Red REDACTED Theatre: Queering Puzzle-Based Tangible Interaction Design

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ABSTRACT

"Red [Redacted] Theatre" is a tangible puzzle-based experience exploring queer history. We used queer methods to design puzzles with archival materials, guiding participants from a more normative "surface" understanding of history into exploring queer histories, breaking familiar language and constructs through play and tangible interaction. Our reflections contribute design considerations for queering tangible interaction through puzzles: (1) designing and deconstructing layers of queer understanding, (2) attending to situatedness in designing tangible puzzle artifacts, and (3) designing puzzles that solve to complexity. We also offer insights on how facilitation and debrief of the experience can prompt reflection on queer history and ways of understanding. Overall, this pictorial contributes to Queer HCI by deepening queer tangible interaction, particularly for exploring queer history.

Authors Keywords

Queer HCI, Queer Archives, Cultural Heritage Design, Tangible Interaction Design, Puzzle Design

CSS Concepts

•Human-centered computing~Interaction design•Applied computing~Computers in other domains~Digital libraries and archives•Social and professional topics~User characteristics~Sexual orientation

Experiencing queer history through tangible puzzles

"Red [Redacted] Theatre" features a familiar crossword structure, which can be solved by placing answers from nearby artifact-based puzzles. On the surface, the experience represents a conventional game and a normative understanding of history, but conventions break down as players engage more deeply with the puzzles and explore other potential answers. Having multiple ways to solve puzzles represents both a "surface" and a hidden or "queer" understanding of history, which leads to further explanation of the game's archival context. We staged the experience with a dark room, spotlights, and red and black colors to parallel the staging and archival materials from the original Red Dyke Theatre performances (p.2).

Participants interact with historical artifacts to solve puzzles and find two possible crossword answers: a "surface" answer, and a "deeper" answer, indicative of hidden queer history.

By tangibly interacting with historical artifacts to solve puzzles with multiple answers, participants enact archival practices and procedurally engage with queering history.

1 INTRODUCTION

Queer archives have seen a recent resurgence in resisting the erasure of queer and trans stories, identities, and bodies from public society [2, 3, 64]. Reflections of LGBTQIA+ identity throughout history are critical not only to document stories today, but also to uncover past histories that have been censored or omitted [32, 44]. Further, by critically

reflecting on archives, we interrogate what "counts" as knowledge or data, how and why it is recorded, and how it holds weight in our collective conceptions of history. Amidst this backdrop, we situate our research: designing for queer archival experiences while exploring how puzzle-based elements can prompt reflection and understanding.

Specifically, we ask: how might tangible, puzzle-based design support exploration and understandings of queer history? We build on Queer HCI and draw from queer methods [28] to design a tangible interactive puzzle experience that invites participants to explore Atlanta's lesbian history. This work expands Queer HCI by deepening our understanding of queer tangible interaction design—an underexplored area— with particular focus on embodied experiences of history. Here, we also join calls in HCI for digital games researchers to meaningfully expand HCI with intersectional perspectives and approaches [8, 27, 36, 68].

Our project, "Red [Redacted] Theatre," comprises an immersive puzzle-based experience inspired by and using archival materials from the Red Dyke Theatre [87], a lesbian theater group founded in the early 1970s in Atlanta. Our experience invites viewers to physically interact with puzzles that illustrate the group's activities from 1972-1978, using archival materials such as show notes, stage programs, photographs, and props. Reproductions of these artifacts form the basis for tangible puzzles in the game, which guide players from a normative "surface" understanding of history, into a discovery of queer histories, and further into a "queer understanding" of history by challenging and breaking familiar language and constructs. The title, "Red [Redacted] Theatre"—a play on the original "Red Dyke Theatre"—evokes themes of censorship explored in the artifact puzzles, while also referencing the game's aim of guiding players to uncover histories and ways of knowing that have traditionally been censored or omitted from archival records.

Members of the Red Dyke Theatre Company (from left: Mickey Alberts, Murray Stevens, and Frances Pici) performing "A Tribute to Gay Pride" (1975), courtesy of the Gender and Sexuality Collections. This image is an archival reproduction of a 35mm film recording of the performance in 1975 [57].

The game experience positions the player as an archivist, sifting through artifacts to solve puzzles in multiple ways: one answer conveys a surface-level understanding of history and another engages more deeply with queer theory, conveying a hidden understanding, which reflects archival efforts to reexamine the past for traces of erasure [32, 44]. These tangible puzzle interactions speak to a physical embodiment of the "unruly," "oppositional," and "coalitional," nature of queer archives, resisting categorical definitions or singular ways of understanding and interpretation [44]. "Red [Redacted] Theatre" proposes that immersive puzzle game experiences can demonstrate this "messiness" or "slipperiness" by virtue of puzzles and structures that engender these qualities through play and tangible interaction.

This paper contributes reflections on the design of "Red [Redacted] Theatre," along with the following design considerations for queering tangible design in puzzle-based interaction: (1) designing and deconstructing layers of queer understanding, (2) attending to situatedness in designing tangible puzzle artifacts, and (3) designing puzzles that solve to complexity. These considerations expand Queer HCI by providing implications for how tangible interaction design, particularly puzzle-based experiences, can prompt reflection on queer history and modes of understanding.

