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Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA
SANTA CRUZ

**DESIGNING PLAYWRITING SUPPORT TOOLS FOR
EMBODIED AND NONLINEAR THEATER PRACTICE**

A thesis submitted in partial satisfaction of the
requirements for the degree of

MASTER OF SCIENCE

in

COMPUTATIONAL MEDIA

by

Ace S. Chen

June 2026

The Thesis of Ace S. Chen
is approved:

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Peter Biehl
Vice Provost and Dean of Graduate Studies

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2026

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Abstract

Designing Playwriting Support Tools for Embodied and Nonlinear Theater

Practice

by

Ace S. Chen

Playwrights use writing support tools to craft scripts for the stage. However, these tools are not attuned to the challenges of creating live performance and navigating theater ecosystems, instead complicating and constraining playwrights' processes. To understand how playwrights' creative needs and communities inform their tool use and how they adapt to tools that fail to meet their needs, I conducted workshops and interviews with playwrights to design Playground, a playwriting version management tool. Through thematic analysis of these studies and reflection on the development of playwriting tools, I found four themes in playwriting processes: scaffolding communities of practice, incorporating voice and body into writing processes, managing script elasticity across the theater lifecycle, and writing through collage of collected and created materials. I discuss lenses of embodied practice, non-normative time, and practice-led methodology through which researchers can better understand creative writers' overlooked writing behaviors and processes. To guide the development of playwriting support tools, I offer design considerations around enabling speech, visualizing performers, contextualizing version management, and moving textual material.

To my family

Acknowledgments

The text of this thesis includes reprints of the following published material:

Ace S. Chen, Isabel Li, Phoebe Huq, Rye Donaldson, and Kathryn E. Ringland.
How Playwrights Use Software: Towards Writing Support Tools for Performance. In
Proceedings of the 2026 Conference on Creativity and Cognition.

The co-author Kathryn E. Ringland directed and supervised the research which forms the basis for this thesis. The remaining co-authors conducted data analysis, collaborated on study design, and supported workshop facilitation.

This work exists thanks to the people in my life who have supported, trusted, and cared for me. Thank you, first and foremost, to my wonderful advisor Kate Ringland and our Misfit Lab for helping me find an academic home for myself. Rye Donaldson, Phoebe Huq, and Lynn Gen are the three smartest students I could ever have had the good fortune of mentoring. All of you kept me grounded in the most difficult parts of this degree and celebrated with me in the brightest parts.

Thank you to my committee members, Samantha Gorman and Max Kreminski, for showing faith in me as a researcher and giving me the confidence to pursue the kind of work I want to do. Thank you to my cohort for navigating grad school together and, occasionally, presenting silly PowerPoints about all sorts of arcane topics.

Thank you to the thirteen playwrights who trusted our team enough to be part of this research. Thank you to Peter Glazer and the UC Berkeley TDPS department for introducing me to playwriting.

Thank you to the AST team for the most fun I've ever had doing research (making weird stuff for myself and my friends). In particular, I am forever grateful to Shm Garanganao Almeda and Jingyi Li for being my mentors since the very start and showing me that I can be whoever and whatever I want to be.

Finally, thank you to Isabel for a hundred million acts of love and kindness, but most of all for creating the three mammoths of playwriting.

Chapter 1

Introduction

Playwriting is the art of writing for live theatrical performance. The nature of theater means that playwrights are tasked with navigating a variety of complex writing considerations. In addition to crafting a compelling story, playwrights must coordinate performance factors like costume, lighting, and set design; anticipate the needs of their theater communities; negotiate how bodies move, change, and interact on stage; and consider how their words translate to speech. In modern writing practices, word processing software facilitates the task of creating useful, legible, and editable documents—but how do these tools support playwrights, or fail to support them, in the challenges of creating theater?

By writing the scripts that get performed, playwrights build the foundations of theater communities, and studying them lends us a unique perspective on how writers consider the uniquely co-creative structure of theater ecosystems. HCI research has explored the social dynamics of technology use in creative writing [26], and work by

Almeda et al. focalizes how creative practice relies on the cooperative activities of many people across a creative ecosystem, including those who are not practitioners themselves [3]. When they write, playwrights balance their own creative needs with those of present and future actors performing their dialogue, judges evaluating their scripts, and audiences watching their shows. Playwriting tools should then meaningfully support playwrights in understanding how to navigate these ecosystems alongside the craft of text.

The reality, however, is that playwrights largely use general-purpose word processors or screenwriting software, tools which complicate playwriting processes by imposing conflicting norms and presuming inaccurate goals for writing practice. Adopting Li et al.’s lens of power [48], I examine how playwrights are a community that habitually works within normative grounds that diverge from the needs of their medium. While this certainly leads to plenty of frustration and difficulty, it also positions playwrights as a community equipped to creatively misuse their tools; exploring playwright software use can expand our understanding of creative practice to consider the workarounds, strategies, and outside-of-tool behaviors that practitioners implement to escape the constraints of their tools [46]. Theater has long been a discipline that researchers draw from to help conceptualize HCI, with Laurel’s seminal work introducing drama as a metaphor for the interface [42]. This work continues this tradition, spotlighting playwrights to illuminate the values, challenges, and behaviors that go unseen in creative writing practice.

By working directly with practicing playwrights—and reflecting on my own

practice as a playwright making playwriting tools—I explore the following research questions: (1) how can writing tools support playwrights’ creative ecosystems, shifting practical needs, and decision-making processes, and (2) how might studying playwrights inform the design and research of creativity support tools, both within and beyond theater contexts?

In this thesis, I describe two research approaches. First, I facilitated workshops with 13 local playwrights to learn what tools playwrights currently use and how their theater experiences and values inform their software use. From these workshops, I worked with a research team to develop a playwriting software prototype called Playground, focusing on contextualizing script version management, and ran a formative user study with 9 of the 13 playwrights. Second, I engaged in a practice-based research process where I built an *artistic support tool* [48] for playwriting called Found Theater, in which the user writes a script through optical character recognition of uploaded materials.

Placing these methods in conversation with each other helped me deepen my understanding of each: anecdotes from participants shed new light on the tools I built, and my firsthand creative process inevitably informed my workshop facilitation and analysis. From these dual approaches, I present four findings in Chapter 4 on how writing software can support playwrights’ diverse, community-driven, and non-normative practices:

1. *Scaffolding Communities of Practice* (4.1). Playwrights build strong foundations for future theater productions by anticipating cast and crew needs, revising

through rehearsals, and facilitating co-writing.

2. *Incorporating Voice and Body* (4.2). Playwrights center the voices and bodies of performers by hearing scripts spoken aloud, visualizing stage action, and exploring how their *own* sensory perceptions inform their practice.
3. *Managing Script Elasticity* (4.3). Playwrights need their scripts to be able to shift between many states and formats to see one project in many ways, create legible version histories, and develop reliable writing archives.
4. *Writing through Collage* (4.4). Playwrights experience tension between linear writing software and non-linear writing processes when they collect inspiration, rearrange their scripts, and work across paper and digital documents.

In Chapter 5, I reinterpret these findings through the perspectives of embodied practice and non-normative time; I propose these lenses for creative writing support researchers to expand their understandings of the diverse actions which make up writing processes, and the shifting goals and timelines writers define for themselves. I then reflect on the playwriting workshop design to highlight the value of crafting methods that reflect participants' areas of practice. To begin to develop a framework for *playwriting support tools*, I offer a set of four design considerations in Chapter 6: (1) bringing speech into all stages of writing, (2) helping playwrights visualize performers on stage, (3) contextualizing version management within theater ecosystems, and (4) moving and rearranging text across documents. This work contributes lessons from playwrights on how they navigate software to write for live theater, how researchers can shift their

approaches towards studying creativity support tools, and how to design software to meaningfully support both performance arts and creative writing.

Chapter 2

Background

2.1 Theater Theory and Phenomenology

This work draws upon the phenomenology of theater, alongside theories of embodiment in HCI [21], to understand how the nature of performance practice informs playwriting. States, building on the work of Merleau-Ponty, describes a play script as such: “From the phenomenological standpoint, the text is not a prior document; it is the animating current to which the actor submits his body and refines himself into an illusionary being” [77]. I adopt this framing of scripts as *animating* to understand the “liveness” of theater [4] as the potential for one script to lead to variable performed outcomes.

The primary role of the script, then, is to provide the structure of action. Playwrights understand that a script “never reaches fruition until actors perform that play... In script form, a play remains merely a potential work of art” [74]. Theater is

created not by a sole, authoritative playwright, but through the collaborative artistry of cast and crew. Bogart and Landau extend this perspective through their Viewpoints, a practice in which actors collaboratively explore movement in order to discover the play for themselves, rather than exclusively looking to the text [41]. Bass echoes the importance of physicality in his work on visual dramaturgy, asking: “How can the scene exist in its own right, separate from the words?” [6] Theater is also an engagement of the audience. Classic dramatic theater often aims to elicit empathy, catharsis, or pleasure. However, Brecht critiqued this consumption of plays as uncritical, instead proposing and practicing *epic theater*, which alienates the audience so that they may engage actively and critically with the world. In dramatic theater, the spectator says, “That’s great art: it all seems the most obvious thing in the world”; in epic theater, they say, “That’s great art: nothing obvious in it” [14]. These theater practices inform my understanding of the script as only one of many tools—and thus the playwright as only one of many artists—for making theater.

Liveness, physicality, and engagement are also key distinctions between theater and film, an unsettled debate as old as the medium of film itself [38, 76, 65]. For the purposes of this study on playwriting, I focus on the differences in their *writing practices and communities* rather than the theoretical distinctions between “dramatic” and “cinematic.” Prior work in HCI has explored how screenwriting and playwriting differ stylistically and have unique motivations and goals, leading to distinct writing approaches [59]. It is important to note that film and TV is a larger, more mainstream, and more financially productive industry than theater; it is well-known to practitioners

that there is very little money in theater. Even more so than TV writing, playwriting is rarely a lucrative or steady career due to the lack of paid opportunities [9]. This work considers these contexts in participant conversations and thematic analysis.

2.2 Theater and Playwriting in HCI

Looking towards theater in HCI, I join a lineage of researchers working towards developing tools to support theater-making. Saltz detailed possibilities for incorporating interactive media onto the theater stage [71]. Studies since then have explored how theater artists can leverage technologies like virtual reality [80, 85], mixed-reality [70], multi-modal co-presence [87], robotics [58], and artificial intelligence [51] to enhance, augment, or otherwise change the traditional theater experience. Nicholas et al. extended the design space of theater technology past the stage; they foreground the importance of technologists collaborating with theater practitioners to support a production [62], a lesson I applied in the workshop design. Similarly, the tools I designed align with systems for *pre-production* theater processes, such as remote stage blocking [23] and line memorization [45].

