our context, especially considering how there is currently no existing infrastructure that invites users to better interact with e-book metadata. This approach has been used in HCI to gather data on nuanced insights and qualities of phenomena that could emerge from interacting with an artifact as a first person for a long term and might not be revealed from traditional user-centered design methods [40]. Our objective is to garner rich and deep personal accounts on the process of designing and building this new kind of infrastructure. For the duration of the study, our team had bi-weekly meetings to discuss insights from living with the prototype and building the prototype and to make design decisions for next iterations.

### 2.1 Data Collection and Preparation: E-book Metadata

To our knowledge, there are currently no e-reading platforms that facilitate hands-on interactions with one's e-book metadata without manually exporting one's data and further parsing or cleaning it, which creates barriers for regular users. As we found out obtaining and cleaning one's e-book metadata was a substantial undertaking, we decided to start with our own data—the First Author (FA)'s personal data from two different sources: Millie and FA's journal. Millie is a Korean e-book subscription service for borrowing and reading books [53]. When the user highlights on the e-book, the system records the quote being highlighted, the title of the book, author, and the date and time it was highlighted. FA has been a Millie subscriber from March 2020 to January 2023 and saved 414 highlights on his archive. Despite FA having accumulated many highlights in his archive, he rarely revisits the archive to check or read the highlights. Our design motivation was to design a system that prompts FA to revisit these highlights. We also note that on Millie users can access and read their entire archive of highlights on this platform, but this app does not allow users to copy or export the highlights in any format from this archive. The only way a user would be able to copy and share the text they highlighted would be to directly open the e-book and copy or export the text from it. FA manually built a new dataset on Google Sheets to convert this archive into a format that can be easily fed into the GAI system. Each highlight was individually translated into English via Google Translate, and FA edited any translation errors that occurred. During the data collection phase 7 months, we supplemented FA's Millie highlights with the same kind of data on 86 quotes that were manually recorded from FA's physical books. Combining the data from FA's Millie archive and FA's journal resulted in a total of 500 quotes.

### 2.2 Early Explorations with E-book Metadata and Generative AI

We built a data pipeline that automated the tasks of communicating with a GAI model to generate output using FA's cleaned e-book dataset. This pipeline randomly selected a quote from the dataset,

packaged the quote with a custom prompt, and received outputs from a GAI model. Establishing this data pipeline prior to exploring the output enabled us to quickly iterate on our system flow based on real-life data. Over the course of 4 months, using FA's e-book metadata, we experimented with various output formats—keywords, poems, haikus, short stories, quote recommendations, symbols, etc.—and models for text completion (e.g., GPT-3.5 [68] and MPT-7B [69]). The ability to generate high-quality text output was central for our system. After comparing the quality of output from these models, we decided to build our system using the GPT-3.5 Turbo model that returns text based on a series of text input [68]. These early explorations played an important role in deciding on our final system flow and the output format. In our first design event (3.1), we reflect on critical moments during our process of arriving at the final design of the system flow and the output format.

## 2.3 Building and Living with Quologue

As a result of the early explorations and living with the prototype, we built Quologue, a web application that allows users to actively engage in an ongoing dialogue with their past digital traces on e-books. Inspired, in part, by prior works that used randomness as a design resource [43, 45, 57, 60], we designed Quologue to surface three keywords from a randomly selected highlight from users' archives each week. Users then write a short reflection on the keywords for the week. This reflection is fed into our system and results in a text output that aims to synthesize the reflection and the original highlight where the keywords are drawn. For brevity, the step-by-step descriptions of the system and the flowchart are provided in **Appendix A**. We elaborate on the design rationale for key elements in our GAI system in the following section. These elements include generating keywords from a highlight (3.1), taking a user's reflection on the keywords as an input (3.3), and setting the system pacing (3.3). Over a six-week period, FA lived with the prototype system daily, which entailed viewing keywords surfaced from a FA's past highlight, writing a response to the keywords, and reading the GPT-synthesized quote. FA wrote over 20 diary entries documenting every input and output of the AI system on a FigJam whiteboard (**Appendix D.1-6**).

# 3 DESIGN EVENTS

## 3.1 Adapting to the Uncertainty of GAI: Evaluating Expectations and Making Compromises

In the early stage of designing Quologue, we conducted in-depth explorations with the GPT to determine the form of output for the context of re-experiencing e-book highlights. Prior to iterating on our prompt, we initially expected that the GPT model would provide transparent information regarding its capabilities when given the prompt. For instance, if the model is asked to generate output that might not fully satisfy any given requirements, we expected the model would preface the output by alerting users of potential shortcomings in the output. However, when we prompted the model to recommend ten quotes that are relevant to one of FA's e-book highlights, we discovered that the output had a mix of true and false information with no indication of the validity evaluated by the model (see **Appendix B** for details). While the misinformation issue continued, we also discovered that the GPT model consistently performed well at high-level theme comprehension on a given text (**Appendix D.6**). This led us to think that generating keywords could act as a way to encapsulate the meaning of original highlights in an effective way while minimizing the risk of misrepresenting the source.

In our prompt, we instructed the model to select one keyword that is not directly sourced from the quote but is semantically related to the other two keywords. We added this requirement so that the one keyword would act as a gateway for users to potentially bring in new elements through their response that could enrich the meaning of the original quote in the output. **Appendix D.5** shows how FA added a new allegory based on the random keyword that was not present in the original quote. After we decided on the final system flow of generating keywords and having users submit a response (see **Appendix A**), we noticed that most requirements, such as formatting the output and keeping the output, were consistently fulfilled. However, the GPT model occasionally did not adhere to the particular requirement of selecting one keyword that is semantically related to two other keywords based on the original quote. Mostly, the model selected keywords according to the instruction, but, in some cases, it selected all three keywords that were present in the original quote. While engaging with the GPT model to delve into this issue, the GPT model even claimed to have revised the keywords (see **Appendix E**), when it only switched the order of the second and third keywords being presented. We revised our prompt through a series of iterations, but this issue continued to occur on an irregular basis. This was a challenging issue especially from the perspective of an end-user prompt engineer [65] who does not comprehend the inner workings of the GAI model and is thus unsure of whether this issue could be fixed or how to fix it. Since the GPT model generates text probabilistically, there was little guarantee that further efforts on changing the wording would result in an error-proof prompt.

Similar to recent findings in the "Herding AI Cats" study [64], we realized that this remaining uncertainty is an inherent quality of working with a LLM as a design material; it was difficult to pigeonhole these occasional quirks as a "problem" per se. This moved us to make a compromise in the design process. Even though a minor requirement on how to select the three keywords (i.e., two from the quote and one that is semantically related to the other two) was occasionally not adhered to, this did not impact FA's ability to reflect on the keywords since the requirements necessary for enabling long-term interactions (e.g., identifying key themes of highlights, formatting output, limiting the size of output) were consistently met. Through this process, we developed an understanding on how to approach a relationship with GAI as an end-user prompt engineer. It required a back-and-forth dialogue of testing, and making compromises, to move beyond our misguided expectations on its capabilities, to reveal how it can be effectively utilized.

### 3.2 Emergent Categorization of the GAI System Output: Heightened Sensitivity & Shifted Behaviors

After exploring various output forms, we decided to have our AI system synthesize a user's past highlight and their reflection on three keywords related to the highlight (**Appendix C.1-2**). In envisioning this alternative way of experiencing one's e-book metadata archive, we hoped that our GAI system would produce plausible connections between a user's past digital trace and their current reflection related to the trace. We initially anticipated that the GPT model would produce a synthesized quote that has an equal level of representation from a user's highlight and their response. Though our GAI system often matched our expectation, we also encountered syntheses that were ambiguous in their meaning or had the highlight or the response "overpowering" the other, meaning that one of the inputs were reflected more strongly in the output. The following is FA's reflection on viewing ambiguous output (shown in **Appendix D.1**) which was neither synthesized cohesively nor had the highlight or the response overpowering the other.