1.1 Author Positionalities

A1 is a queer, gender non-conforming (she/they), white and Latinx, able-bodied researcher, from a relatively middle-class upbringing in the United States, with a background in media arts, design research, and interactive narrative. A2 is a white, queer, cis woman, neurodivergent researcher from the United States. Her background is in art and design (graphic, game, narrative), as well as the design, localization,

construction, and operation of escape games. A3 is a queer, trans*, white, disabled researcher, from an abusive middle-class upbringing in the United States, having experienced multiple bouts of homelessness. Her background is in engineering, interactive narrative, game design, and interactive media design. A4 is a cis woman, heterosexual, white, able-bodied, queer-allied researcher, with a middle to upper-middle-class family upbringing in the United States. A5 is a gender non-conforming (she/they), queer, white, neurodivergent researcher, who was a first-generation college student from a lower-class upbringing in the United States. Together, we bring queer, trans*, and disabled perspectives; along with interdisciplinary backgrounds in interactive narrative, escape games, engineering, and media arts; that inform our research, design, and theoretical grounding of our work.

2 RELATED WORK

We draw from Queer HCI, Queer Tangible Games, Serious Games, Tangible Design for Archival Experiences, and Queer Archives Scholarship. We begin with definitions of queerness, such as bell hooks' characterization: "'Queer' as being about the self that is at odds with everything around it and that has to invent and create and find a place to speak and to thrive and to live" [39, 1:27:41]. Queer methods then encourages us to "embrace the mess to devise new modes of inquiry and analysis" [28:13], and, as Keeling notes, facilitate "uncommon, irrational, imaginative, or unpredictable relationships between beings and their environments" [42:154]. To *queer* tangible interaction, we focus on how design can enact these strange, messy, unpredictable relationships in material experiences.

2.1 Queer HCI

We draw from tactics for using queer theory in design and designing technology for LGBTQIA+ expression. Particularly, Light argues for designing against persistent storage, exploring pluralities, hacking, and resisting compulsory "opting in" to technologies [45]. Scholars have also described "glitching" as an enactment of queer failure in technology [23, 24, 33,

34, 62, 69]. Additionally, Queer HCI focuses on gender and sexual identity in online communities [4, 17, 18, 30, 41], as well as design by and for trans, non-binary, and gender nonconforming individuals [29, 31, 79]. Outside of online contexts, scholars have explored tangible design for wearable technologies to support queer expression [7], to explore identity and sociality [81], to encourage community autonomy and safety [10, 11], and to explore lesbian history [65]. Queer artists have also designed tangible interactions that glitch normative systems [6,7,13,50] , creating subversive objects for technological agency [5], and coding with embodied gestures [35]. We add to this work in Queer HCI by deepening research in tangible interaction design that explores queer histories through puzzle-based interaction.

2.2 Queer Tangible Games

Game designers have also used tangible interaction to explore queer modes of play. For instance, queer physical games foreground discussions of emotional labor in a radically soft environment, or deconstruct conventional uses of computer technology [25, 37, 46]. Queer board games [85] and tabletop role-playing games (TTRPGs) reimagine game mechanics to enact stories of emotional intimacy and collectivity [55, 61, 71, 77, 82]. In these examples, familiar game mechanics are deconstructed in physical space, centering queer bodies and focusing on alternative ways of feeling and relating to one another. With "Red [Redacted] Theatre," we draw from these games to similarly queer tangible interactions through physical puzzle design, contributing reflections and considerations from our design process.

2.3 Serious Games

We also draw from serious games [1], puzzle-based learning [53], and the growing field of escape games that explore critical thinking and reflexivity. Particularly, we look to escape games such as "The Privilege of Escape," which explores invisible privilege and inequity [63], and board games such as "Train," which explores complicity within systems [66]. Within

serious games, the Values at Play (VAP) framework offers a guide for identifying and designing for moral and political values in games [22]. While VAP and the accompanying "Grow a Game" cards [21] use existing game design conventions, the reliance on familiar structures can result in design issues when treating complex, uniquely situated subjects [51]. Instead, we ground our experience within the complexity of our subject matter, as with Wonica's design process in "Ending the Cycle" [85]. It is within this vein that we create "Red [Redacted] Theatre," using queer subject matter and methods, along with puzzle-based interaction, to fundamentally shape our design process.

### 2.4 Tangible Design for Archival Experiences

We lastly look to scholars who have explored tangible design for memory, cultural heritage, and archives. For instance, projects have explored projection mapping onto historical artifacts [54], physical interfaces for oral histories [48], and locative historical soundscapes [70]. Researchers have developed frameworks for presenting cultural artifacts [13], physical interfaces for weaving narratives [80], worn textiles for sharing memories and personal histories [20], and wearables for exploring personal locative histories [83]. We also particularly look to physical experiences that center marginalized histories [9, 75]. These works reflect HCI's growing design engagements with historicism [76], as well as critical efforts that foreground past silences and exclusions in technological design [40, 43, 67, 78, 84].