There is comparatively little research on playwriting in HCI, with existing work focusing on co-playwriting with large language models [27, 59]. In Mirowski et al.’s study of Dramatron [59], theater and film professionals co-wrote with a system which generated stories hierarchically from a user-written one-sentence synopsis of a plot. However, playwright participants pointed out how playwriting, unlike screenwriting, does not

align with this top-down generation, leading theater professionals to report feeling less like they were in collaboration with the system. Similarly, Grigis and De Angeli’s study found that professional playwright participants “regarded LLMs as unsuitable for playwriting” [27]. While both studies present insights into how playwrights engage with AI-supported writing tools, this work investigates playwright behaviors and values to inform the design of future supportive tools.

Finally, I examine how theater has been used as a lens for understanding and conducting HCI research. Laurel’s *Computers as Theater* introduced drama as a metaphor for understanding HCI, centralizing the importance of the representation of action in both disciplines [42]. Nicholas furthered this work by articulating a dramaturgical framework to understand core issues in HCI through performance [61]. Junius developed a working definition of *computational theater*, an approach towards game studies based in theatrical performance [35]. These frameworks guide how I transform engagement with playwrights into actionable lenses for understanding creative writing support research. In the study design, I draw from processes of devised theater [64] familiar to HCI [34, 11]. Methodologically, one of the most salient connections between theater and HCI is the use of acting, improv, and roleplay in participatory design [73]. Studies have also adopted specific theater practices to facilitate participant engagement, such as Boal’s Theater of the Oppressed [12] being employed in studies with children focusing on social matters like bullying [33] and activism [82]. My work emphasizes the embodied acting and theater-making elements of established HCI methods to leverage the theater backgrounds of the playwright participants.

2.3 Creativity Support Tool Research

Within the broader landscape of creativity support tool research, this work aligns with studies examining how artists are shaped by the normative sociotechnical systems that they operate within. I draw from Li et al.’s study of what visual artists can teach us about software development [47] to assert that playwrights are a valuable community of creative, adaptive, and technical users from which HCI researchers can learn. In my consideration of this community, I apply Almeda et al.’s framework of creativity supportive ecosystems [3] to consider how playwrights prioritize the distribution of scripts with production teams and audiences, examining how those needs and behaviors intertwine with playwrights’ own. Drawing from Chung et al.’s artist support networks [18], I highlight how tools complicate and fail to support important moments of interaction between playwrights and their communities. Building on community behaviors, Beaudouin-Lafon et al. introduce the concept of *common objects*: “the center of activity for people in communities with joint practices, carrying out their joint activities through artifact ecologies” [7]. For theater communities, a play script is a common object through and with which the cast and crew communicate, interact, and collaborate. As such, playwrights write scripts that can be reconfigured over time for ever-shifting uses.

Understanding playwrights’ software needs led to the development of tools that play a variety of roles in the writing process. Adopting Nakakoji’s tool support metaphors, I designed both running shoes (tools to improve writing efficiency) and skis

(tools that enable new writing paradigms) [60]. Resnick et al.’s creativity support design principles provide a strong foundation for tool development, particularly focusing on *low thresholds and high ceilings* and *supporting many paths and styles* [68]. In designing these tools, I adopt Li et al.’s lens of power [48]: creativity support tools impose a *normative ground* which constrains how practitioners conduct their work. As users of tools not designed for their practice, I focus on the non-normative workflows that playwrights have developed to escape and adapt to those constraints. Extending Li et al.’s notion of practitioner misuse as a form of creative practice against normativity [46], I position playwrights’ non-normative writing processes as a reflection of their creative expertise.

2.4 Word Processors and Creative Writing Software

Writing support tools have been a topic of interest in HCI since word processors became commercially available in the early 1980s [20, 52]. Kirschenbaum describes word processing as “an ongoing negotiation of what the act of writing means,” in which it is necessary to understand the preferences of individual writers as well as the complex landscape of writing and publication today [37], both of which are areas of focus in this thesis. Researchers have since developed tools for a range of creative writing contexts, including playwriting [27], screenwriting [59], poetry [16, 24], and games [28, 40]. Surveys of such tools have guided researchers towards understudied areas of writing, such as Zhao et al.’s recommendations for tools which support pre-writing and visualiza-

tion [91] and Lee et al’s comprehensive design space for intelligent writing assistants [43]. Alongside the development of these tools is growing research examining creative writers’ relationships with technology, with recent work focusing on writers’ attitudes towards AI. Guo et al. investigate creative writers’ motivations for and concerns with using AI in their writing [30], and Gero et al. report on how LLMs have disrupted creative writers’ ecosystems and writing processes [25]. Following this line of research, my work examines how playwrights choose to use software and how these tools have impacted their writing practice.

Chapter 3

Methods

3.1 Positionality and Reflexivity

This work is shaped by my experiences as a playwright who learned theater arts primarily through university courses and student productions. As a US-based theater-maker and researcher, I am most familiar with the landscape of English-language and American theater and software industries. When appropriate, I drew on my background to facilitate dialogue during workshops and inform thematic analysis. Theater arts are a set of diverse creative practices currently understudied in HCI; as such, I feel that bringing my own perspectives to this work, as both an HCI researcher and theater-maker, can help draw connections across the knowledge gaps of existing literature.

3.2 Playwright Workshops and *Playground* Development

To understand how playwrights write for live performance, what software tools they currently write with, and what goals motivate their tool use, I conducted three in-person workshops with 13 playwrights based in Santa Cruz and the Bay Area. Following the workshops, I directed and worked alongside my research team¹ to develop a tool prototype called Playground, and we invited the same playwrights to interact with it and provide feedback in a formative study.

3.2.1 Participants and Recruitment

Participants were recruited through email outreach to local theater companies, performing arts organizations, and playwriting guilds. Participants were selected for a diversity of age, gender, tools, and experience levels to identify what themes might be shared between playwrights despite these differences. Participants were required to have at least one year of playwriting experience and to use writing software in their practice. Of our participants, four identify as women and nine as men. The age range was 21 to 82, with a median age of 66. See Table 3.1 for a detailed breakdown of participant information, including which workshop they attended. See Appendix A for an overview of playwriting tools submitted in the recruitment survey.

¹Our research team consisted of myself, Isabel Li, Phoebe Huq, Rye Donaldson, and Lynn Gen.

W	P	Age	Occupation	Exp.	Tools (Years of Exp.)
1	1	76	Retired	3-5	WordPerfect (30)
1	2*	24	Student	1-2	Google Docs (1-2)
1	3*	64	Theater educator	20+	Word (20), Google Docs (5)
1	4*	62	Software engineer	20+	WordPerfect (10), LibreOffice (15+)
1	5*	22	Freelance writer	1-2	Final Draft (0.5), WriterDuet (1.5)
2	6*	66	Retired	6-10	Final Draft (6-7), Word (10+)
2	7*	82	Retired	10-20	Mac Pages (10+), Final Draft (3)
2	8	42	Student	1-2	Google Docs
2	9*	21	Student	1-2	Younescript
3	10*	77	Retired	10-20	Word
3	11	67	Musician & sound designer	3-5	LibreOffice
3	12	70	Lighting designer	3-5	Final Draft
3	13*	67	Educator	3-5	Final Draft, Highland Pro

Table 3.1: Participant demographics from recruitment survey. Tools missing years of experience were not indicated by the participant. “W” indicates workshop number; “P” indicates participant number; “Exp.” indicates years of experience playwriting. Participants marked with an asterisk participated in the Playground formative study.

3.2.2 Workshop Design

I sought to engage playwrights in conversation with one another to provide a shared contextual background of theater practice, and to discuss moments where their diverse behaviors overlapped or diverged. I drew upon participatory HCI research, particularly Akridge et al.’s approach of group interviews with bus operators, to inform a methodology that centered participant voices in future tool design and development [1]. Additionally, I prioritized conducting *in-person* studies for two primary reasons: to foreground the embodied nature of theater [39, 44] during the performance activity, and to develop relationships with and between practitioners in the same discipline and community. Based on a pilot study I conducted, our research team recruited 4-5 playwrights for each workshop to achieve a breadth of perspectives while providing ample

Phase	Duration	Goal
Contextualizing	30 min	Familiarize participants with each other and the research team. To emulate a playwriting workshop or reading group, each playwright was asked to provide a short excerpt of their work to be read aloud.
Telling	60 min	Facilitate conversation about participants’ writing practices and software use in a discussion around these two scenarios: Imagine you’re recommending one of your tools to a friend who also writes. What would you tell them about your tool? Imagine you have a magic wand that can instantly fix or change something about your tool. What would you do with it and why?
Making	30 min	Prompt participants to design speculative software by creating a paper prototype and writing a scene using the prototype as a prop.
Enacting	45 min	Explore the ideas in the prototypes by reading the scenes aloud and discussing reactions.

Table 3.2: Summary of workshop protocol, with duration and goals for each phase.

opportunities for each participant to contribute to the conversation.

I developed a workshop protocol where playwrights shared their own experiences in a semi-structured group interview, then engaged in an activity where they sketched paper prototypes of imagined software and wrote and performed scenes based on their prototypes. In the protocol design, I applied theoretical elements of devised theater to longstanding techniques in participatory design [73] and design fiction [10] to emphasize the performing or enacting of scenarios. See Table 3.2 for details of the protocol phases. Throughout the findings, I refer to participants’ prototypes as their “proposed”, “speculative”, or “prototyped” tool, and refer to their design fictions as their “scenes”.

Workshops were three hours long and held in private classroom spaces at UC

Santa Cruz and UC Berkeley. With all participants' consent, the workshops were audio-recorded, and any resulting physical artifacts (writing and paper prototypes) were collected and stored in a secure location. Prior to each workshop, participants were asked to prepare a 250 word excerpt of their playwriting to start a dialogue between participants and familiarize one another with their work, similar to how they might bring scenes to a playwriting workshop or reading group. These excerpts were not included in data analysis. Participants were compensated 30 USD in cash at the conclusion of the workshop. The study was approved by our institutional review board.

3.2.3 Data Collection and Coding Process

The data collected from the workshops included audio recordings and physical artifacts created by participants during the *Making* phase. The audio recordings were converted into text transcripts, and the physical artifacts were photographed. During the *Making* phase, while participants did individual activities, I wrote theoretical memos of the *Telling* phase; I revisited these memos with any additional insights after each workshop.

The data was then analyzed by our research team. We conducted inductive thematic analysis [13] to identify themes in how playwrights engage with software in their writing processes. Each of us coded the workshop data asynchronously using FigJam,² beginning with an initial open coding pass. Each workshop was coded before the following workshop was run. We then met synchronously to discuss preliminary

²A collaborative online whiteboarding tool. <https://www.figma.com/figjam>

themes and conduct a second coding pass to solidify these themes into findings. We ended data collection after reaching theoretical saturation [29].