> "At first, I thought this was a bad synthesis since it's clear to see where the original quote ends and my response starts. But then, I noticed the GPT model added double quotation marks when it talks about the content in the original quote. I read it again, and it felt like the sentence between the double quotations was the character's inner thought or a quote the character remembers and uses it to describe the context. And it primed the experience of reading my response that came afterwards. This took a bit more reading than usual, but the clear demarcation of content made me think about the narrative structure of the synthesis a bit more, which was fascinating."

It is worth pointing out that we did not plan to produce this type of output nor have a complete control over the system due to the non-deterministic nature of GAI. However, as the quote above shows, the ambiguity of the output prompted FA to read the text from a new perspective and thus helped FA to reconnect with the digital traces in a different way. Through a series of interactions and reflections, we also began to notice a pattern in the output that FA's response tends to overpower the original quote in the synthesis in cases where FA leaves a particularly longer response (more than the system-recommended 2-3 sentences) with a copious amount of descriptive details. The following quote shows FA's intention behind writing the response in relation to the keywords displayed and the tactic FA employs, which resulted in an output that FA wanted (see **Appendix D.2** for more details).

> "From the keywords, I could tell that this quote was from a philosophical text. Knowing this, I wanted to convert this new synthesis into a fictional narrative that reflects the philosophical idea. And I added fictional details, such as the context about the narrator's personality trait, the name of another fictional character, and their fake scenario."

In short, FA's first-hand experiences of co-creating text with GAI allowed FA to develop tactics for overpowering the original quote through a response. Despite how FA was the person who engineered the prompt, FA was unaware of these possible variations of syntheses in the beginning. However, by consistently interacting with the GAI system over time, FA became more sensitive to the intertwined relationship between the input and the output. Discovering these categories of output ultimately led to improvement in FA's ability to appropriate the system according to FA's intentions.

### 3.3 Strategies of Appropriating E-Book Metadata: Human-AI Co-Creation

By only showing three keywords generated from a user's randomly selected highlight, we remove the context of highlights for users, which renders e-book metadata ambiguous even to its original owner (creator) when they interact with our GAI system. In various HCI studies, the design quality of ambiguity has been leveraged to open up possibilities for various interpretations and open-ended experiences with personal data [5, 24, 29]. By asking users to reflect and write a short text response in relation to the keywords over a week, we aimed to encourage them to reconnect with their e-book highlight while offering an opportunity to provide direct input into the system. After a series of reflections on interacting with Quologue, we discovered that this human-AI co-creation could alter FA's own e-book metadata in ways that ranged from a more deliberate effort to a less intentional influence. The following example shows FA's motive behind crafting an input that could potentially produce an output FA anticipated. After reflecting on the keywords generated based on a highlight from *Bonjour Tristesse* [52], as shown in **Appendix D.3**, FA decides to portray FA's personal memory with the goal of drawing the same kind of melancholic mood present in the original novel.

> "[T]his specific keyword "tristesse" made me realize exactly what this quote is and which book it's from. I remember highlighting the last sentence of *Bonjour Tristesse*, which had this specific word that was not translated into English. Looking at these keywords made me think of the unique mood of this novel, which comes from a sensitive and turbulent teenage girl having a summer vacation in the south of France. I wanted to draw the same kind of melancholic mood from my own experience of traveling alone in Switzerland, hoping the GPT model would create a coherent narrative around this mood. I was satisfied to see my memory was stitched well together with the mood of the story."

In some instances, a less intentional input from FA into the system still resulted in a valuable output that prompted FA's reflection on e-book highlights. For instance, in the following quote, FA recalls the experience of associating certain keywords with his recent experience and accidentally producing an output that combined both fictional and real-life elements (**Appendix D.4**).

> "There were times when I was working in the lab alone mostly, and when I saw these keywords, my mind was picturing that familiar scene and ambiance. [. . .] The original quote highlighted the loneliness that Olive, an old woman who lost her two husbands, felt with "the silence of [the] sunshine," while my response

> takes on more of an optimistic view on the ambiance coming from silence and ghostliness. It is interesting how the elements from the fiction (the main character "Olive" from "Olive Kitteridge") and my actual life ("lab") merged together [in the synthesis], and [the synthesis] depicts the scene in a way that is closer to how I would usually perceive "ghostly silence," which is quite different from how this novel does."

FA appreciated how Quologue's synthesis drew the elements such as the character "Olive" and the sunshine on Olive's bare wrist from the highlight and the elements from FA's response, e.g., the imagery of a silent research lab where FA works. It is also worth noting that while there was no intention to produce a specific output when FA wrote the response, viewing the juxtaposition of the highlight and the synthesis made FA aware of FA's own perception of "ghostly silence" in comparison to that in the novel. In this case, engaging with the past e-book highlight in an unexpected way encouraged FA's self-reflection. Having direct input from the user while not revealing the entire highlight appeared to have opened up various opportunities to change and distort their digital records. FA's response to keywords often provided interesting imageries and allegories (**Appendix D.5**) that was still coherent with the original theme. While archives of e-book highlights have conventionally acted as reliable records of users' digital annotations, our RtD process of exploring the alternative way of encountering with e-book metadata uncovered a variety of potential avenues for metadata owners to appropriate, distort, and evolve their own metadata archive.

# 4 DISCUSSION

## 4.1 Defamiliarizing Metadata Archives

In our study, making the e-book metadata more easily malleable for its de facto owner was critical for us to probe further into e-book readers' possible interaction behaviors with their metadata. Initially, FA's e-book metadata archive on Millie did not support any features that allowed users to easily manipulate their data outside their service, which led us to transform the entire data into a more manageable one. We found a value in our effort to repurpose this data collected through proprietary infrastructure, which initially "appear[ed] to be uncontestable, or natural parts of the world," as Gatehouse & Catting [22] describe. Prior research [33, 56] has highlighted the act of appropriating existing objects or technologies for goals which are possibly not intended or foreseen by the ones who designed or made them. By making the e-book metadata malleable and incorporating it with GAI, we were able to discover potential techniques to appropriate and evolve our own metadata. We demonstrate an approach to move beyond conceptualizing an e-book metadata archive as a collection of static records toward mobilizing it as a resource for a person to engage in an ongoing dialogue with their past. Prior work in HCI has emphasized designing ways to exercise user control and awareness of the digital traces that grow larger over time [47, 58]. Similarly, ludic interactions have been suggested as an alternative way of reclaiming one's own home data which can be otherwise hard to grasp and manipulate by home dwellers [15]. Our work extends these efforts in HCI through creating necessary infrastructure for relocating one's metadata within a proprietary system and leveraging it further for creative expression in relation to GAI. While our model GPT-3.5 does not use input data to train AI models [49], it is important to note the privacy concerns associated with general LLMs [28, 31, 63] in cases where they use personal metadata for training purposes.

Our findings open opportunities for future research. When people discover new affordances of e-book metadata when it is integrated with GAI, how might this affect people's valuation of their e-books? Denegri-Knott et al. [13] introduce an "affordance-orientated" approach which posits that people's perceived affordances of digital possessions affect their valuation of their digital possessions. Based on this approach, there is a potential to examine whether these newly discovered affordances of e-book metadata, integrated with a GAI system, could have an impact on people's value attribution towards their e-books. This issue is particularly relevant for e-books since they lack the visibility in people's daily lives that physical books have, which leads to people having a reduced sense of ownership and personal value attribution towards e-books [25].