We also draw from research that discusses how queer archival practices challenge normative information organizing operations [15, 44, 47, 49], and how archival research can be reoriented towards bodies, feelings, objects, and spaces that constitute them [14, 19, 52]. Particularly, we look to physical installations that explore LGBTQIA+ histories: Crichton's "Lineage: Matchmaking in the Archive" invites living artists to reflect on materials of deceased individuals in the San Francisco GLBT Historical Society [16]; Meyer and McKinney's "Tape Condition: degraded" highlights Canada's ArQuives of porn tapes as a "vital record of

Understanding Queer Archives

Drawing from queer theory and archives scholarship to design our experience

Designing our tangible experience, we first recognize the tension between queerness' ephemerality and "unruliness" and the desire to recognize it "in language" or archival systems [47]. Particularly, there are several dimensions through which we can conceptualize this pursuit. These dimensions include "documenting queer experiences," "queering an existing archive by uncovering previously unknown queer subjects," and "queering archival practices" [44].
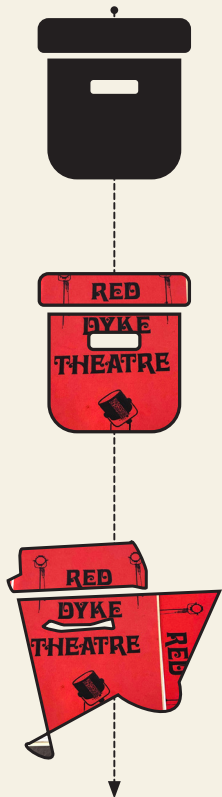
FROM NORMATIVE HISTORIES

We start by exploring existing archival records, looking for traces of queerness in the cracks and gaps in "familiar" histories.

TO DOCUMENTING AND UNCOVERING QUEER SUBJECTS

We then consider records that include artifacts less likely to be archived, such as ephemera (t-shirts, sexual paraphernalia, buttons, fliers, etc.) [44, 52], and affective dimensions, or "feelings and experiences that motivate the production of records" [44:22], offering alternative modes of knowledge [19]. Further, considering queerness' collectivity, we understand that relationships and communities constitute archives, and we recognize their unofficial recordkeeping and collective remembering efforts [44].

TO QUEERING THE ARCHIVE

We challenge the nature of the archive, questioning the "type of knowledge we inherit" about gender and sexuality, along with the "manner in which we inherit it" [47]. We might ask questions such as, "What constitutes an 'archive' largely?" or "What is included and what is traditionally left out?" Questioning the nature of the archive, we explore the tension between making queer stories legible and pressing "sexuality and gender into some form of signification (usually language)" [47].

LGBTQ subcultures" at risk of disappearing as archives become digitized [50]; and the "Rainbow Arcade" exhibition [86] showcased the LGBTQ video game archive [74] with playable titles, concept drawings, fan modifications, and documentaries of online gaming communities. With "Red [Redacted] Theatre," we add to this body of work by contributing insights from our design process of a physical archival experience.

3 DESIGNING WITH QUEER METHODS

We designed both the overall game structure and the individual puzzles to convey dimensions of queer archives scholarship through play: documenting queer experiences, uncovering queer stories in existing archives, and queering archives. Doing so, we build on tactics from Keeling's "Queer OS" [42:154] and Brim and Ghaziani's Imagining Queer Methods, which materializes how scholars might use queer theory to "tweak or explode what is possible with our existing [methodological] procedures" [28:15]. Particularly, we use methods such as "resisting categorization;" "negotiating differences;" "disrupting ideals of stability, rationality, objectivity, and coherence;" "deconstructing" or "making strange" familiar constructs; and "re-centering the lens on queer lives" [28:15]. Additionally, we ground our tangible design process in methods that similarly embrace embodied [38], reflective [73], and ambiguous [26] approaches.

4 DESIGN PROCESS

4.1 Engaging archival ephemera

Engaging the archive, we drew from several queer methods tactics, reflecting on how the Gender and Sexuality Collections and our experiences as researchers resisted traditional archival modes of categorization, interrogated assumptions about empiricism and data collection, and centered the lens on queer lives and histories [28]. In the collection, we focused specifically on ephemera, or materials not traditionally archived, from the Red Dyke Theatre, a lesbian theater company in Atlanta, which performed and documented their community-focused productions from 1972-1978. Their

archival ephemera—photographs, flyers, booklets, show notes, T-shirts, among other objects—centered queer relationships and activities, and our experiences with these materials prompted us to reexamine our assumptions about "what counts" in an archival collection.

In repeat visits over an eight-month period, we worked with the lead archivist to learn about the company, its activities, and its members. We interviewed and brainstormed ideas for showcasing the Red Dyke Theatre's materials with one of its founding members, Frances Pici. We also participated in embodied encounters with archival materials [38], noticing the relationships between our bodies and objects in physical space: our methodical actions when opening archival boxes, the sensation of the thick cotton fabric of the T-shirt, the careful movements of our hands when pulling photo slides out of plastic protective sheets, the particular way of holding slides at their edges to view them on a light table, the gentle handling of coffee and ink-stained show-notes in archival folders, and the emphasis on neatly wrapping materials in tissue to place them back in their settings. These embodied activities with ephemera formed the basis of our tangible interaction and puzzle experience design.

4.2 Developing Tangible Puzzles

We created replicas of objects from the Red Dyke Theatre as tangible puzzles. Doing so, we further engaged queer methods: "making the familiar strange" by creating unusual puzzle forms through digital fabrication; "interrogating alternate possibilities for world making" by creating an environment for exploring queer history; and "recentering queer lives" [14] by engaging stories through play. We designed three puzzles, each from a different piece of ephemera: a T-shirt, a flyer, and photo slides. We chose these materials because of their tangible qualities and ability to interplay with queer archival concepts in puzzle design: the softness and sensation of placing the T-shirt into an archival box; the careful handling and examining necessary

Experiencing the Archive

Engaging archival ephemera in the Gender and Sexuality Collections

Pictured are examples of the Red Dyke Theatre's flyers, show notes, photographs, and T-shirts [56, 58–60]. Founding members Frances Pici (left) and Murray Stevens (right) are also pictured in photo slides.