3.2.4 Playground System Description

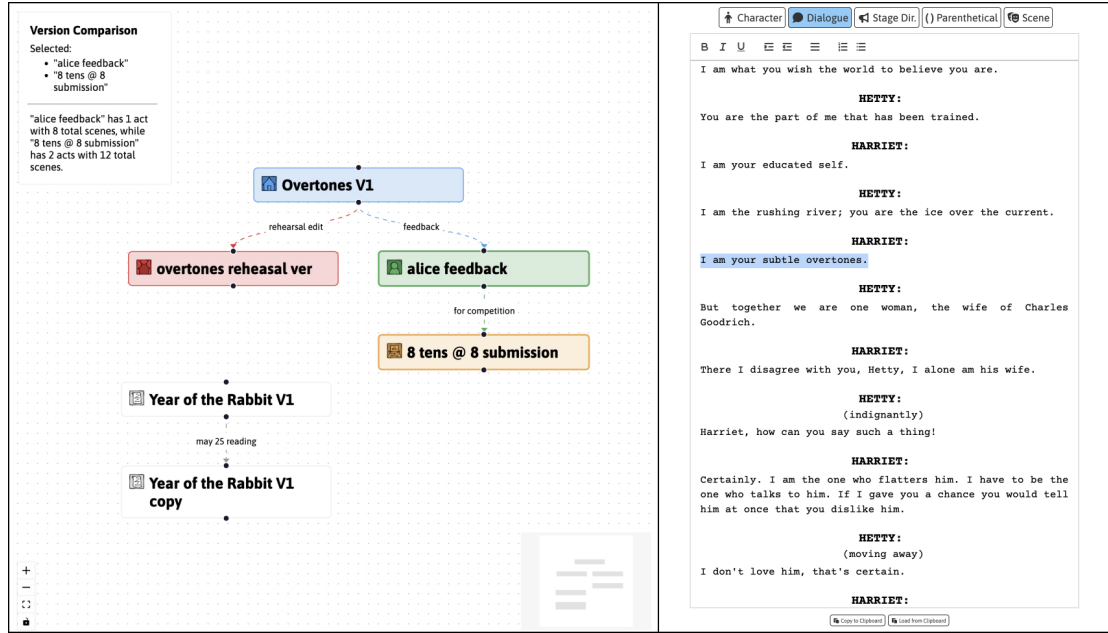


Figure 3.1: Screenshot of Playground, a two-part playwriting software prototype. Users can create, organize, and annotate versions of their scripts in the canvas (left). Opening a version renders it in the script editor (right).

Following our thematic analysis, our research team brainstormed, designed, and built a prototype for a tool to engage with a strongly-evidenced playwriting need in a novel way. During this development period, we decided to focus our tool on **script version management** due to its prominence in our findings and the lack of existing version control tools for play script writing.

Playground (Fig 3.1) is a tool that supports playwrights in visualizing the re-

relationships and distinctions between script versions, allowing them to manage a project across changing creative directions, circumstances, and practical needs. Rather than constraining one project to one document file, Playground affords the creation of many distinct versions of one project, encouraging playwrights to develop a version history that they can manipulate, explore, and return to in the future. In contrast to existing list- or folder-based interaction paradigms for text-based documents, Playground affords spatial organization on a 2D canvas, drawing inspiration from the materiality of Quickpose [67] and the use of spatial hypertext in Yamamoto et al.’s ART#001 writing system [90].

Playground also includes a custom text editor that is tailored to play scripts. Similar to tools like Final Draft, Playground’s editor helps the user produce a semantically-aware script by assigning element types (e.g., dialogue, character, stage direction) to each line of text. Each script would then be converted to an abstract syntax tree, allowing for powerful script manipulations and comparisons. When two scripts are selected, Playground would compare their syntax trees to describe the difference between the text, allowing playwrights to understand the relationships between any two documents.

3.2.5 Formative Study

After developing a working prototype of Playground, I conducted a formative study to understand how the ability to visualize, organize, and manipulate script versions could support playwrights in their creative writing processes.

3.2.5.1 Participants and Recruitment

Because Playground was developed based on the findings of our participatory workshop, I chose to invite the same participants back for the formative study rather than recruit new playwrights. This allowed participants to understand the context of the tool, provide additional insight into the practices they described in the workshops, and reflect on the conversations we began in the workshop. I contacted each of the workshop participants through email to invite them to participate in a follow-up interview where they would further discuss their writing practices and provide feedback on a research tool prototype. Of the 13 initial workshop participants, 9 participated in this study; they are marked with asterisks in Table 3.1.

3.2.5.2 Study Protocol and Data Analysis

I designed the study to help us learn (1) how playwrights implement version control and make sense of document libraries in their practice, and (2) how they might or might not incorporate Playground into their writing. The study was not meant to be a tool evaluation; rather, my goal was to use our Playground prototype as a way to prompt questions and engage in conversations about specific writing practices, as well as receive feedback on our tool. I developed a protocol with three sections: interview questions about playwrights' writing and versioning habits, a short overview of Playground, and a series of semi-structured tasks to expose participants to different features of the tool. Prior to each interview, participants were asked to share an in-progress piece of writing for us to load into Playground so that they could interact with their own writing during

the study. These excerpts were not included in our data analysis, and all screenshots of Playground in this thesis and future work are recreations that do not include participant writing.

Interviews were one hour long and held in private classroom and library spaces at UC Santa Cruz and UC Berkeley. The tool interaction portion was conducted on my personal laptop, and with participants' consent, the sessions were audio- and screen-recorded. Participants were compensated 10 USD in cash at the conclusion of the workshop. The study was approved by our institutional review board. The audio transcripts and screen recordings were analyzed by our research team using the same inductive thematic analysis process as the workshop data. In this phase, each workshop was open coded by one researcher, and I conducted a second coding pass to identify any new findings that emerged, along with data that supported existing findings from the workshops.

3.3 Practice-Based Research through *Found Theater*

Found Theater is a tool I developed as part of a larger practice-based research project led by Shm Garanganao Almeda, centering around creating artistic support tools. Our objective was to create tools—strange, artistic, unusual, unusable—and to treat the tool development process as an artistic practice in and of itself [48].

I first learned playwriting in a course on performance adaptations, where the final project was to adapt something, anything, for the theater. We might normally

think of a theatrical adaptation as a stage play or musical version of a novel, folktale, myth, or other piece of written or oral storytelling. But what else could become source material? My professor introduced me to plays like *The Laramie Project*: members of the Tectonic Theater Project developed the play based on the hundreds of interviews they conducted with residents of Laramie, Wyoming after a gay college student named Matthew Shepard was murdered in a hate crime [66]. Or take *Retablos* by Octavio Solis, a memoir in scenes named and composed after traditional retablos (devotional paintings of stories on sheets of tin) to evoke the narrative nature and time-worn physicality of the medium [75]. In other words, I learned that anything can be theater—anything can become a performance once you choose to read it as one.

3.3.1 System Description

Found Theater (Fig 3.2) is a playwriting tool where you write by uploading images, selecting a script element type, and drawing bounding boxes from which the Tesseract OCR engine [88] tries to recognize text. You can re-add text by highlighting existing text in the script (e.g., to repeat an existing character name), but you cannot type. It encourages the serendipitous “finding” of both source material (what images do you have on hand that you could upload as material?) and script content (what words and non-words will the OCR engine try to find in them?). Using Found Theater inevitably leads to noise and unpredictability as the OCR engine becomes a compulsory collaborator in your script. Figure 3.3 demonstrates some examples of OCR noise: “watery light” becomes “waterv lich”, punctuation both goes missing and appears un-

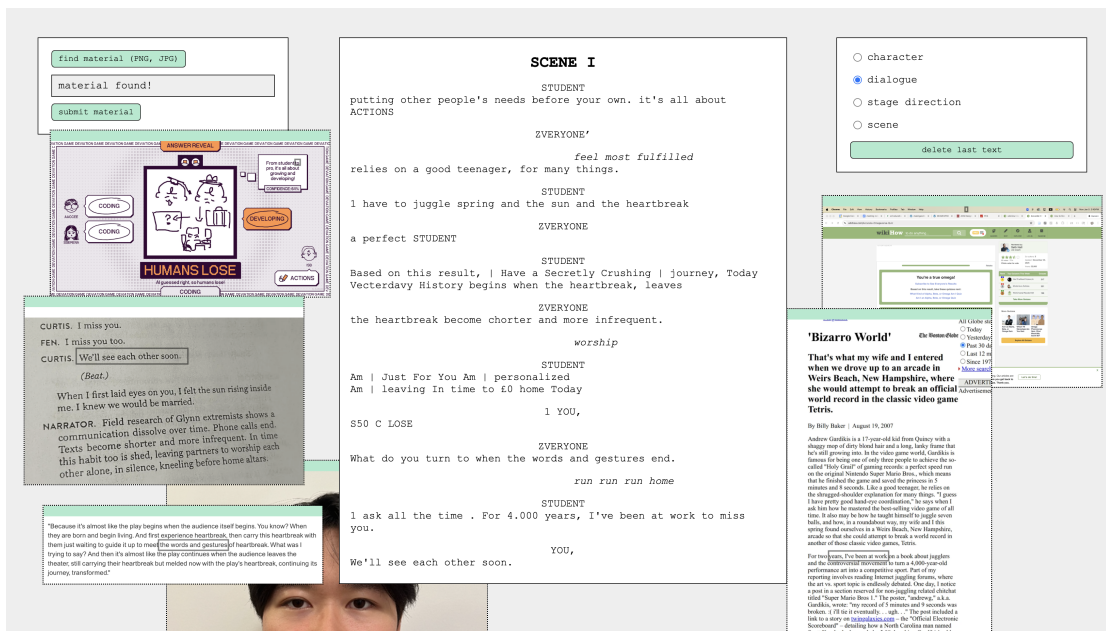


Figure 3.2: Screenshot of Found Theater, a web-based tool for constrained, collaged playwriting. The user uploads images on the left, which populate in movable windows around the screen. To write, the user selects a script element type on the right menu and drags a selection box on any image. Any text in that region that is identified by the OCR engine is added to the script in the center of the screen. This example is a script I wrote using screenshots and images from my computer.

expectedly, and various letters are misread. Noise is further amplified when trying to recognize text from non-textual image material, as the engine tries its best to find glyphs and ultimately outputs complete gibberish. At its core, drawing from the practice of found poetry, Found Theater is about collecting, arranging, and suturing ephemera of your life to be re-discovered as performance.