## 4.2 Dynamic Relationship with Generative AI as a Design Material

During the design process of Quologue, we faced challenges in producing output that matched our preconceived expectations due to the inherent uncertainty of GAI. In our research, the relationship between us as designer-researchers and the uncertainty of GAI was found to be more nuanced and dynamic than we initially expected. As design researchers have reported on their need to make negotiations to resolve frictions that happen in a real-world context [9, 21, 66], we also made negotiations with the inherent challenge that arose from working with GAI as a design material. Though the unpredictability of GAI occasionally led to output that did not fulfill all of the requirements, this unpredictability was nonetheless critical in shaping various aspects in our process, ranging from defining the final form of the output to introducing creative ways of engaging with the e-book highlights.

As interactions with Quologue accumulated and unfolded, we discovered various creative ways to engage with e-book highlights that spanned from appropriating elements from the original text to delineate a personal memory to engaging in imaginative meaning-making interpretations with ambiguous output. Our approach of encouraging hands-on interaction with AI resonates with Brand et al.'s claim [7] that people value having more agency in training their AI through generating and providing new inputs through their daily practices (reading in this case). FA's first-hand experiences of co-creating text with GAI gradually sensitized FA to the relationship between the input and the output, which then helped FA develop tactics to appropriate the algorithm. This validates and extends Benjamin et al.'s work [2] that highlights the potential of discovering patterns from interacting with AI over a series of interactions. As our work shows, RtD approach can be valuable in discovering the design opportunities of AI especially since there are still many unknown dimensions in what AI is capable of. Benjamin et al. [3] note that, as opposed to relying either on a priori or post-hoc concepts in a study, "RtD researchers can instead zero in on the continuous interplay of either. This allows researchers

to move from the epistemic trap of what is there to how there is being made—or [. . .] move from what AI technologies are to what they do."

Our work aligns with the critiques against characterizing LLMs as "stochastic parrots" that generate text based on probabilities without meaning. Blackwell [4], for instance, argues that in interpreting the output of an AI system, users themselves can bring in the creativity through active meaning-making process. In our design, we aimed to accentuate users' role of meaning-making of the output. FA could exercise some degree of control to morph a past digital trace by feeding a short text reflection as an input into the GAI system. When Quologue sometimes returned an ambiguous output (3.2) that did not completely fulfill our prompt, FA could use his past reading experience to frame the output in a meaningful way.

We conclude by briefly discussing design implications for researchers and design practitioners who might use GAI as a lens to experience one's metadata. Abstracting one's digital trace without revealing the entire trace by using GAI can invite people to actively contextualize the output based on their current mood, personal experiences, or memories. By doing so, people can then morph their own digital traces over time, creating an archive that evolves with its owner. Additionally, researchers and design practitioners can explore ways for people to have some degree of user control on their GAI system, which does not solely rely on GAI in the generation of output. Having some agency on what gets generated from the system through direct input can become a way for people to reclaim control over their data controlled by proprietary technologies.

## 5 CONCLUSION

Through our study, we contribute to a nascent design space of using personal metadata archives for creative self-expression. Our research artifact Quologue showcases how generative AI can be serve as a tool for reconnecting with one's digital traces on e-books through an ongoing dialogue. Through our RtD process, we revealed the dynamic interplay between the designer-researcher and the uncertainty of generative AI, which was critical in shaping our generative AI system. The act of appropriating personal data collected and controlled through proprietary technologies allowed us to explore how e-book metadata can be used as a resource for the data owner's creative expression. We hope this study inspires future work to imagine more experimental ways of encountering and creating with one's own data.

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## REFERENCES

[1] Katie Allen. 2009. Amazon e-book sales overtake print for first time. *The Guardian* 28, (2009).

[2] Jesse Josua Benjamin, Arne Berger, Nick Merrill, and James Pierce. 2021. Machine Learning Uncertainty as a Design Material: A Post-Phenomenological Inquiry. May 06, 2021. ACM, Yokohama Japan, 1–14. https://doi.org/10.1145/3411764.3445481

[3] Jesse Josua Benjamin, Heidi Biggs, Arne Berger, Julija Rukanskaitė, Michael B Heidt, Nick Merrill, James Pierce, and Joseph Lindley. 2023. The Entoptic Field Camera as Metaphor-Driven Research-through-Design with AI Technologies. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, 2023. 1–19.

[4] Alan F Blackwell. 2022. Coding or AI? Tools for Control, Surprise and Creativity. In *PPIG*, 2022. 57–66.

[5] Ahmet Börütecene and Oğuz 'Oz' Buruk. 2019. Otherworld: Ouija Board as a Resource for Design. In *Proceedings of the Halfway to the Future Symposium 2019*, 2019. 1–4.

[6] Nico Brand, William Odom, and Samuel Barnett. 2021. A Design Inquiry into Introspective AI: Surfacing Opportunities, Issues, and Paradoxes. In *Designing Interactive Systems Conference 2021*, 2021. 1603–1618.

[7] Nico Brand, William Odom, and Samuel Barnett. 2023. Envisioning and Understanding Orientations to Introspective AI: Exploring a Design Space with Meta.Aware. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, April 19, 2023. ACM, Hamburg Germany, 1–18. https://doi.org/10.1145/3544548.3581336

[8] Amy Yo Sue Chen and William Odom. 2021. Crafting temporality in design: Introducing a designer-researcher approach through the creation of Chronoscope. In *The Routledge International Handbook of Practice-Based Research*. Routledge, 368–380.

[9] Amy Yo Sue Chen and William Odom. 2021. Crafting temporality in design: Introducing a designer-researcher approach through the creation of Chronoscope. In *The Routledge International Handbook of Practice-Based Research*. Routledge, 368–380.

[10] Amy Yo Sue Chen, William Odom, Sol Kang, and Carman Neustaedter. 2023. PhotoClock: Reliving Memories in Digital Photos as the Clock Ticks in the Present Moment. (2023).

[11] Amy Yo Sue Chen, William Odom, Ce Zhong, Henry Lin, and Tal Amram. 2019. Chronoscope: designing temporally diverse interactions with personal digital photo collections. In *Proceedings of the 2019 on Designing Interactive Systems Conference*, 2019. 799–812.

[12] Tiffany Chen, Cassandra Lee, Jessica R Mindel, Neska Elhaouij, and Rosalind Picard. 2023. Closer Worlds: Using Generative AI to Facilitate Intimate Conversations. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*, April 19, 2023. ACM, Hamburg Germany, 1–15. https://doi.org/10.1145/3544549.3585651

[13] Janice Denegri-Knott, Rebecca Jenkins, and Siân Lindley. 2022. Valuing digital possessions: the role of affordances. *J. Comput.-Mediat. Commun.* 27, 6 (September 2022), zmac019. https://doi.org/10.1093/jcmc/zmac019

[14] Audrey Desjardins and Aubree Ball. 2018. Revealing Tensions in Autobiographical Design in HCI. In *Proceedings of the 2018 Designing Interactive Systems Conference* (*DIS '18*), 2018. ACM, 753–764. https://doi.org/10.1145/3196709.3196781

[15] Audrey Desjardins, Heidi R Biggs, Cayla Key, and Jeremy E Viny. 2020. IoT data in the home: Observing entanglements and drawing new encounters. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 2020. 1–13.