Original Red Dyke Theatre T-shirt, photo slides, and show flyer

Crafting Tangible Artifact Puzzles

Fabricating the t-shirt, show flyer, and photo slide replicas

We re-created the RDT T-Shirt by digitally designing, vinyl cutting the label, and ironing it onto a red cotton T-shirt to match the original.

We digitally traced and printed each of the original photo slides on transparent photo paper, cut and inserted them into slide cartridges, and wrote dates and names on each to comprise puzzle clues.
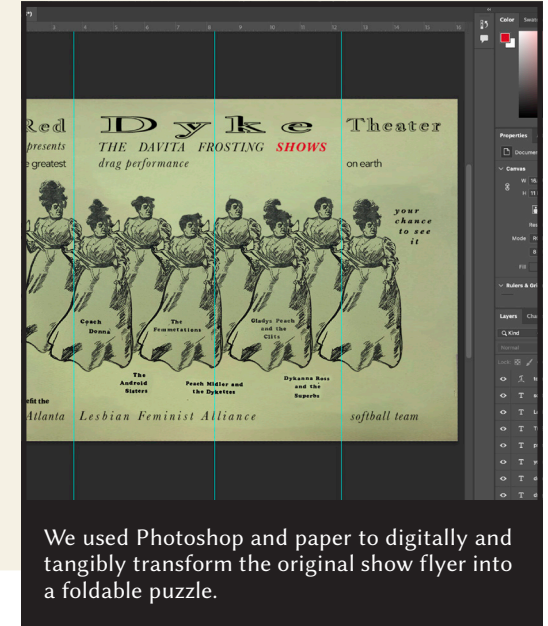
We used Photoshop and paper to digitally and tangibly transform the original show flyer into a foldable puzzle.

to explore photo slides containing names and dates; and the flexibility of the paper flyer to be folded in multiple ways, revealing or obscuring certain words and images. Each puzzle has two possible answers: a more easily solved "surface answer," representing a surface understanding of history; and a more obscured "hidden answer," suggesting concealed queer subjects or an alternative understanding of familiar history.

To re-create the T-shirt, we used a hi-resolution digital photograph of the original Red Dyke Theatre T-Shirt [60] and manipulated it in Photoshop and Illustrator to isolate the label as a vector file. We imported the vector into vinyl cutter software, cut the label in black vinyl, and ironed it onto a red cotton T-shirt, matching the color and fabric of the original. We also added the name "Murray," one of the original Red Dyke Theatre

members, to the shirt's label, as a clue to its origin. The puzzle involves noticing the T-shirt—an ephemeral material that features in queer archival practice [44, 52], which sits crumpled behind the archival boxes. Players find it and acknowledge it as a valid historical artifact by placing it in an archival box. The empty box represents the "surface answer," where ephemera is not archived. By placing the shirt inside the box, participants find the "hidden answer," having included it in the archival collection.

For the photo slides, we individually photographed each of the original slides on a light table provided by the Gender and Sexuality Collections [56]. We digitally cropped the photographs from the images of the original cartridges, printed them on transparent photo paper, cut them to size, and fit them into empty slide

cartridges. For the puzzle, the slides are placed in either chronological (a surface understanding) or relational (a queer understanding) order, so we inscribed both the dates of the photos as well as the names of the members pictured on our fabricated cartridges to form the puzzle clues.

For the show flyer, we manipulated a hi-resolution photograph of the flyer [59] in Photoshop to create an optical illusion folding puzzle containing both the surface answer when folded and the hidden answer when unfolded. To achieve this, we duplicated and distorted the original drawing to visually indicate the multiple, subversive, and glitch-like [45] imagery that parallels hidden, queer ways of knowing.

Players could solve the puzzles in any order,

Building the Crossword and Experience
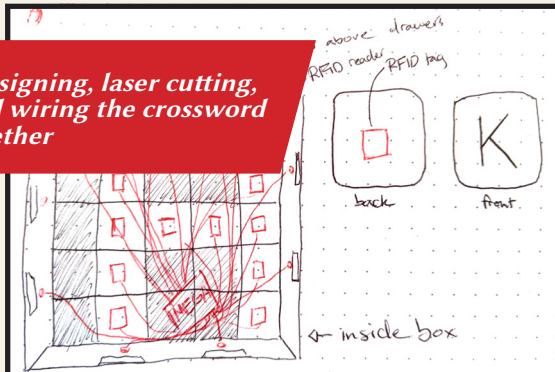
We sketched the crossword connections for answers to be validated once certain tiles were placed on the board.

We mapped out the crossword pieces in CAD, lasercut them in Plexiglas, and wired the switches to validate answers.
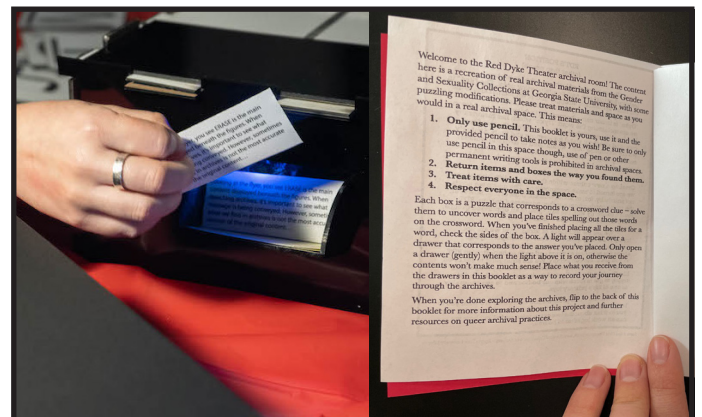

For the experience, we set up the crossword board, answer tiles, archival boxes with puzzle artifacts and clues, and a light table for viewing the photo slides.