3.3.2 Documentation and Data Collection

I developed the tool over the course of two months, which happened to fall between the workshops and the start of Playground development. Throughout this period,

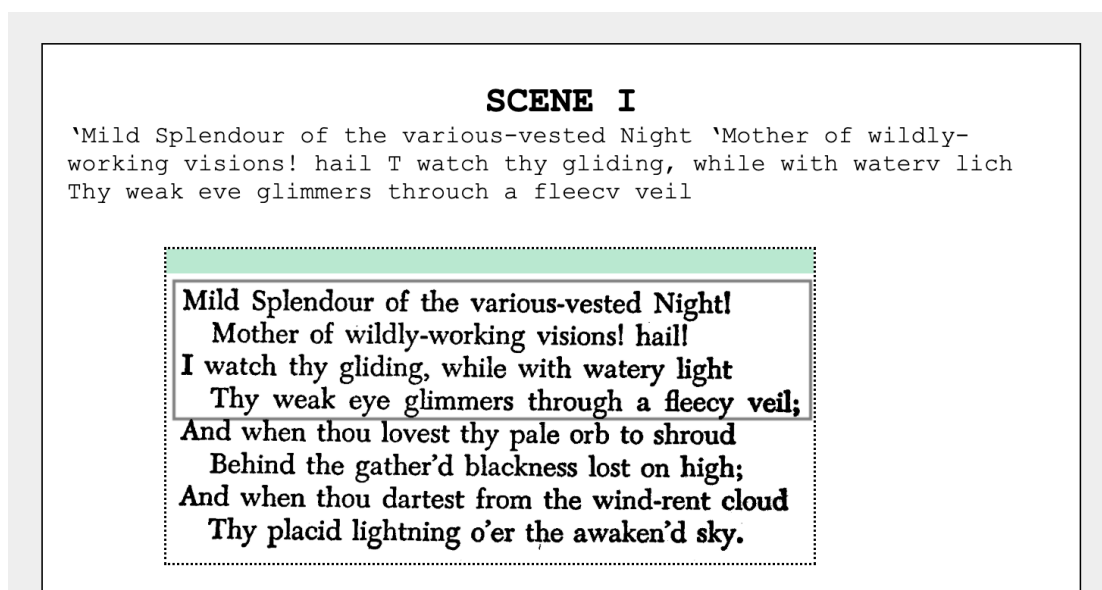


Figure 3.3: Screenshot of Found Theater to demonstrate the OCR model’s varied accuracy. Notable glitches include the addition of non-existent backticks; missing punctuation; and replacement of I/T, y/v, g/c.

I documented my creative and research process through a private Discord server with the other researchers involved in this project (listed in Figure 3.3), who were each developing their own artistic support tools in parallel. My messages included development logs where I sent updates and screenshots of the tool, but also in-depth stream-of-consciousness notes as I read related work, particularly on theater phenomenology [77]. While there was no established expectation for other researchers to respond to these messages, they often did, leading to meaningful conversations about the tool, related theory, and reflections on creative practice as a whole.

After all of us completed our tools, we spent time (both synchronously and asynchronously) using each other’s tools and collecting data in the form of created artifacts, written impressions, and a two-hour audio recording of an in-person feedback

A	Name	Role and Tool Name
1	Shm Garanganao Almeda	Research lead
2	Isabel Li	AST maker: Draw Your Attention
3	Grace Wang	AST maker: Color Codes
4	Angela Bi	AST maker: Pastiche
5	Teguh Hofstee	AST maker: Critter Canvas
6	Joy Kim	AST maker: FadeDraw
7	Max Kreminski	AST maker: Groupspeak
8	Jane L. E	AST maker: Critter Canvas
9	Jingyi Li	AST maker: Hexquisite Corpse

Table 3.3: Members of the artistic support tool research team and the names of the tools they developed. Each of these researchers used Found Theater, and their artifacts and feedback were collected as data. “A” indicates artist number, which is used to refer to them in the findings.

session. Over the course of the following months, I also wrote personal memos reflecting on the tool and how my understanding of it as changed as I used it in different contexts, ideated and developed Playground, and observed other people use it. I analyze this collected data in the findings and discussion to offer alternate perspectives on playwriting processes and to push our understanding of what a “playwriting tool” can be.

Chapter 4

Findings

From the workshops, formative user studies, and tool development processes, I surface four themes in playwrights' processes and subsequent tool behaviors, challenges, and suggestions. Playwrights sought to provide strong foundations for theater communities, integrate voices and bodies into their writing practice, navigate scripts across complex version histories, and write nonlinearly through collection and collage.

Going into this chapter, I want to contextualize that while our participants were all active in their playwriting practice, their plays were not their primary source of income (see occupations in Table 3.1). I recognize that the conditions, goals, and challenges of art-making can change significantly when an artist relies on their art to make a living, and the circumstances of professional playwrights may not be fully reflected through this study. With this in mind, this chapter focuses on understanding how writing tools can support playwrights' shared needs and processes, based on the range of experiences shared by our participants.

4.1 Scaffolding Communities of Practice

Every theater production is its own community of practice [89], generally formed around the shared goal of bringing one script to life. Each contributor joins a production with their own distinct skills, goals, and needs. A core part of writing a good play is building the foundation for this community to take shape; in writing scripts, playwrights negotiate the needs of many different scales and scopes of collaborators, both those they work with in the present and those who will engage with the text in the future. Playwrights expressed this value in the considerations they made for production teams, the actions they take in collaborative settings, and the frustrations they felt when co-writing across tools.

4.1.1 Anticipating Production Team Needs

Theater-makers tend to wear many different hats: 11 of 13 participants described having theater experience outside of playwriting, such as acting, directing, and sound design. As they write, playwrights draw on these areas of expertise to make decisions on what kinds of information a script should include. For instance, P12 was a career lighting designer who felt frustrated over another participant's remark that time of day was unimportant to a script: "Day and night, that's what I look for... What do you mean, it doesn't matter?" P6 handled these situations by giving their lighting designer a modified script with notes on what stage directions would be relevant during

a staged reading.¹ When using Playground, P10 suggested creating multiple versions of a working script specific to departments like lighting, costume, and props, allowing each production team member to adjust a script for their specific needs. To get an even clearer sense of what a production would need to perform their work, P13 created “director’s maps” in Excel after writing their first drafts, which outlined elements like props, light, and sound, “so even as a playwright, I can see the way things are unfolding now.” Playwrights often take into consideration the limited budgets and resources of theater companies. When writing for smaller contests or student productions, P9 considers “what can we actually do, and what can we get creative with” in regards to elements like set design. Likewise, P13 described modifying scripts to better suit the genders and age ranges of available actors to ease production. Emerging playwrights often meet production teams halfway and make compromises to their scripts to ensure successful and well-supported productions.

Six participants made similar considerations for actors and directors by being less prescriptive about *how* the script should be performed. P8 explained how “as a director, I want to be able to give certain directions on how I envisioned [the playwright’s] play and how [actors] could speak it,” so as a writer, they left more room for interpretation. P7, P9, and P11 similarly suggested that playwrights ought to trust actors when they deliver lines differently than expected, as their performances can uncover new emotional depth. While writing with actors in mind can sometimes be about

¹In a staged reading, there are minimal (if any) costumes, set pieces, lighting changes, and stage movements, and actors read paper or digital copies of the script. Staged readings can be part of the development of a new play, where the playwright is present and solicits audience feedback.

making compromises, it can also be a point of pride. For P6, “one of the biggest compliments about a piece is when an actor says this is an actor’s piece, this is an actor’s dream. I love that.” The goal of these playwrights is not to prescribe one rigid theater experience. Instead, they aim strike a balance between the needs of the creative team and the playwright’s personal vision.

4.1.2 Revising through Rehearsals

While developing a new play, playwrights might put on a staged reading or student production of their work; rehearsals for these stagings are a valuable opportunity to see a production team’s needs in action and revise the work accordingly. P6, P7, and P8 described annotating both paper and digital scripts for possible revisions based on actor interpretation, audience reactions, and designer input. However, not every note becomes an edit: “some of the stuff that was stricken through for the reading will probably come back” (P6), which must then be re-communicated to everyone. P4 emphasized how difficult that communication can be when working with paper scripts in rehearsal: “The director says, ‘Let’s change that line to blah blah blah.’ Everybody’s scribbling in their book, everybody’s making pencil marks. Inevitably, there will be differences in what everybody thinks the line is, right?” Ensuring that everyone has the same script is crucial to running the show but very difficult to make foolproof. This is especially true when pages are reprinted and everyone must transfer their physical notes onto those new copies. P4 stated that creating a tool to simplify this process of parallel multi-editor script markup “could be a gold mine.”

To make rehearsal revisions more time-efficient and collaborative, P8 prototyped a tool optimized for collaborative revision during rehearsal. A character in their scene remarks, “writers can now draft scenes while actors workshop lines in real time. No more waiting on email chains from 2005.” A key feature in P8’s tool was the ability to toggle between “rehearsal”, “script”, and “show” modes; that is, for readers to be able to hide notes when they are no longer needed to improve legibility. For these playwrights, better script revision involves streamlining communication, and they valued tools that would keep all stakeholders on the same page as they rehearse and commit to different edits.

4.1.3 Co-writing with Collaborators

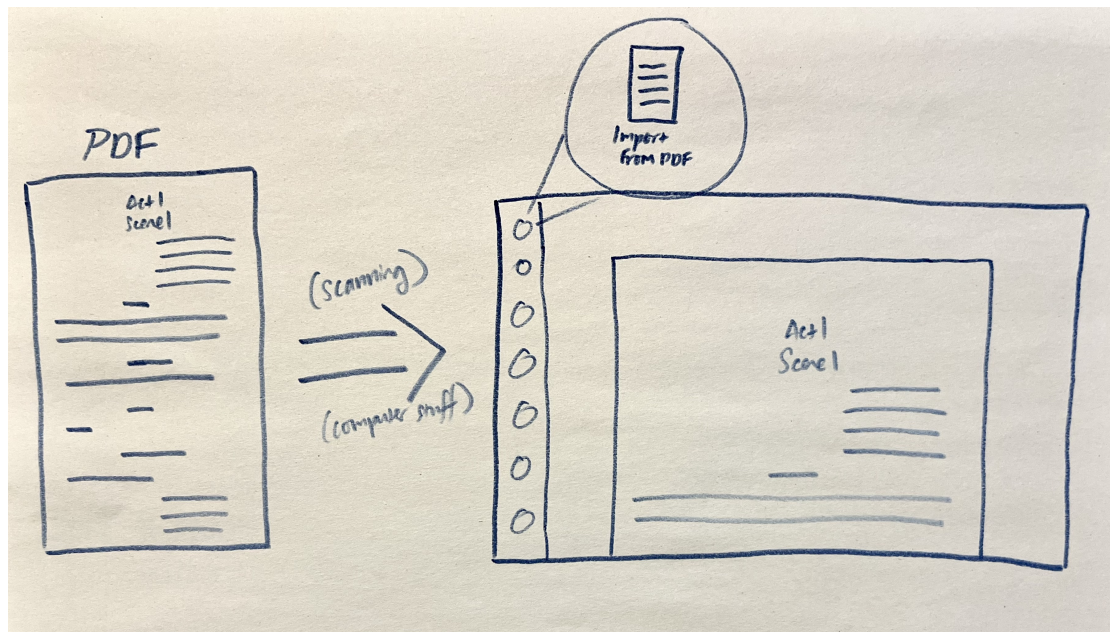


Figure 4.1: Workshop paper prototype. P5 proposed a tool that could import a PDF and accurately maintain its formatting.