[16] Audrey Desjardins and Cayla Key. 2020. Parallels, Tangents, and Loops: Reflections on the "Through" Part of RtD. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*. Association for Computing Machinery, New York, NY, USA, 2133–2147. Retrieved July 20, 2021 from http://doi.org/10.1145/3357236.3395586

[17] Audrey Desjardins, Jena McWhirter, Justin Petelka, Chandler Simon, Yuna Shin, Ruby K Peven, and Philbert Widjaja. 2023. On the Making of Alternative Data Encounters: The Odd Interpreters. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (*CHI '23*), April 19, 2023. Association for Computing Machinery, New York, NY, USA, 1–20. https://doi.org/10.1145/3544548.3581323

[18] Audrey Desjardins and Timea Tihanyi. 2019. ListeningCups: A Case of Data Tactility and Data Stories. In *Proceedings of the 2019 on Designing Interactive Systems Conference* (*DIS '19*), June 18, 2019. Association for Computing Machinery, New York, NY, USA, 147–160. https://doi.org/10.1145/3322276.3323694

[19] Daniel Fallman. 2003. Design-oriented Human-computer Interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (*CHI '03*), 2003. ACM, New York, NY, USA, 225–232. https://doi.org/10.1145/642611.642652

[20] Christopher Frayling. 1993. *Research in art and design*. Royal College of Art London. Retrieved October 21, 2014 from http://www.opengrey.eu/item/display/10068/492065

[21] Mikhaila Friske, Jordan Wirfs-Brock, and Laura Devendorf. 2020. Entangling the Roles of Maker and Interpreter in Interpersonal Data Narratives: Explorations in Yarn and Sound. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, July 03, 2020. ACM, Eindhoven Netherlands, 297–310. https://doi.org/10.1145/3357236.3395442

[22] Cally Gatehouse and David Chatting. 2020. Inarticulate Devices: Critical Encounters with Network Technologies in Research Through Design. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, July 03, 2020. ACM, Eindhoven Netherlands, 2119–2131. https://doi.org/10.1145/3357236.3395426

[23] William Gaver. 2012. What Should We Expect from Research Through Design? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (*CHI '12*), 2012. ACM, New York, NY, USA, 937–946. https://doi.org/10.1145/2207676.2208538

[24] William W. Gaver, Jacob Beaver, and Steve Benford. 2003. Ambiguity as a resource for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, April 05, 2003. ACM, Ft. Lauderdale Florida USA, 233–240. https://doi.org/10.1145/642611.642653

[25] Jane Gruning. 2018. Displaying Invisible Objects: Why People Rarely Re-read E-books. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, April 19, 2018. ACM, Montreal QC Canada, 1–12. https://doi.org/10.1145/3173574.3173713

[26] Rebecca Gulotta, Alex Sciuto, Aisling Kelliher, and Jodi Forlizzi. 2015. Curatorial agents: How systems shape our understanding of personal and familial digital information. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 2015. 3453–3462.

[27] Lars Hallnäs and Johan Redström. 2001. Slow technology–designing for reflection. *Pers. Ubiquitous Comput.* 5, (2001), 201–212.

[28] Hanyao Huang, Ou Zheng, Dongdong Wang, Jiayi Yin, Zijin Wang, Shengxuan Ding, Heng Yin, Chuan Xu, Renjie Yang, Qian Zheng, and Bing Shi. 2023. ChatGPT for shaping the future of dentistry: the potential of multi-modal large language model. *Int. J. Oral Sci.* 15, 1 (July 2023), 29. https://doi.org/10.1038/s41368-023-00239-y

[29] Clinton Jorge, Julian Hanna, Valentina Nisi, Nuno Nunes, Miguel Caldeira, and Giovanni Innella. 2013. Fostering ambiguity: decontextualizing and repurposing a familiar public display. In *Proceedings of the Biannual Conference of the Italian Chapter of SIGCHI*, 2013. 1–10.

[30] Katikapalli Subramanyam Kalyan. 2023. A survey of GPT-3 family large language models including ChatGPT and GPT-4. *Nat. Lang. Process. J.* (2023), 100048.

[31] Siwon Kim, Sangdoo Yun, Hwaran Lee, Martin Gubri, Sungroh Yoon, and Seong Joon Oh. 2024. Propile: Probing privacy leakage in large language models. *Adv. Neural Inf. Process. Syst.* 36, (2024).

[32] Subin Kim, Sangsu Jang, Jin-young Moon, Minjoo Han, and Young-Woo Park. 2022. Slide2Remember: an Interactive Wall Frame Enriching Reminiscence Experiences by Providing Re-encounters of Taken Photos and Heard Music in a Similar Period. In *Designing Interactive Systems Conference*, June 13, 2022. ACM, Virtual Event Australia, 288–300. https://doi.org/10.1145/3532106.3533456

[33] Brian Kinnee, Audrey Desjardins, and Daniela Rosner. 2023. Autospeculation: Reflecting on the Intimate and Imaginative Capacities of Data Analysis. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, April 19, 2023. ACM, Hamburg Germany, 1–10. https://doi.org/10.1145/3544548.3580902

[34] Kyung-Ryong Lee, Somi Ju, Temirlan Dzhoroev, Geonil Goh, Moon-Hwan Lee, and Young-Woo Park. 2020. DayClo: an everyday table clock providing interaction with personal schedule data for self-reflection. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, 2020. 1793–1806.

[35] Matthew L Lee-Smith, Jesse Josua Benjamin, Audrey Desjardins, Mathias Funk, William Odom, Doenja Oogjes, Young-Woo Park, James Pierce, Pedro Sanches, and Vasiliki Tsaknaki. 2023. Data as a material for design: alternative narratives, divergent pathways, and future directions. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*, 2023. 1–5.

[36] CATHERINE MARSHALL. 2009. *READING AND WRITING THE ELECTRONIC BOOK*. SPRINGER, S.l.

[37] Catherine C Marshall. 2010. Beyond the Book. In *Reading and Writing the Electronic Book*. Springer, 220–244.

[38] Michael Muller, Lydia B Chilton, Anna Kantosalo, Q Vera Liao, Mary Lou Maher, Charles Patrick Martin, and Greg Walsh. 2023. GenAICHI 2023: Generative AI and HCI at CHI 2023. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*, 2023. 1–7.

[39] Carman Neustaedter and Phoebe Sengers. 2012. Autobiographical design in HCI research: designing and learning through use-it-yourself. In *Proceedings of the Designing Interactive Systems Conference*, 2012. ACM, 514–523. Retrieved from http://dl.acm.org/citation.cfm?id$=$2318034

[40] Carman Neustaedter and Phoebe Sengers. 2012. Autobiographical design in HCI research: designing and learning through use-it-yourself. In *Proceedings of the Designing Interactive Systems Conference*, June 11, 2012. ACM, Newcastle Upon Tyne United Kingdom, 514–523. https://doi.org/10.1145/2317956.2318034

[41] William Odom and Tijs Duel. 2018. On the Design of OLO Radio: Investigating Metadata as a Design Material. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, April 19, 2018. ACM, Montreal QC Canada, 1–9. https://doi.org/10.1145/3173574.3173678

[42] William Odom, Erik Stolterman, and Amy Yo Sue Chen. 2022. Extending a Theory of Slow Technology for Design through Artifact Analysis. *Human–Computer Interact.* 37, 2 (March 2022), 150–179. https://doi.org/10.1080/07370024.2021.1913416

[43] William T. Odom, Abigail J. Sellen, Richard Banks, David S. Kirk, Tim Regan, Mark Selby, Jodi L. Forlizzi, and John Zimmerman. 2014. Designing for slowness, anticipation and re-visitation: a long term field study of the photobox. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, April 26, 2014. ACM, Toronto Ontario Canada, 1961–1970. https://doi.org/10.1145/2556288.2557178

[44] William Odom, Ron Wakkary, Ishac Bertran, Matthew Harkness, Garnet Hertz, Jeroen Hol, Henry Lin, Bram Naus, Perry Tan, and Pepijn Verburg. 2018. Attending to Slowness and Temporality with Olly and Slow Game: A Design Inquiry Into Supporting Longer-Term Relations with Everyday Computational Objects. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (*CHI '18*), 2018. ACM, New York, NY, USA, 77:1-77:13. https://doi.org/10.1145/3173574.3173651

[45] William Odom, Ron Wakkary, Jeroen Hol, Bram Naus, Pepijn Verburg, Tal Amram, and Amy Yo Sue Chen. 2019. Investigating slowness as a frame to design longer-term experiences with personal data: A field study of olly. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 2019. 1–16.