We designed stickers with explanations of crossword answers that players would receive upon placing the correct tiles on the surface. Correct tiles contained magnets that would activate reed switches to turn on an LED over the corresponding sticker drawer. Players could then place their stickers in their show program booklets for later reflection and debrief.

retrieving answers that corresponded to clues in an adjacent physical crossword puzzle. We chose this form to validate answers because crosswords are historically normative (i.e. white, male, cis, Western) [12] and traditionally solve to only one answer [72]. Deconstructing the crossword with multiple possible answers and interpretations, we queered its form, disrupting its ideals of stability, rationality, objectivity, and coherence [14]. For our design, we chose answers based on the qualities of the artifacts (shown in section 4.2), digitally fabricated pieces in CAD, and laser-cut these into interlocking black and white tiles. We also created an internal magnet-based system of reed switches and LEDs that would validate answers. If a player placed "correct" letters for either surface or hidden answers, magnets on the tiles' undersides would line up with switches in the crossword base to turn on an LED above a side drawer. Within the drawer, stickers with printed text gave more information and context for the corresponding answer. For surface

answers, the sticker text ended with a prompt to explore more, giving additional hints to solve the hidden puzzles. For hidden answers, stickers gave more context about the Red Dyke Theatre and queer archives.

To begin, each player was given a "show program" booklet, modeled after the Red Dyke Theatre's programs, to introduce the experience and give additional context. Once each player received a sticker from entering an answer in the crossword, they could place it inside their booklet to add context and create their own piece of take-home ephemera from their playthrough. While players engaged with the experience in teams, each player on a team received an individual booklet and their

Developing a Layered Puzzle Structure

Our puzzle communicates layers of understanding that participants can move through to explore queer history.

SURFACE UNDERSTANDING

Players use conventional understandings of history and minimal interaction with artifact puzzles to solve clues, moving from a familiar framework into deeper exploration. The "surface" answer is relatively easy to find, building from "common knowledge" and often immediately visible. This reflects a surface level engagement of history and primes players to see how they are often missing deeper meaning.

HIDDEN UNDERSTANDING

This layer closely parallels the first because it is accessed through the same puzzles (same space on the crossword, same clue, same archival artifact). However, it requires players to engage more deeply with the artifacts and rethink their initial understanding of the clues. Each puzzle has a "hidden history" answer as well as a "surface answer," and it's possible for players to solve the "hidden" answer before or instead of the surface answer.
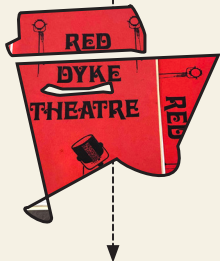
QUEER UNDERSTANDING

This layer, manifesting in the facilitation and debriefing of the experience, offers a means for players to explore queer concepts more deeply. Here, they can discuss their own participation in the queering of familiar constructs both during the experience and afterwards in their ongoing exploration of how histories are created and collectively understood.

Player starts with a familiar, surface understanding: flyer is closed and sealed in plastic

Player solves the surface puzzle on the closed flyer, then realizes there is more to explore

Player takes the flyer out of the plastic and opens it, revealing a hidden answer

*Player reflects on this answer and its explanation to understand queer context and theory.*

own stickers upon solving a puzzle. We elaborate on this more in section 4.3.

4.3 Queer Understandings in Reflection
We framed the experience by giving each player a booklet with instructions and historical context, including a replica of the Red Dyke Theatre's original mission statement. The booklet functioned in several ways: to introduce and give context to the experience; to serve as a tangible reflection of participants' playthroughs by providing a space to place stickers from solving puzzles; and to function as its own piece of ephemera that participants could take home and personally archive. Because the booklet framed and helped facilitate conversations about the game, it gave participants a personal connection to their experience and therefore to their own understandings of the archive. Developing this personal connection and responsibility to the materials of the game engaged queer understandings of the archive by highlighting individuals' collective involvement in making sense of history and exploring alternate possibilities for how artifacts are collected and understood.

The booklet also served as a tangible reflection of participants' experiences, strengthening the affective, material link to the game and its subject matter. Individuals could also delve into resources provided, including links to the Gender and Sexuality Collections, where they could continue their engagement with the original Red Dyke Theatre materials. Through this continued experience, underscored by the "take-home" aspects of the booklet, participants could relate to history beyond the institutional setting. This expansiveness and emphasis on tangible ephemera reflect how "queering the archive" looks to personal and community contexts, questioning the nature of what "counts" in history and what is left out. By reflecting on their experiences with "Red [Redacted] Theatre," in dialogue with other players and the research team, and by taking home their own ephemera—the booklet and stickers within, participants could more deeply explore what it means to queer understandings of history.

The Puzzle Experience

Our tangible puzzle experience can be solved in multiple ways, indicating a surface understanding of history and a deeper, hidden understanding of history, which, through reflection and debrief, engages a queer understanding.

THE T-SHIRT PUZZLE

In the T-shirt puzzle, we emphasized the importance of ephemera as valid artifacts in history and archives. In the experience, all artifacts are stored in archival boxes, but one is empty, cueing that something is missing. Players must find ephemera, in this case a T-shirt crumpled behind the boxes, to place in the empty box and trigger the "hidden" answer to the puzzle. Players are clued to the shirt's relevance as it is present in other artifacts, such as in the adjacent photo slides.