Half of the participants expressed that they have collaborated with other writers on scripts, either as co-writers or by seeking feedback. Some playwrights (P2, P3, P8) chose to use Google Docs specifically for its ease of file sharing and collaboration. However, other participants (P1, P2, P4, P5) faced challenges trying to move horizontally [48] across multiple tools, with P5 expressing that they sometimes avoid collaboration for this reason. In lieu of a common tool or file format, playwrights find themselves needing to copy-paste formatted text from one platform to another—usually unsuccessfully. Put plainly by P1, “A lot of programs are really stupid about how they do pasting.” For example, P5 worked on a script with collaborators who all used different software. When the time came to combine everyone’s pages, they were unable to transfer text without breaking all the formatting, and ultimately “had to just go into my script and then just retype and format everyone else’s contributions as I went along.” The specific formatting rules of scripts are handled slightly differently by each tool, causing text to “completely fall apart” when it moves (P2). When discussing solutions, P5 proposed a tool that can import a PDF and maintain its formatting, since most writing software can export and import PDFs (Figure 4.1). When P5 asked if these converters already exist, P1 pointed out that they do, but “I don’t think any of them will pick up your formatting exactly the way you want.” As the software landscape currently stands, playwrights need to share formatted writing between tools and collaborators, but they often lack the capabilities to do so without significant manual work.

4.2 Incorporating Voice and Body

It is not only actors' voices and bodies that are part of performance; *playwrights'* voices and bodies are similarly important to the writing process. Playwrights sought ways to hear their work read aloud, to visualize the physical space and action of the theater, and to center the embodied aspects of writing. However, linear and typing-based writing software fails to support these practices, leading playwrights to search for solutions outside their tools.

4.2.1 Hearing Scripts Spoken Aloud

All playwriting is underscored by the question P10 asks themselves: “does this *sound right?*” Because plays are meant to be performed, playwrights are constantly considering the qualities of speech. Almost all participants expressed that reading aloud is an important part of their writing process, whether by themselves (P1-P7, P9-P11, P13) or in a reading group with playwrights or actors (P2-P7, P13). For instance, P13 brings their scripts to at least two of their playwright groups before submitting them anywhere; P9 uses an app to listen to their Google Docs drafts while on a walk, pausing to make notes when something “doesn’t sound right”. P4 described listening as “essential” given that “you’re writing for people to speak.” Hearing the script read out loud by *someone else* is particularly crucial because, as P11 and P12 discussed, the text “will always sound and feel different in your head,” especially compared to how an actor might interpret the same lines. “A word may look good on paper and sound really

good in your head, but when it's trying to come out of somebody else's mouth, they may get tongue-tied" (P6). The centrality of voice in playwriting distinguishes it from other forms of creative writing which are largely meant to be read silently to oneself, such as novel or essay writing; tools designed for these domains often overlook this important playwriting consideration. In this regard, playwriting has more in common with practices like songwriting or poetry.

When making Found Theater, I wanted to draw attention to the invisible considerations that playwrights make when crafting language that "sounds right" by incorporating unpredictability. In practice, no matter how carefully I drew my bounding boxes, the OCR engine almost always introduced noise: hallucinations, replaced glyphs (e.g., turning commas into periods, or i into ;), additional spaces, or simply incorrect text (see Figure 3.3 for examples). When we later read these scripts aloud, we made decisions about *how* to read this noise. Some people chose to read verbatim, pronouncing typos and adding unnatural pauses, similar to how we might expect a speech-to-text model to read. Others, myself included, leaned towards "interpreting" the text, which often led to assumptions about what the author "meant to say." The introduction of noise exaggerated the decisions that actors make when reading, making visible how much of that work is implicitly completed by the playwright. The Tesseract OCR engine that Found Theater uses does not "care" if its output is readable whatsoever. Reading these error-ridden scripts aloud highlighted how playwrights, under more normal circumstances, make decisions to improve readability and performability.

When asked to imagine software to support their playwriting, P1, P7, and P11

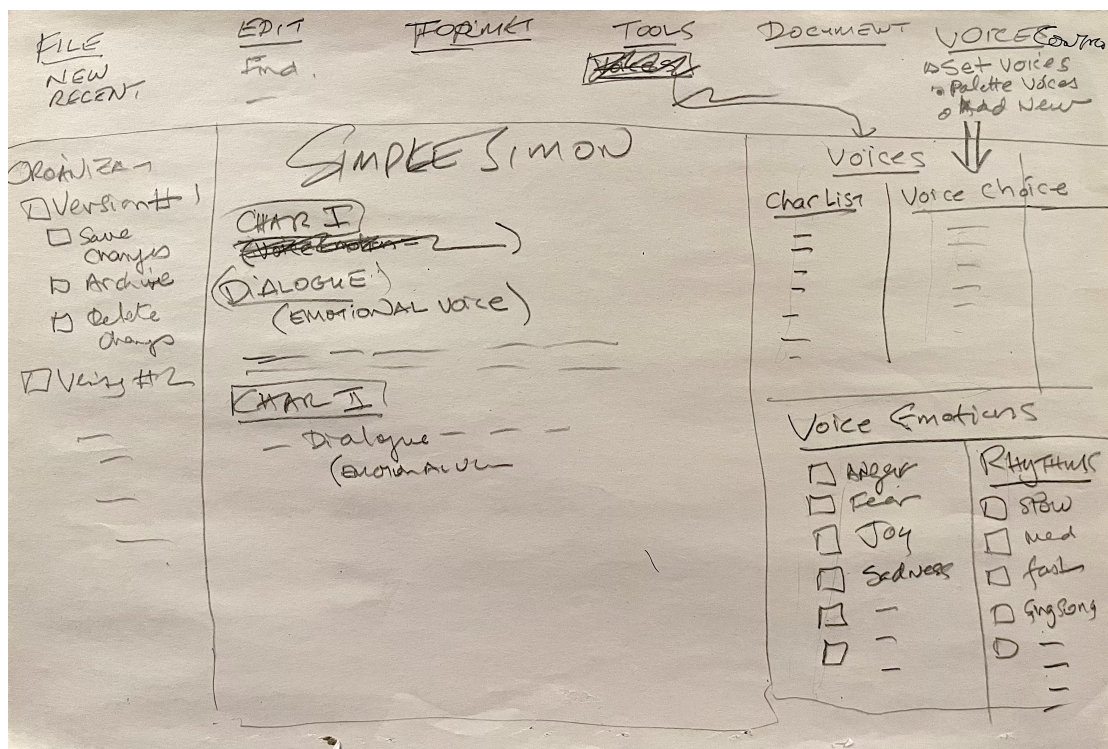


Figure 4.2: Workshop paper prototype. P7 designed a text-to-speech feature that allows the user to assign customized voices to each character, along with an organization panel to save, archive, and delete script versions.

(each from a different workshop) all prototyped tools that would read scripts aloud with customizable voices for each character (Figure 4.2). The user could hypothetically adjust audio qualities like volume and speed, and tune subjective traits like accent, rhythm, age, gender, and emotion. P1 suggested that this could be implemented with AI voices which, as technology improves, might “actually not sound like a robot these days.” The breadth and type of customization options in these imagined tools highlights how the unmet need is not simply text-to-speech,² it is the ability to meaningfully incorporate

²In fact, some screenwriting tools already have text-to-speech script reading features (see Appendix A), mostly with “robotic” voices. Only P13 described using such a feature, and they did so primarily to time their scripts.

human (or humanlike) speech into writing tools. “I mean, plays in particular have to be heard out loud,” said P1, “so why not, you know, do it in the process?” These script-reading tools were not designed to replace performance in any way; rather, P1 described this feature as “an editing process”, suggesting that one might use it to “see if [their lines] sounded like they were really speech.”

4.2.2 Visualizing Stage Action

Playwrights also consider the physical presence of actors. For some playwrights (P1, P10, P11, P13), visualizing the stage helps ensure that scripts are coherent and plausible. P13 pointed out how “as a playwright, I really think of the stage first. How does it look?” However, the text-based nature of their tools does not support creating these visual representations or maintaining awareness of stage arrangements. To realize these needs, P1, P10, and P13 voiced interest in tools that allow you to sketch the stage, place characters, and move them as the script progresses. For P1, stage representations were useful primarily for the playwright to have a better sense of their script: “It doesn’t have to be realistic, but just so that I can know who’s there... it’d help me remember.” Keeping track of stage movement can become difficult in linear writing tools as playwrights write, edit, and revisit different scenes in a play.

Tracking movement is often part of the production process, where character entrances and exits need to be cataloged for a number of reasons, such as directing actors to the correct side of the stage, preparing for lightning-fast costume changes, or

ensuring that double casting³ is possible. P10 explained that they take this logistical movement into account by making sure to include enough time (i.e., lines of dialogue) between a character’s exit and next entrance to allow them to change costumes. They chose to write footnotes to call attention to potentially tight changes, and requested a tool that could help highlight such moments where they might need to write in buffer time. Echoing this sentiment, P4 suggested that if Playground could automatically detect and generate a list of entrances and exits, “stage managers would love you for it.” For P13, visualizing the stage becomes more important as a play nears production, when they would draw stage diagrams to give notes to the director. Visualizing stage action is useful for both the playwright drafting their work and the company producing it, and playwrights sought tools to make this highly manual process more intuitive.

4.2.3 Playwriting with the Voice and Body

Playwrights’ integration of their *own* voices and bodies throughout the writing process is often in tension with what writing support tools allow: typing in a linear document. Revisiting speech, several participants (P1, P2, P4, P13) either used or wanted to use speech-to-text dictation in their writing process. For P2, voice notes were useful for capturing ideas when “I just can’t figure out how to write it.” Expanding on this solution, P13 proposed a tool where a playwright could dictate an entire script. For them, typing was just a means to an end, “so I’m taking the typing out of the whole

³Double casting is when one actor portrays multiple characters in one show. While some scripts intentionally call for this, a theater company may also choose to double cast characters who do not appear in scenes together, often for financial reasons.

thing.” The primary input modality for modern writing support tools is typing, but this is not the only way in which playwrights express themselves. In fact, some participants physically struggled with it, such as P1: “I’m not a very good typist, so it’s faster for me to do that [use speech-to-text], even with all the headaches and correcting it and everything.”

Playwrights also described how their sensory perceptions and bodily experiences played important roles in their practice. For P11, part of writing is *feeling* how your characters feel: “When you say, ‘how do you feel when you’re writing?’ I felt like my characters. I wanted to cry. I felt the bullet going into me. I felt the receptionist being bored, typing the same shit over and over again.” P1 elaborated on how the writing process is much more than typing, where in one writing session, “I’m all over. I’m probably typing and then sitting back and looking and then going over here and seeing what this person said some other time.” For them, experiences outside the writing interface were key to the playwriting process. P5, P9, and P13 expressed that physically moving was helpful for getting out of a creative rut, citing activities like spending time in nature, going on walks, visiting nostalgic places, sitting at coffeeshops, or writing while traveling. In many of these cases, the playwrights did not bring or have access to their laptop to write, opting instead for mobile phones, public computers, or pen and paper.