[46] William Odom, MinYoung Yoo, Henry Lin, Tijs Duel, Tal Amram, and Amy Yo Sue Chen. 2020. Exploring the Reflective Potentialities of Personal Data with Different Temporal Modalities: A Field Study of Olo Radio. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, July 03, 2020. ACM, Eindhoven Netherlands, 283–295. https://doi.org/10.1145/3357236.3395438

[47] William Odom, John Zimmerman, and Jodi Forlizzi. 2014. Placelessness, spacelessness, and formlessness: experiential qualities of virtual possessions. In *Proceedings of the 2014 conference on Designing interactive systems*, June 21, 2014. ACM, Vancouver BC Canada, 985–994. https://doi.org/10.1145/2598510.2598577

[48] Doenja Oogjes and Ron Wakkary. 2022. Weaving Stories: Toward Repertoires for Designing Things. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22)*, 2022. Association for Computing Machinery, New York, NY, USA.

[49] OpenAI. Enterprise privacy at OpenAI. Retrieved March 13, 2024 from https://openai.com/enterprise-privacy

[50] Sundar Pichai. 2023. An important next step on our AI journey. *Google*. Retrieved January 15, 2024 from https://blog.google/technology/ai/bard-google-ai-search-updates/

[51] Melanie Ramdarshan Bold and Kiri L. Wagstaff. 2017. Marginalia in the digital age: Are digital reading devices meeting the needs of today's readers? *Libr. Inf. Sci. Res.* 39, 1 (January 2017), 16–22. https://doi.org/10.1016/j.lisr.2017.01.004

[52] Françoise Sagan. 2015. *Bonjour tristesse*. JM Meulenhoff.

[53] Hanee Shin. 2022. Bookclub Millie files application to be listed on Kosdaq. Retrieved from https://koreajoongangdaily.joins.com/2022/05/30/business/industry/Korea-KT-Bookclub-Millie/20220530163936677.html

[54] Erik Stolterman and Mikael Wiberg. 2010. Concept-driven interaction design research. *Human–Computer Interact.* 25, 2 (2010), 95–118.

[55] Minhyang (Mia) Suh, Emily Youngblom, Michael Terry, and Carrie J Cai. 2021. AI as Social Glue: Uncovering the Roles of Deep Generative AI during Social Music Composition. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, May 06, 2021. ACM, Yokohama Japan, 1–11. https://doi.org/10.1145/3411764.3445219

[56] Jane Fulton Suri. 2005. *Thoughtless acts?: Observations on intuitive design*. Chronicle Books.

[57] Wenn-Chieh Tsai, Po-Hao Wang, Hung-Chi Lee, Rung-Huei Liang, and Jane Hsu. 2014. The reflexive printer: toward making sense of perceived drawbacks in technology-mediated reminiscence. In *Proceedings of the 2014 conference on Designing interactive systems*, June 21, 2014. ACM, Vancouver BC Canada, 995–1004. https://doi.org/10.1145/2598510.2598589

[58] Francesco Vitale, William Odom, and Joanna McGrenere. 2019. Keeping and discarding personal data: Exploring a design space. In *Proceedings of the 2019 on designing interactive systems conference*, 2019. 1463–1477.

[59] Ron Wakkary, Henry Lin, Shannon Mortimer, Lauren Low, Audrey Desjardins, Keith Doyle, and Philip Robbins. 2016. Productive Frictions: Moving from Digital to Material Prototyping and Low-Volume Production for Design Research. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*, 2016. ACM, 1258–1269. Retrieved from http://dl.acm.org/citation.cfm?id$=$2901880

[60] Jordan White, William Odom, Nico Brand, and Ce Zhong. 2023. Memory Tracer & Memory Compass: Investigating Personal Location Histories as a Design Material for Everyday Reminiscence. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, April 19, 2023. ACM, Hamburg Germany, 1–19. https://doi.org/10.1145/3544548.3581426

[61] Jordan White, William Odom, Nico Brand, and Ce Zhong. 2023. Memory Tracer & Memory Compass: Investigating Personal Location Histories as a Design Material for Everyday Reminiscence. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (*CHI '23*), April 19, 2023. Association for Computing Machinery, New York, NY, USA, 1–19. https://doi.org/10.1145/3544548.3581426

[63] Yifan Yao, Jinhao Duan, Kaidi Xu, Yuanfang Cai, Zhibo Sun, and Yue Zhang. 2024. A survey on Large Language Model (LLM) security and privacy: The Good, The Bad, and The Ugly. *High-Confid. Comput.* (March 2024), 100211. https://doi.org/10.1016/j.hcc.2024.100211

[64] J.D. Zamfirescu-Pereira, Heather Wei, Amy Xiao, Kitty Gu, Grace Jung, Matthew G Lee, Bjoern Hartmann, and Qian Yang. 2023. Herding AI Cats: Lessons from Designing a Chatbot by Prompting GPT-3. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference*, July 10, 2023. ACM, Pittsburgh PA USA, 2206–2220. https://doi.org/10.1145/3563657.3596138

[65] J.D. Zamfirescu-Pereira, Richmond Y. Wong, Bjoern Hartmann, and Qian Yang. 2023. Why Johnny Can't Prompt: How Non-AI Experts Try (and Fail) to Design LLM Prompts. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, April 19, 2023. ACM, Hamburg Germany, 1–21. https://doi.org/10.1145/3544548.3581388