THE PHOTO PUZZLE
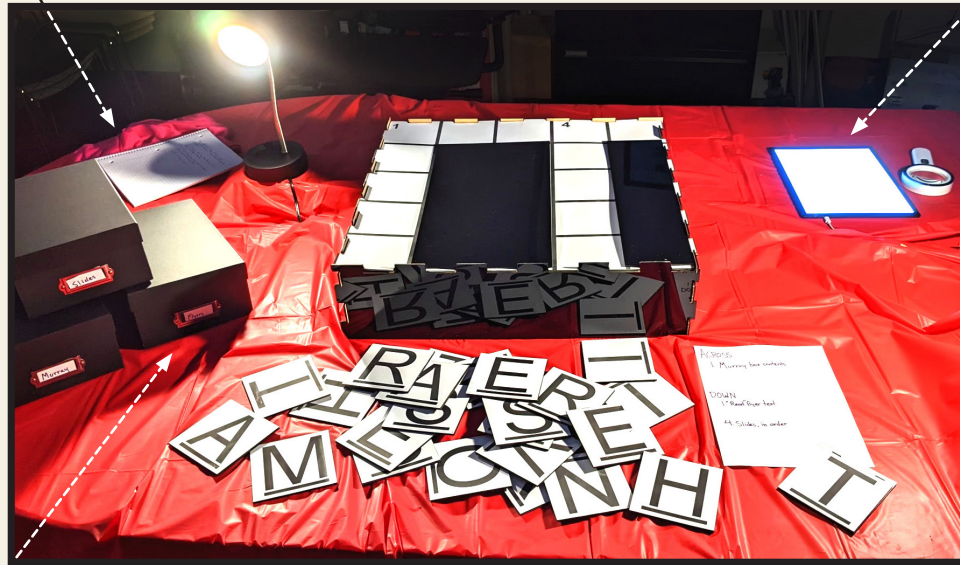
We explored chronology, demonstrating how conventional means of ordering historical information is not the only or most meaningful way to make sense of how events, artifacts, or individuals connect. If players order slides chronologically, they will reveal a "surface" answer, and therefore a "surface" understanding of history. To find the "hidden" answer, players needed to read a few lines on an adjacent notebook detailing how different theater members related to each other, recognizing that the names mentioned are also the names on the slides. Doing so, they would connect artifacts to new, meaningful ways of ordering content to make sense of history differently or "queerly."

THE CROSSWORD

The crossword, which can be solved in two ways, brings the experience together: players solve clues from the artifact puzzles and use the tiles to input their answers.

THE FLYER PUZZLE

We explored themes of censorship with a play-on-words clue that says "Read" flyer text, encouraging players to identify red text in the flyer. When folded closed and placed in a plastic sleeve, the flyer puzzle redacted sections of text, metaphorically indicating censorship of queer content and identity. The closed flyer looks "complete" and matches traditional letter dimensions, indicating that surface history is typically considered "neat" and "explained." Players needed to pull the flyer out of its plastic sleeve and open it to read the hidden answer, evoking a transgression of boundaries, and disrupting orderly archival materials to reveal the messy unruliness of queer-coded language.

Designing Puzzle Interactions

This diagram shows the path of each puzzle interaction through layers of understanding via actions and thoughts (here written as reflective questions) that influenced our design.

PRESENTED INFORMATION
The starting view of artifacts and clues. Each artifact begins in a labeled box, and the clues are next to the crossword. Players can solve the puzzles in any order.
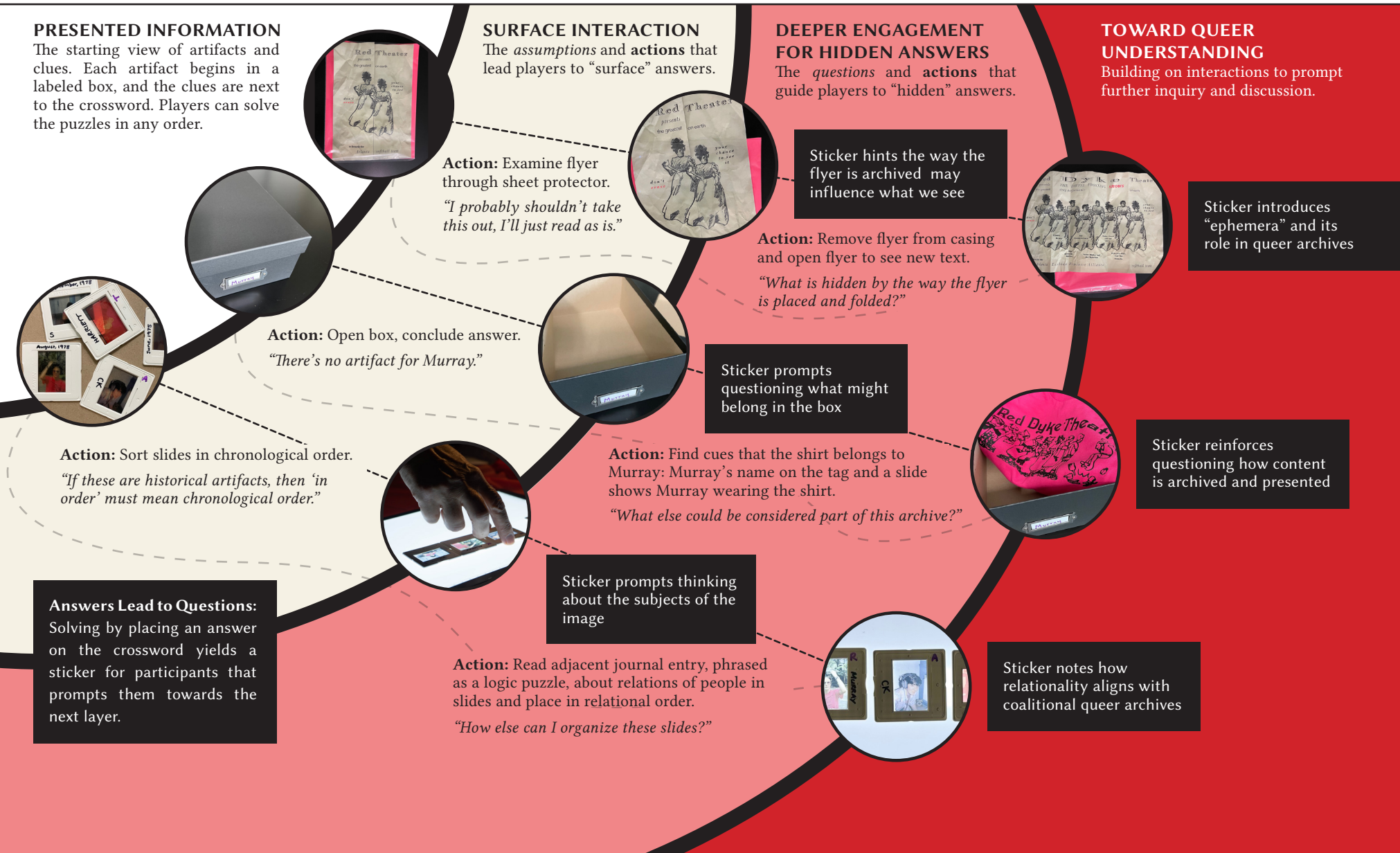
SURFACE INTERACTION
The *assumptions* and **actions** that lead players to "surface" answers.