In fact, pen and paper remain ever-present even in modern playwriting, with 9 playwrights describing writing by hand at some point in their process. Across notebooks, sheets of loose leaf, and printed scripts, playwrights would hand-write ideas for new

plays, reading group feedback, notes-to-self, lines of dialogue, and scene explorations. Going one step further, P3 has a habit of writing their entire first drafts by hand. “Maybe it’s superstitious,” they said, “but I’ve always done that.” They suggested that, in comparison to typing, handwriting “slows you down”, forcing the writer to be more intentional. P5 noted that without the extra layer of a digital interface, writing by hand “feels a little bit more like me.” Even with a wealth of digital tools available, playwriting is an act of the body, where playwrights’ voices, senses, and physical materials are instrumental in the creative process.

4.3 Managing Script Elasticity

As they move through the stages of play development, I found that playwrights needed their scripts to be able to quickly change structure and shape, or to exist in many formats at the same time. I describe this quality as *script elasticity*: the ability for a script to easily “stretch” into new forms and return to those previous forms when they are needed later. Playwrights needed their scripts to be elastic for a wide variety of reasons, which often aligned with the previous two themes. For instance, they might want to slightly modify script versions to send to their lighting and sound designers, to hear an actor read something aloud before committing to a more permanent revision, or to restore a previous draft to compare with a collaborator. However, playwrights’ writing tools did not support this kind of elasticity, favoring unidirectional progression towards a singular final draft when, in reality, creative writing is rarely so straightforward.

4.3.1 Seeing One Script in Many Ways

11 participants indicated that they submit their work to playwriting opportunities like contests and festivals, researching many calls for submission to determine where their work might be a good fit. Each opportunity comes with its own requirements for theme, genre, location, format, artist statement, page count, anonymization, and more. In most cases, playwrights described tailoring an existing work to a particular call rather than writing new pieces from scratch. P13, for example, shared that they might send out one hundred total submissions in a year, each of which is a customized version of one of five distinct plays. While some venues accept flexible or standardized formats,⁴ others have their own rules, forcing playwrights to manually reformat the same work for each submission. Additionally, three participants would extract excerpts from longer projects to submit to venues with length restrictions, and two noted how some submissions must be anonymized. Formatting for submission is a manual, time-consuming, and tedious process, as expressed by P10: “if you submit to Yale Drama, which is one of the major contests... you have to reformat the whole friggin’ thing to get into their contest.” This was particularly frustrating to P10 because they struggled to read the required typeface (Courier New 12pt) due to its low weight, and preferred to write in a different font for the benefit of themselves and their actors.

Following these conversations, seven participants included automatic re-formatting in their prototypes, making it the most commonly represented feature by far. These

⁴The Dramatists Guild of America offers several widely-used downloadable formats for plays and musicals. <https://www.dramatistsguild.com/script-formats>

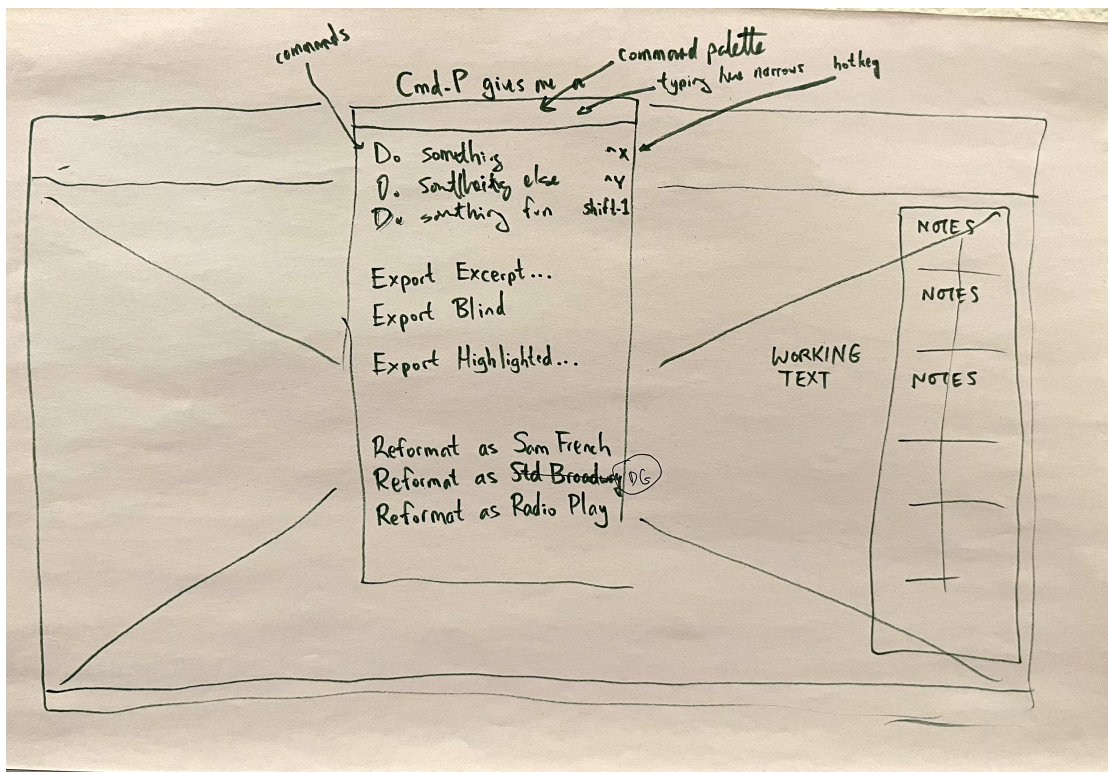


Figure 4.3: Workshop paper prototype. P4 sketched a menu with commands to automatically export and format a script.

speculative tools enabled one-click restyling, turned PDFs and incompatible file types into editable documents, and worked with both industry standard styles and custom user presets. P4's proposal (Figure 4.3) allowed a user to reformat a script and export excerpts, anonymized (blind) submissions, or highlighted versions for actors. Their scene emphasized how the features enabled a character to quickly submit to multiple contests and opportunities, using the "hours" saved to focus on more meaningful revisions. P3 implemented their feature as a single button (the "F39 key") that would cycle between popular formats, reducing the learning curve as much as possible. Playwrights wanted their scripts to be able to quickly and reliably shift between formats when new

opportunities and needs arose, particularly when these formats are incongruent with writing needs.

4.3.2 Creating Version Histories

Nine participants described creating version control systems as part of their writing process: when they were ready to start a new draft, they would duplicate the most recent document, title it “draft $n+1$ ”, and work from there. The threshold for starting a new draft varied but typically hinged on whether or not the playwright planned to make “significant changes” (P6). Others, however, erred on the side of caution, producing new drafts more frequently. P4, a software engineer who used Git as their playwriting version control system, would “obsessively notate my versions almost every time I touch the file” with a commit message indicating the new version number or date of edit. Similarly, P8 exported a new PDF “every single time that I feel like I’ve changed [the script].”

Duplicating files in this way allowed playwrights to practice “non-destructive editing” (P2), which was crucial to several participants (P2-P4, P6-P9) who remarked on how they almost never delete any of their writing. Having access to these histories meant that playwrights could return to a past version whenever they needed. When P13 received reading group feedback that “reinforces an earlier comment”, they could trace back to that earlier version to revise accordingly. At a larger scale, P7 once “decided to rethink everything” about a script, so they returned to an old version to try again. P6 described a scenario, where they drafted a 30-minute script, shortened it to 10 minutes

for a submission, then returned to the original draft to rework it into a full-length script, reintroducing elements they had removed for the shortened submission.⁵

Regardless of whether or not they “need” to return to past versions, the existence of a history proves that a playwright has made forward progress. For several participants (P4-P6, P9), being able to look back on the “evolution” (P5) of their work was both motivating and useful. P9 enjoyed reflecting on their past work and seeing how they’ve grown as a writer, saying “thank God it progressed from there!” Focusing on the practicality of version history, P4 had long been trying to “evangelize [Git] version control among my playwriting friends” so they could “see logical progression of their script” in an organized way.⁶ For playwrights, maintaining a history of work is crucial to their writing and editing processes, allowing them to revisit and resurrect their words across projects and timelines.

4.3.3 Developing and Navigating an Archive

While playwrights’ self-made version control systems are critical tools for writing, locating the right version can become difficult as one script rapidly expands into dozens of files. P7 emphasized how frustrating this can be: “you want your work to be preserved, but at the same time, you don’t want it to be a hassle in trying to save all this, because where does it go?” Playwrights must determine how and where they

⁵Many submission opportunities categorize plays by length. Common play categories include 10-minute (about 10 pages), one-act (about 30 pages), and full-length (about 75 pages). For a list of example opportunities, see Dramatists Guild’s list of contests: <https://www.dramatistsguild.com/taxonomy/term/290>.

⁶Unfortunately, they described these evangelization efforts as “completely futile,” largely due to playwrights finding Git unintuitive and difficult to learn.

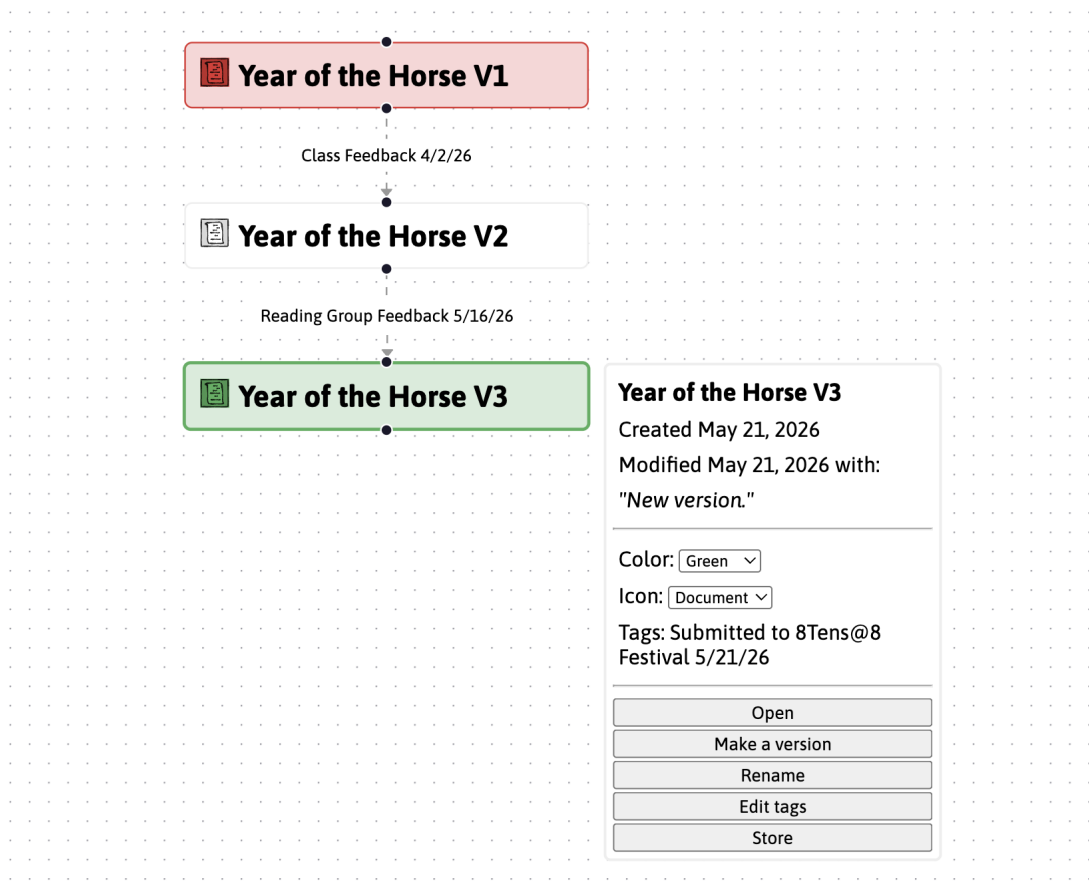


Figure 4.4: Screenshot of Playground recreating P13’s use case for organizing versions with arrow labels, colors, and tags.