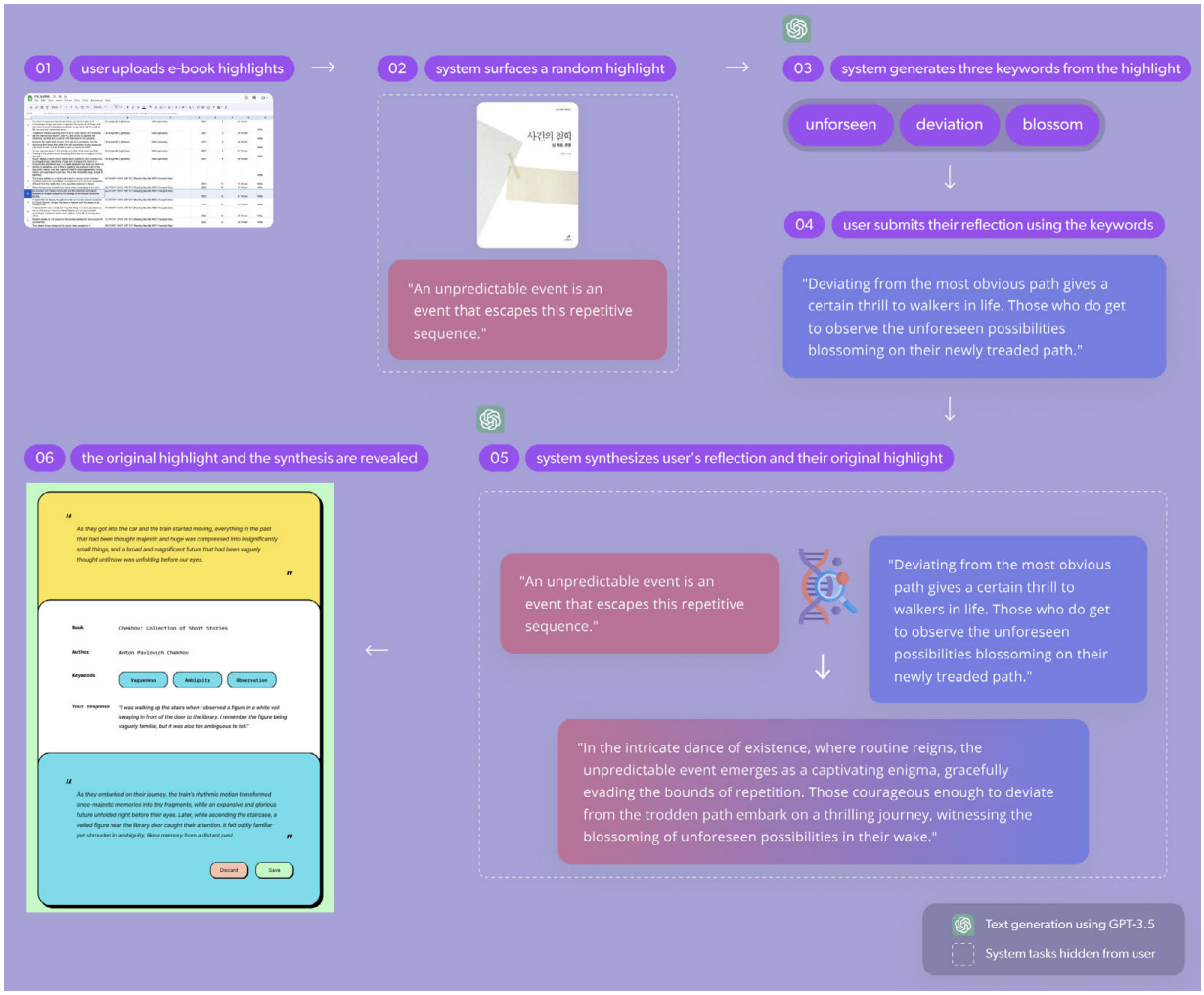
[66] Ce Zhong, Ron Wakkary, William Odom, Amy Yo Sue Chen, MinYoung Yoo, and Doenja Oogjes. 2022. On the Design of deformTable: Attending to Temporality and Materiality for Supporting Everyday Interactions with a Shape-Changing Artifact. In *Designing Interactive Systems Conference*, June 13, 2022. ACM, Virtual Event Australia, 1555–1564. https://doi.org/10.1145/3532106.3533501

[67] John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI conference on Human factors in computing systems*, 2007. ACM, 493–502. Retrieved from http://dl.acm.org/citation.cfm?id$=$1240704

[68] GPT models. Retrieved from https://platform.openai.com/docs/guides/gpt

[69] MPT-7B. Retrieved from https://huggingface.co/mosaicml/mpt-7b

# A THE SYSTEM FLOW OF QUOLOGUE



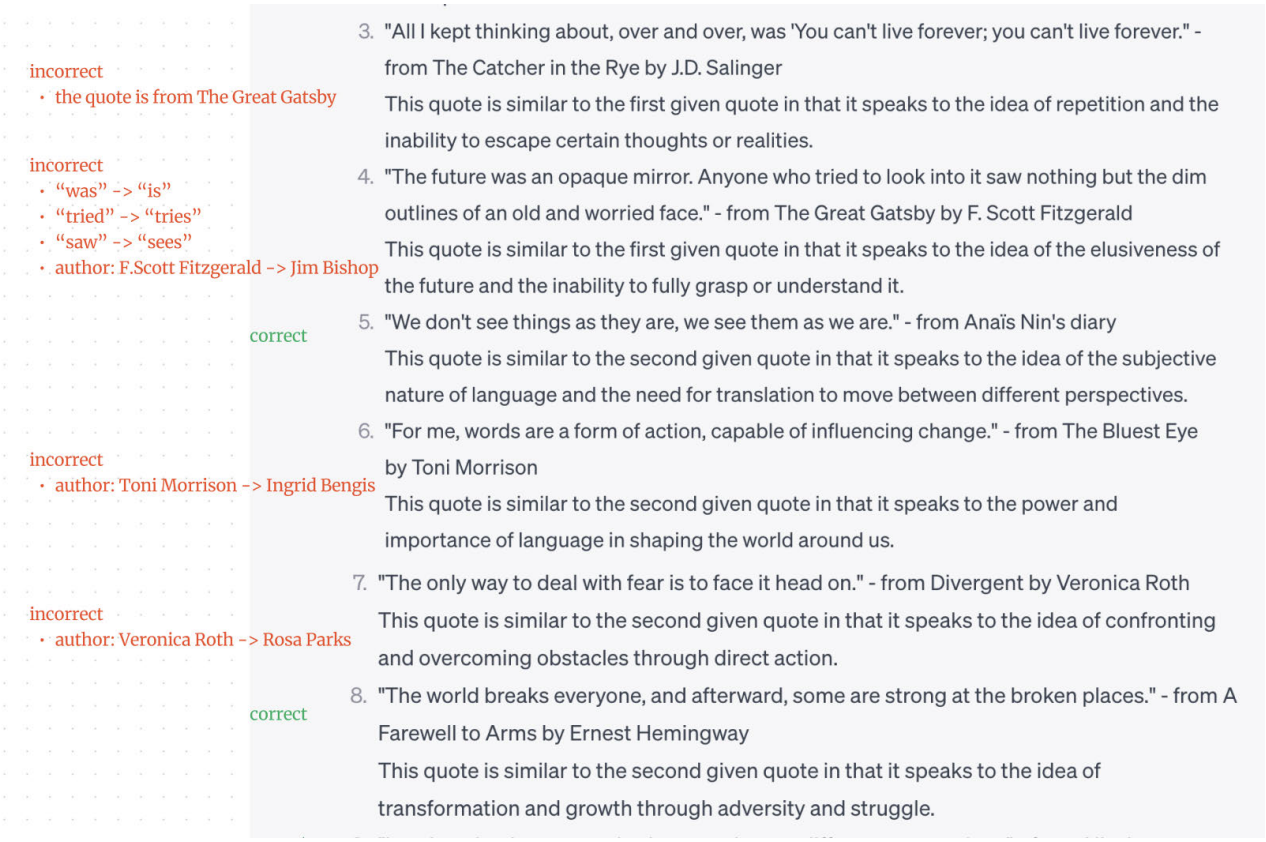

On Quologue, users are first asked to upload a csv or an excel file of their collection of e-book highlights. Each data point must include a highlighted quote, a book title, an author's name, and a date of the highlight. Since our system is compatible with Kindle, Kindle users can simply download their "My Clippings.txt" file, which contains their entire e-book highlights, and upload this on Quologue. This will be followed by parsing the file in an expected format for system processing.

On every Monday, our system connects to the GPT-3.5 API via a prompt that packages a randomly selected highlight, output formatting requirements for streamlined parsing, and guidelines for choosing effective keywords. Users can only view the keywords (without the highlighted quote) and craft their short text response (2-3 sentences) using the keywords over the course of a week (**Appendix C.1**). If the user does not submit their response by the end of the week, new keywords will replace the old ones. When a user submits their response, our system sends the GPT model another prompt with an original highlight, a user's response, and instructions for synthesizing the two quotes.

After the synthesis is complete, a user's original highlight and our synthesis are revealed for the first time (**Appendix C.2**). This information is accompanied by the metadata of the original highlight (the book title, the author's name, and the date of the highlight) and the metadata added from their interaction with Quologue (the three generated keywords and their response). Users have an option to either save or discard this synthesis. If they choose to save the synthesis, this can be randomly re-surfaced for keyword generation in future interactions. After this final step for the week, users can wait until new keywords appear on Monday.

To implement this, we built a Next.js application hosted on Vercel (https://vercel.com/), a platform that facilitates deployment of web applications. We used NextAuth.js to authenticate users, and our user data are stored on Amazon Simple Storage Service (Amazon S3).