DEEPER ENGAGEMENT FOR HIDDEN ANSWERS
The *questions* and **actions** that guide players to "hidden" answers.

TOWARD QUEER UNDERSTANDING
Building on interactions to prompt further inquiry and discussion.

Action: Examine flyer through sheet protector.
"I probably shouldn't take this out, I'll just read as is."

Sticker hints the way the flyer is archived may influence what we see

Action: Remove flyer from casing and open flyer to see new text.
"What is hidden by the way the flyer is placed and folded?"

Sticker introduces "ephemera" and its role in queer archives

Action: Open box, conclude answer.
"There's no artifact for Murray."

Sticker prompts questioning what might belong in the box

Action: Sort slides in chronological order.
"If these are historical artifacts, then 'in order' must mean chronological order."

Action: Find cues that the shirt belongs to Murray: Murray's name on the tag and a slide shows Murray wearing the shirt.
"What else could be considered part of this archive?"

Sticker reinforces questioning how content is archived and presented

Answers Lead to Questions:
Solving by placing an answer on the crossword yields a sticker for participants that prompts them towards the next layer.

Sticker prompts thinking about the subjects of the image

Action: Read adjacent journal entry, phrased as a logic puzzle, about relations of people in slides and place in relational order.
"How else can I organize these slides?"

Sticker notes how relationality aligns with coalitional queer archives

5 INFORMAL PILOT OBSERVATIONS

We informally tested "Red [Redacted] Theatre" as a demo for a public event in a lab space at Georgia Institute of Technology. 11 teams played, with sizes ranging from one to five players, and as these playthroughs were informal, our research team adapted to each in the moment, which resulted in some variation in terms of play experience. During these playthroughs, we noted the following initial observations:

1. All but one individual solved the "surface" answers first (i.e. identifying the red text in the flyer when closed, ordering photo slides chronologically, and answering "empty" to describe the archival box without the T-shirt) indicating that these "surface" puzzle states played into familiar preconceptions about history that participants brought into their experiences.

2. One two-person team postulated aloud about the structure of the experience and came to understand its intent without explanation from the research team. In this playthrough, the individual who solved the "surface" answers acknowledged their own behavior as conforming to a traditional model, and they worked together with their partner to solve both the "surface" and "hidden" answers (i.e. opening the flyer and finding the hidden red text, ordering photo slides relationally rather than chronologically, and answering "shirt" to acknowledge the T-shirt as part of the archive).

3. All but one team of two, who previously indicated that they couldn't stay, played through the entire experience, solving both "surface" and "hidden" puzzle variants.

These initial observations suggest that developing a layered puzzle structure that challenges normative ways of understanding history can engage individuals in queering the archive through tangible interaction. We expand on this in our Discussion, and we intend to deepen our observations in future work, as noted in our Limitations.

6 DISCUSSION AND DESIGN CONSIDERATIONS

6.1 Designing and Deconstructing Layers of Queer Understanding

We evoked elements of queer archives scholarship by designing an experience to explore multiple ways of understanding history. First, handling archival materials through play engages participants in documenting queer subject matter, even at a surface level, as players traverse the archives and build knowledge. Second, if participants choose to explore more deeply, they are likely to uncover queer histories in existing archives, or even reorient their understandings of the archive itself. Lastly, through reflection, debrief, and offering ephemera in the form of the take-home booklet, individuals are encouraged to further reinterpret history as messy, ongoing, personal, and collective.