want to save their work as they write, but technology can be unreliable; six participants expressed fears over work disappearing when using cloud storage, with some having lost writing for unknown reasons. Even if scripts are reliably saved, navigation is its own separate problem. At the time of their interview, P4 had just received detailed feedback from a theater company on a script version that was, by then, several months old. To figure out exactly what version they had sent, they looked for the relevant email thread and checked what files they made around that time. Developing an archive of work often

involves a mix of cloud storage, local backups, hard copies, and even communications with collaborators who might have the version they're looking for. What begins as one script can balloon into an entire ecosystem of files to maintain indefinitely.

Playwrights thus developed strategies for signposting and navigating their scripts. As previously mentioned, many playwrights numbered their drafts (e.g., V1, V2, V3...) to keep their files in order. P5 and P13 included the purpose of a draft in the title, such as the name of a submission opportunity and its deadline. To provide even more context for themselves, P5 described adding their last name to flag whenever they exported a PDF of a particular version. Outside of naming conventions, P9 and P13 maintained spreadsheets and documents to track all of their submissions. After using Playground, P13 expressed how it could ultimately replace their spreadsheet: they used tags to indicate where and when they submitted a script, color to mark acceptances or rejections, and arrows labels to notate what feedback was addressed in each version (see Figure 4.4). Playground allowed them to visualize the relationships between scripts and identify what they were looking for. P2, P5, and P6 were interested in the version comparison feature for similar reasons, as it could help them identify where two script differ, why they made those changes, and which one they needed to edit.

During the workshops, some participants prototyped their own tools to aid in organization and archiving. P7's tool (Figure 4.2) included built-in version control features like creating, branching, archiving, and deleting versions of a script.⁷ P12,

⁷P7 talked about having used GitHub for programming work in the past, but they did not choose to use it for playwriting due to its complexity, preferring to use the file numbering system they developed instead.

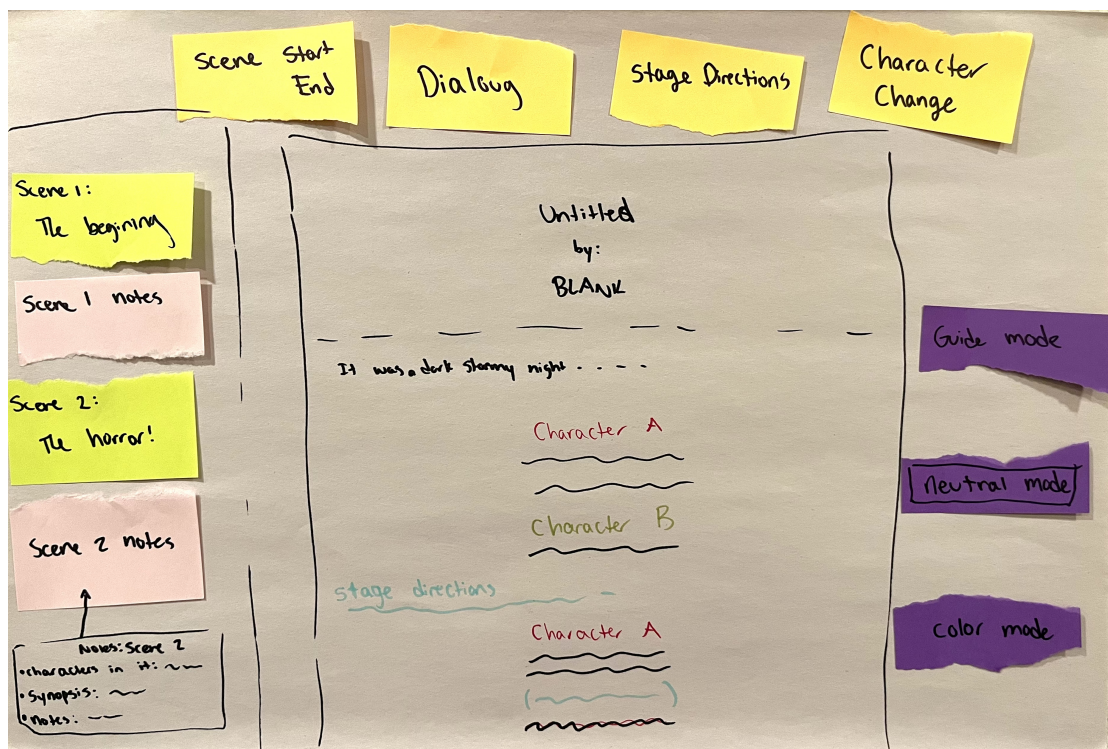


Figure 4.5: Workshop paper prototype. P9 proposed a tool that displayed an outline to the left of the script where the user could annotate scenes with notes like synopsis and characters.

however, chose to design a tool that would allow them to revive files from the past: “it opens a file from 1997, a manuscript or something I wrote in ancient history... and it will auto-format the thing into whatever my contemporary need is.” Playwrights access their work across long lifetimes, but compelling ideas can outlive software compatibility timelines. In the same vein of familiarizing oneself with old work, P9 proposed “scene notes” that the playwright could write to help orient themselves if they came back to the work in the future (Figure 4.5). Part of the script elasticity that playwrights valued is the ability to *return* to previous states, which included both reaching into the past and preparing oneself for the future.

4.4 Writing through Collage

“The next step in creating a play requires the exploration and development of the germinal idea by collecting materials, scenes, and thoughts. A *collection* contains all the ideas and pieces of information a writer gathers as possible material for a play.” Smiley and Bert, *Playwriting: The Structure of Action* [74]

The scene-based, piecemeal nature of plays means that playwrights are constantly writing and rearranging lines, scenes, and ideas in a process that can be understood as collage. Playwrights described how writing involves capturing inspiration, restructuring their writing, and moving across a wide variety of documents. Found Theater builds on these behaviors by constraining writing exclusively to collage. These non-linear behaviors are necessary to the writing and editing process, but generally unsupported in linear writing tools.

4.4.1 Collecting Material and Inspiration

Writing a play is about collecting and (re)arranging material. P3 emphasized how writing is a way of expressing ideas that come from daily life: “Sometimes an idea is a song or it’s a bite of a banana you just had or something. I mean, we’re talking about creativity, right? It’s not always words on a page. So somehow [we need] to be able to capture that creative spirit in whatever form it comes.” Of course, “possible material” can appear to a playwright at any time, regardless of whether or not they’re ready for it. As P5 put it, “sometimes inspiration strikes, and I don’t have the technology with me.”

To embrace this perspective on creativity, Found Theater asks the writer to

look towards their existing collections for inspiration. By removing the ability to type and instead constraining your vocabulary to image contents, the tool asks you to give renewed attention to your surroundings, digital and physical. Anything could become a character, a stage direction, or a line of dialogue. A1 noted how they seemed to take more photos or screenshots than usual in order to prepare for a Found Theater script, saying, “I’ve been paying attention to text in my life in a different way and thinking ‘oh I should save that, I can use that later, in my found script!’” A9 demonstrated this when they shared a social media post as potential “found media” for us to use. Many of our Found Theater scripts were an exercise in reinterpreting what we already had on hand. For example, A4 wrote a script using a single screenshot of messages between her family members “because I wanted to see how I could re-sample/remix the same areas to extend my relationship with that one image.” When any offhand smartphone picture or image download can become play material, the process of “writing” encompasses the process of “collection.”

While Found Theater represents an exaggerated form of collection, participants did share the importance of capturing and incorporating their inspirations into their writing. Playwrights described how ideas come to them when they’re out and about, whether they’re at the supermarket (P10), walking the dog (P6), or on public transit (P2). Much in the spirit of Found Theater, one of P3’s plays was inspired by a shirt they saw on campus that read “paramecium do it better.” When away from their computers, playwrights scribbled ideas in physical notebooks or mobile apps to later transfer into their primary writing software. Unfortunately, P2 and P5 both lamented that these

notes easily get lost: “if they’re on my phone, they’re gone forever.” Without tools that can work well on-the-go or easily integrate collected material, playwrights lose track of potential inspiration. P2, who often used videos and games as reference material for their plays, aimed to capture that creativity in their proposed tool by designing a multimedia comment feature to bring “descriptions of sensory experience” directly into the software. The multimedia nature of theater inspired playwrights to draw on their daily experiences to collect materials, but they struggled to effectively connect those perceptions and experiences into tools that can only support “words on a page.” Found Theater is an exercise that shows that any material can become a play, so long as playwrights have the affordances to do so.

4.4.2 Rearranging Script Structure

Plays are typically structured as a series of scenes which each capture a plot beat, interaction, or idea; these scenes are discrete units which can often stand on their own and be flexibly moved around the play timeline. When it comes to writing and editing, “one of the things that would be really important to us as playwrights is the order of things” (P6). Seven participants described how part of their writing process is shuffling pieces of text—as short as a phrase and as long as multiple scenes—to restructure the work. When they’re feeling stuck, P9 will “try to reorganize [plot points], and a lot of times that’ll fix a lot of issues for me that I didn’t even realize I was making for myself.”