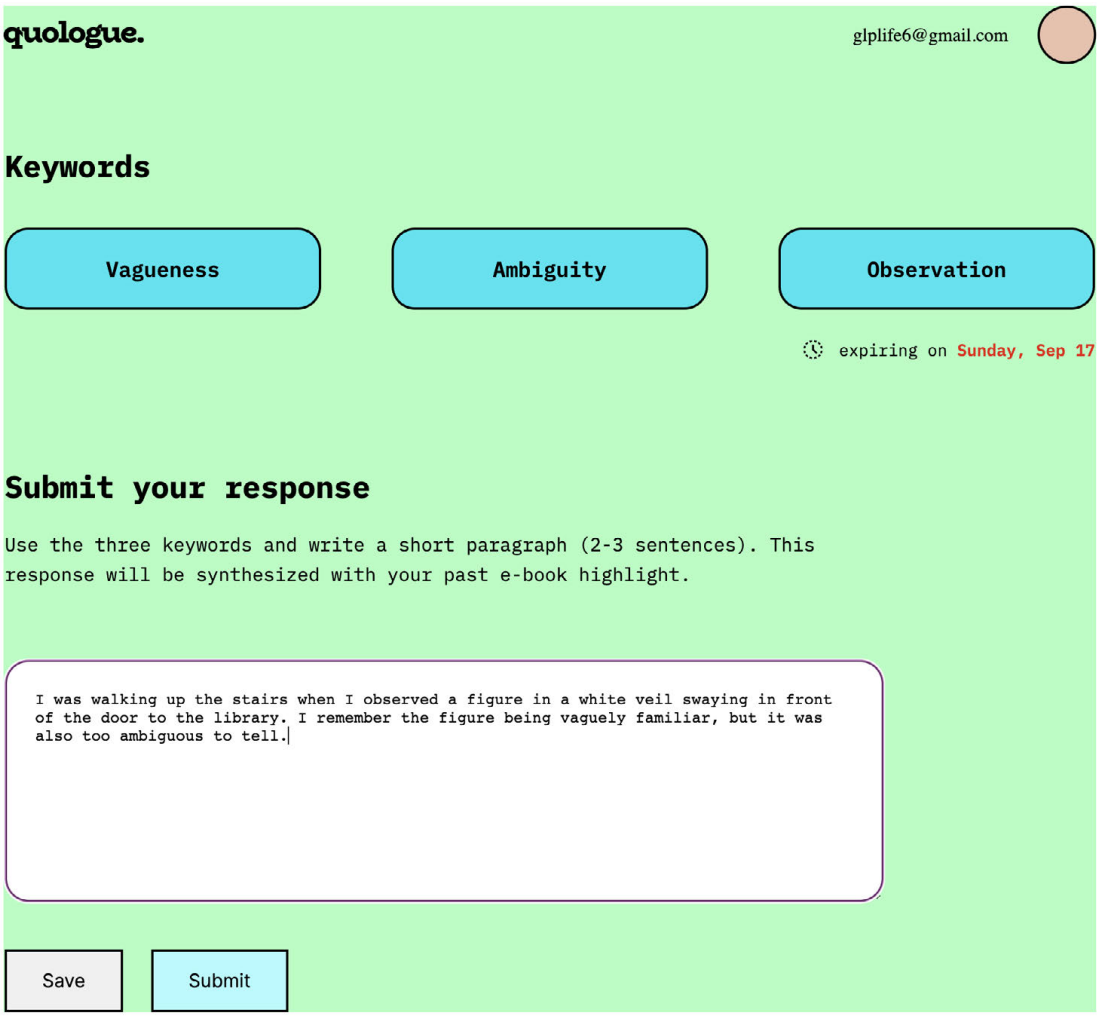
## B QUOTE RECOMMENDATIONS FROM THE GPT 3.5 MODEL



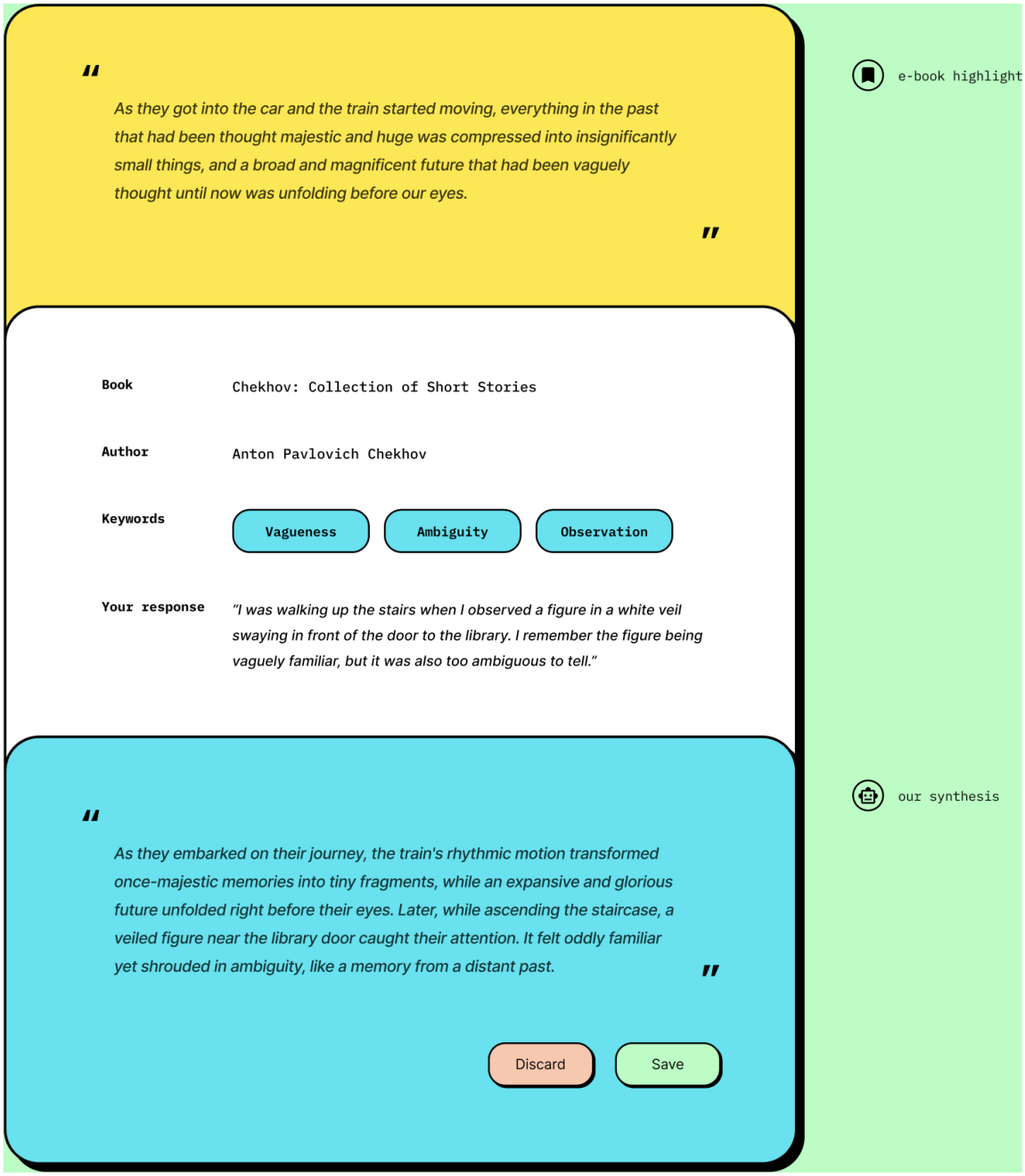

This is a screenshot from an interaction with the GPT-3.5 model. We discovered a mix of true and false information when we prompted the model to recommend ten quotes that are relevant to one of FA's e-book highlights. Some quotes in the list were correct, but they were matched with a wrong title of the book or a name of the author. In some cases, several words of the original quote were modified.