In informal observations, this layered approach allowed individuals to rethink their initial assumptions to find the "hidden" puzzle answers, leading to understandings of queering the archive. For individuals who reached an awareness of this layered structure during play, the contrast between "surface" and "hidden" answers worked to highlight how a queer lens might challenge normative constructs. Participants "negotiated differences" by physically negotiating multiple solutions to the same clues; "resisted categorization" by deconstructing existing solution categories and finding new ones; and "interrogated alternate possibilities for world making and livability" by physically embodying an environment that centers queer experiences and ways of being [28:15].

Design consideration: To design a tangible experience that steps participants through layers of understanding, towards queering the archive, practitioners might consider starting with familiar constructs (e.g. a crossword or a timeline of photographs), and encouraging participants to use those very constructs to subvert and "disrupt ideals of stability, rationality, objectivity, and coherence," thus making familiar constructs strange and rethinking assumptions about history [28].

6.2 Situatedness in Designing Tangible Puzzle Artifacts

We created puzzle replicas of tangible artifacts using ephemera: flyers, T-shirts, and notebooks, indicative of queer archival practices [44]. Doing so, we presented these artifacts to not only document stories, but also to queer them by deconstructing and reconstructing tangible materials into puzzles. While we made efforts to faithfully replicate ephemera from the Red Dyke Theatre to respect the organization's history, we also "made strange" their forms in our puzzle design [44]. For instance, we "glitched" the flyer design in our folding puzzle [23], and we scrambled the timelines and relationships written on the photo slides. Though our only alteration to the T-shirt was adding the name of a Red Dyke Theatre member to its label as a clue to its provenance, its presentation and puzzle mechanic of acknowledging ephemera as archival speaks to "interrogating alternate possibilities" for exploring history [28:15]. Additionally, we guided players from a familiar experience of seeing archival materials in neatly organized boxes, into "strange" modes of interaction by virtue of our tangible puzzles, towards a more profound, and even "unusual," engagement with history.

However, we still navigate the paradox of queering the archive: even in making stories tangible through our material engagements, we risk crystalizing sexuality and gender into the singular interpretation of our experience [47]. Creating tangible puzzle replicas, we act as curators of these histories. Despite inviting participants to challenge the epistemology of the archive, we nevertheless exclude information by virtue of our situated perspectives. For instance, we chose archival materials for tangible puzzles based on an iterative, co-productive engagement with the archive, but in our curation, we omit other artifacts in the collection and therefore other pieces of history to prioritize our design goals. On reflection, we challenge our own assumptions about how we come to know, interpret, and design for archival experiences, reflexively acknowledging our roles as curators of history. Further, acknowledging

our situatedness as researchers, we might deconstruct even our own categories of meaning, arriving at queer understandings in tangible design.

Design consideration: When designing a tangible experience of history, the process of creating material replicas (e.g. a flyer that can be deconstructed and reconstructed through folding) designers might use this as an opportunity to interrogate their own positionalities, assumptions, and interpretive practices, in curating (and queering) experiences of history.

6.3 Designing Puzzles that Solve to Complexity

Traditionally, puzzles are designed for players to solve to a simple, singular solution. Players typically interact with a set of constraints where they apply a known set of variables to an unknown space with an unknown solution [53]. Rather than urging players to map, categorize, and simplify this unknown space by finding a single solution, could puzzle design instead encourage multiple solutions and multiple possible understandings? With "Red [Redacted] Theatre's" multiple solutions, which are designed around surface, hidden, and queer understandings, we resist solving to simplicity and instead propose puzzles that solve to complexity. This acknowledgement of multiple, simultaneous answers parallels the anti-categorical stance of queer methods [28], where participants can acknowledge difference and nuance in history through puzzle interaction, by virtue of the puzzles' structures. In informal observations, individuals were engaged by how complex, multi-faceted puzzles could challenge their assumptions about familiar ways of knowing and exploring history, suggesting that this design approach works to engage queer subject matter and methods.

Design consideration: When creating tangible puzzles, designers might consider puzzles that solve to complexity, which engages queer methods in design and procedurally entangles participants in multiple, collective ways of knowing and understanding history.

6.4 Limitations and Future Work

For our future work, we look to further addressing queer understanding through tangible interaction. For instance, beyond facilitation and debrief, we could design interactions such that players are encouraged to physically disrupt the stability and normative framework of the crossword. They might, for example, arrange crossword tiles in other physical configurations or in more performative capacities to further explore embodied queer experiences. Players might also use this deconstruction to discuss their personal relationships to queer history, reflecting on alternate world-making possibilities. Lastly, they might reflect outside of the scope of the experience, participating in and even facilitating their own ongoing conversations about history and queering the archive.

We also look beyond our pilot playtest towards a deeper evaluation of our experience, potentially hosting the experience in the archives rather than in a lab space. This effort would comprise inviting groups to experience "Red [Redacted] Theatre," conducting observations on their playthroughs, and facilitating group debriefing sessions in the style of semi-structured interviews. We plan to conduct these playtests to better understand how individuals engage with puzzle interactions and through these, layers of understanding history, ultimately contributing to further reflection on how we might queer tangible interaction design.

7 CONCLUSION

We share design considerations from our project "Red [Redacted] Theatre," which explores how queering tangible interaction with puzzles can engage understandings of queer history and archives scholarship. With this work, we deepen tangible interaction design research in Queer HCI, specifically bridging puzzle design with queer theory, and we offer the following design considerations: (1) designing and deconstructing layers of queer understanding, (2) attending to situatedness in designing tangible puzzle artifacts, and (3) designing puzzles that solve to complexity to further engage queer methods in design.

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