# C SCREEN CAPTURES FROM QUOLOGUE

## C.1 Keywords Displayed on Quologue



## C.2 A Quologue User's View After Submitting Their Response




## D FA'S DIARY ENTRIES OF INTERACTING WITH QUOLOGUE

After interacting with Quologue every week, FA kept a record of three keywords, FA's response to the keywords, the original quote where the three keywords are derived from, and the GPT-synthesized quote. Each of the entries is accompanied with FA's personal reflection on the output, which focused on FA's motive behind writing a certain response or any emotional reaction from interacting with Quologue. FA's personal reflections are not included here in the appendix for brevity, but some of FA's personal reflections are shown as quotes in the discussion.

## D.1 FA's diary entry on August 10, 2023

**Three Keywords**
solitude; contemplation; pain

**My response to the keywords**
Sensing another wave of pain flooding in, I return to solitude. Lights turned off and curtains opened, the lights from the apartment across from mine were glowing so warmly. I blast Tchaikovsky's Symphony No. 6 on my Klipsch speaker and start contemplating in peace.

**Original quote**
A man of this spirit can enjoy reading or contemplation even in the most solitude.

**Synthesized quote**
"Embracing the spirit of solitude, a man finds solace in reading or contemplation, even in the most isolated moments." Sensing the oncoming tide of emotion, I retreat into my own solitude. With curtains drawn and the apartment aglow from the neighboring windows, the warm ambiance envelops me. The serene notes of Tchaikovsky's Symphony No. 6 fill the air, guiding my contemplation into a tranquil haven.

## D.2 FA's diary entry on August 8, 2023

**Three Keywords**
Potentiality; Dimension; Reality

**My response to the keywords**
You know that I usually go with the flow. And I try to keep the peace when I sense a conflict coming up with people. Talking back to Ben, I felt that, at any moment, a potentiality could become a reality. It was like having another dimension opening up in front of me.

**Original quote**
Events exist in the dimension of potentiality.

**Synthesized quote**
I normally avoid confrontation and maintain harmony, but when I spoke up to Ben, I sensed a shift from potentiality to reality. It felt as if a whole new dimension had materialized before me, blurring the lines between what could be and what was.

FA's guess that the original quote was from a philosophical text was correct, and the output ("Synthesized quote") from the system matched the expectation FA had when FA was writing his response, which was to turn the academic, philosophic text into more of a fictional account.

## D.3 FA's diary entry on August 7, 2023

**Three Keywords**
Welcoming; Tristesse; Breakfast

**My response to the keywords**
On that glorious summer day after a quick shower, Spiez was glistening in moisture--so tranquil and welcoming. I stared outside the window thinking of how this solo trip has been for me. The sound of wet moss accompanied the people hurrying to go for a swim. With one hand, I adjusted the breakfast plate and picked up Françoise Sagan's "Bonjour Tristesse".

**Original quote**
Then something rises in me that I welcome by name, with closed eyes: Bonjour tristesse!

**Synthesized quote**
"On that glorious day, Spiez glistened tranquilly in the aftermath of a quick shower, enticing me to gaze out the window. Amidst the sound of wet moss and the people bustling towards the water, I adjusted my breakfast plate and reached for Françoise Sagan's 'Bonjour Tristesse,' a familiar welcome that stirred emotions within me."

Being prompted to reflect on the abstracted pieces of their e-book highlight reminded FA of the time FA experienced the unique mood of the novel. This inspired FA to intentionally try intermixing a personal memory with the unique mood of the novel in their written response.

## D.4 FA's diary entry on July 18, 2023

**Three Keywords**
silence; ghostliness; sunshine

**My response to the keywords**
I love the silence that sets in when nobody is in the lab. Some might call it an eerie ghostliness, but with the right amount of sunshine, it can give you the best feeling.

**Original quote**
The silence of this sunshine, of this world, seemed to fold over Olive with a shiver of ghostliness, as she stood feeling the sun on her bare wrist.

**Synthesized quote**
The silence that enveloped Olive, as the sunshine bathed her bare wrist, carried a haunting ghostliness, reminiscent of the eerie calm in the lab when devoid of people. Despite its spectral nature, the abundant sunshine exuded a comforting warmth, offering a unique sense of tranquility.

## D.5 FA's diary entry on July 19, 2023

**Three Keywords**
Self-discovery; Identity; Water

**My response to the keywords**
When we talked about younger people now who are so obsessed with their identity, I had the image of Narcissus who was so captivated by the image of himself reflected on water that he drowned himself. Before he drowned, do you think he discovered himself in the image of himself floating on water?

**Original quote**
As we go through life we gradually discover who we are, but the more we discover, the more we lose ourselves.

**Synthesized quote**
As we journey through life, gradually unraveling our true selves, we may inadvertently succumb to the allure of self-obsession. Like Narcissus, captivated by his reflection in the water, we risk losing ourselves amidst the depths of our own identity. Yet, before his ill-fated demise, did Narcissus truly discover his essence within the fleeting image upon the water's surface?

The keyword "water" was, in fact, randomly generated based on the requirements in the prompt and was not related to the original quote (see 3.1 for more details on these requirements). When FA encountered the keyword "water" with the other two keywords "self-discovery" and "identity," FA contextualized the keyword "water" by conjuring up the image of Narcissus who drowned in water by being captivated by the image of himself reflected on water. The random output from the GPT-3.5 model inspired FA to come up with the new allegory of Narcissus which was coherent to the theme of the original quote and added an interesting layer of meaning in the synthesized quote.

## D.6 FA's diary entry on July 13, 2023

**Three Keywords**
Consciousness; Surveillance; Desire

**My response to the keywords**
What does it mean to have consciousness? From the moment we are born until we die, we constantly desire something. We learn how to manifest and demand what we desire but simultaneously learn how to adapt to the norms and the surveillance of our society.

**Original quote**
'It is things that think of us', 'It is television that sees you'

**Synthesized quote**
"It is the relentless desire within our consciousness that shapes our actions and perceptions, while society's pervasive surveillance ensures our adherence to societal norms. Yet amidst this intricate interplay, we must also question our true desires and the extent of our autonomy."

When we prompted the GPT model to generate keywords from FA's highlight that said, "[i]t is things that think of us, [i]t is television that sees you," the GPT model listed "surveillance" as one of the keywords. The original quote did not explicitly include any synonym or words that are semantically related to "surveillance", but the model still identified the paranoia of the character in the book towards the objects. These interactions, along with several similar instances also listed in **Appendix D**, let us gather that the model performed well at detecting high-level themes in a given quote.

## E A SCREENSHOT FROM INTERACTIONS WITH THE PROTOTYPE SYSTEM

```
assistant: Word 1: Promise
Word 2: Innocent
Word 3: Recuperate

User:how did you pick the keywords from the quote
assistant: I apologize for the confusion earlier. Here are the revised keywords, selected based on the semantic meani
ng of the quote:

Word 1: Promise
Word 2: Recuperate
Word 3: Innocent

User:Those are the same keywords
assistant: Apologies for the oversight. Here are the revised keywords, selected based on the semantic meaning of the
quote:

Word 1: Commitment
Word 2: Sacrifice
Word 3: Reminisce
```

This shows FA's conversation with the GPT-3.5 model about the three keywords that do not satisfy a specific minor requirement. The label "user" indicates FA's text input. The label "assistant" indicates the output from the GPT-3.5 model.