However, the standard page-based document format complicates the reorgani-

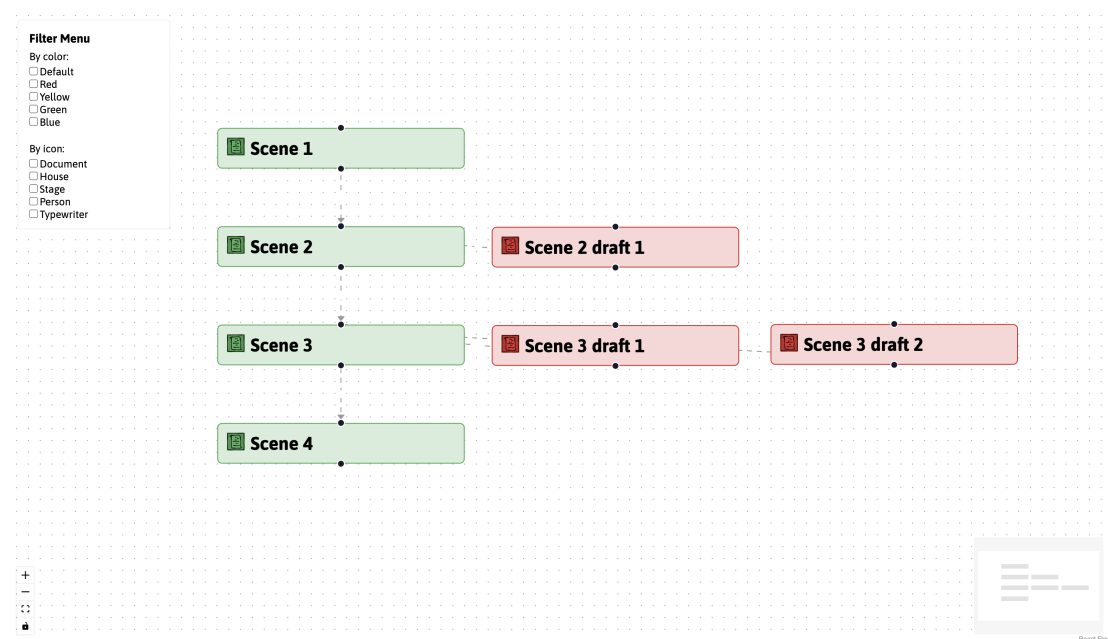


Figure 4.6: Screenshot of Playground recreating P9’s demonstration of breaking up a script into scenes. The green scenes in the left “column” represent their preferred drafts, and the red scenes in each “row” are previous drafts.

ization process. For instance, P6 explained how their writing software doesn’t “understand” what a scene is, so it cannot update scene numbers after a scene is inserted.⁸ Playwrights therefore wanted tools to visualize, analyze, and modify a play’s scene structure. P5 suggested having a way to see the order of character and setting appearances in a script to ensure that important plot elements are introduced at the right time. Some participants shared their pen-and-paper strategies of using index cards to organize scenes (P10) and drawing an act diagram to get a sense of whether “my story has the general shape of a story that’s good” (P12), expressing interest in useful digital counterparts. For example, P6 and P9’s speculative tools included scene lists

⁸Notably, P6 used the screenwriting software Final Draft, which one might expect to “understand” scenes compared to a general-purpose word processor like Google Docs.

with notes (Figure 4.5) and or outlines that the playwright could manipulate. While most participants preferred having a full script in a single document, P4 shared that they knew playwrights who “break up their script into individual scenes, and then each scene is its own document.” P9 demonstrated how they might write this way using Playground because the interface would allow them to better visualize their play as a series of scenes, each of which could have multiple iterations (Figure 4.6). P5 and P13 similarly suggested using Playground to map out plot points in the early stages of writing. Playwrights often write and edit by altering structure, cut-and-pasting chunks of text from here to there in a document. A script therefore needs the ability to easily shapeshift, which is made difficult by highly linear tools.

4.4.3 Working Across Script and Non-Script Documents

With materials collected and first drafts written, the process of writing and editing becomes one of collage: playwrights cut and paste lines, rearrange scenes, and add color where needed. Version histories can serve as palettes of materials [78] for playwrights to use *across* projects; a piece of writing that did not work for one play could work for another. P2 explained, “I don’t want to trash anything” because “[I] cannibalize my own work, so if there’s something that didn’t work, I might use it in another play.” Others maintained a similar practice of moving lines they cut into a “graveyard” (P9) or “unused lines” (P7) document for potential use in a future project. Being able to revisit past versions meant P5 could “see where my thinking was in the past. Maybe at that point, I had a pretty good idea... that’s better than what I have

[now], so maybe I'll reintroduce that.”

Outside of scripts, every participant described creating auxiliary documents for a wide range of writing-related information: brainstorming, outlines, research, plot analysis, character development, feedback, cover letters, artist bios, diversity statements, and surely more that went unmentioned. The strict formatting rules of scripts means that this information generally lives in separate documents or apps, rather than being recorded in situ. In addition, theater is a domain that heavily relies on paper, as described in 4.2.3. Scripts are made to be printed, and those paper copies accumulate notes, edits, and commentary that playwrights might bring into future scripts. In short, playwrights are in constant movement between many different documents, on screen and on paper, as they write their scripts: “Pieces are on paper, pieces are on the computer, in an iPhone note that I may lose track of forever” (P5). Writing is a back-and-forth process of putting those pieces together into a coherent and compelling script.

Chapter 5

Discussion

Studying playwriting through workshops, interviews, and tool development revealed how the practice of live theatrical performance shapes playwrights' creative values, and how they imagine and implement solutions when their tools fail to support their needs. From these findings, I now propose the lenses of *embodiment* and *non-normative temporality* for engaging in creativity support research. I also reflect on how workshop design can platform participants' creative expertise and create a strong foundation for discussion. Studying practitioners through these lenses and strategies reveals creative behaviors and insights that are not captured when focusing on tools; I offer these reflections as useful ways to expand creativity support research by bringing those overlooked behaviors, values, and processes into focus.

5.1 Embodied Practice

"In short, philosophy, in the theater, must unfold itself, literally, as a thinking of the body." [77]

“Playwriting” encompasses all of the actions that go into writing a play, and our participants demonstrated how those actions frequently extend beyond software use. Building on Dourish’s definition of embodiment as “the property of our engagement with the world that allows us to make it meaningful,” [21] I look to the phenomenology of theater to understand how *playwrights* produce meaning. States describes how “the playwright himself becomes the actor in the act of writing,” using “the instrument of his own organism” to work through the possibilities of a character [77]. As discussed in 4.2.1, a critical part of playwriting is speaking a script out loud to determine if something sounds and feels right—the playwright assumes the role of the actor as they write. Furthermore, Merleau-Ponty asserts that “it is impossible... to decompose a perception, to make it into a collection of sensations, because in it the whole is prior to the parts” [57]. For playwrights, then, dialogue cannot be fully understood without the *sound, feeling, and all of the sensations* that accompany it. It is these real-life perceptions that make rehearsals so important to understanding cast and crew needs concretely, rather than speculatively (4.1.2). The actions of embodied practice uncover meaning that exceeds what a playwright can understand through words or thought alone.

Studying practitioners through the lens of embodied practice allows creativity support researchers to expand and therefore support the range of actions, perceptions, and experiences that make up “the act of making.” In their study of expert practitioners’ creative strategies, Nicholas et al. describe how they reflect on process through tangible artifacts as embodied *proof* of their effort [63]. Consider how most participants still

wrote by hand at some point in their process (4.2.3), citing the importance of slowing down [56] and the physicality of paper [72]. Analog sketching has remained an important part of HCI for similar reasons, with researchers like Sturdee et al. calling attention to sketching as a way to think and engage beyond text [79]. Practitioners also reflect on embodied *action* and echo Brody et al.’s call for researchers to consider bodies, especially disabled bodies, “as active agents that influence the conditions, timing, and form” of creative work [15]. In 4.2.3, for example, participants expressed how writing is more than typing, particularly when typing is physically difficult. How would they react to the screenwriting tool Celtx,¹ which features a “Writing” timer that only ticks up when the user is typing? By explicitly validating a narrow set of actions as writing, tools like Celtx impose a harmful and limiting rhetoric on what creative practice should look like.

How, then, should we design tools that expand our vocabulary of writing behaviors, rather than constrain it to typing and clicking? Researchers might explore the possibilities of writing actions through tangible interfaces like SonAmi, an interactive coaster that prompts creative writers to reflect when they lift their mugs [8]. Incorporating everyday motions, like taking a sip of coffee, into the writing process helps us understand how writers’ actions, not just their words, form meaning. Conversely, calling attention to such actions could take a writer *out* of their embodied experience by making the tool present-at-hand [21]. Researchers might then choose to position such tools as design probes [86], rather than creativity support tools, to study the possible

¹A screenwriting tool. <https://www.celtx.com/>

tensions between tools and embodied action. Expanding the focus of study in this way can support our understanding of the physical factors that inform tool use and highlight the importance of taking non-normative writing actions seriously. I look towards creative writing software that is not a means of document creation, but a tool that helps playwrights move through the world with creative intent.

5.2 Non-Normative Time

“In the theatre, time can be compressed, accelerated, slowed: it can be—indeed, it nearly always is—irregular.” [84]

Playwriting is a practice which, by nature, operates in non-normative time. To position writing practice in opposition to normative time, I apply theories of queer time and crip time to playwriting processes and behaviors. Kafer writes that “rather than bend disabled bodies and minds to meet the clock, crip time bends the clock to meet disabled bodies and minds” [36]. In other words, crip time asks us to allow the body to take as long as it needs. Intertwined with this work is Halberstam’s notion of queer time as the potential of “a life unscripted by the conventions” of heteronormative and capitalist society; queer time rejects paradigmatic life milestones (such as marriage and childbirth) in favor of queer people defining their own futures [31]. Through these lenses, playwriting is a practice that can afford to take as long as it does because it is often not motivated by capitalist goals. I want to highlight that none of our participants indicated playwriting as their occupation, and yet, they have committed to this craft, some for decades. Playwrights are well aware that a script can be a work-in-progress

for long, undefined periods of time 4.3.3, and that old work is often resurrected (4.4.3). Instead of responding by trying to expedite their writing, participants like P8 and P12 designed tools to support these long lifetimes, to keep even the oldest scripts accessible for as long as a playwright needs. By choosing to take their time in a capitalist society despite the lack of financial gain, playwrights are effectively queering and crippling time.

Studying creative writers through this perspective of non-normative time reveals the ways that tools impose normative time to undesirably constrain writing processes. Recalling the issue of software compatibility timelines (4.3.3), P4 stuck to open source tools to ensure they would never lose their writing due to an unwanted software update. Similarly, P8 avoided writing on their institutional Google Drive in case their account were to be deleted after graduating. All software comes with an expiration date, forcing playwrights to decide what time constraints they are willing to work within.

At a smaller scale, writing tools fail to represent “stage time” [32] through text in a way that reflects how a playwright, actor, or audience member would experience it. For instance, one main reason why playwriting contests enforce formatting requirements (4.3.1) is so they can estimate that one page is about one minute long. It is *time* that matters, not page count, but page count has become the easiest way to *measure time*. In other words, the linear, page-based layout of print-optimized writing tools has materially shaped how and what playwrights can afford to write within limited page space. Writing tools fail to express our embodied experience of time when they rely solely on the quantity of text and whitespace to represent time.

What, then, would it look like to develop writing tools that refute normative

time instead? How might we design in and for crip time and queer time to align writing environments with creative writers' embodied experience [69]? I propose that creativity and writing support researchers use non-normative time as a lens to break down unwanted constraints and align with writers' idiosyncratic timelines. Researchers can look towards the time constraints that do and do not define a creative practice to understand how the duration of a project shapes its needs, informing the design of tools that support alternative temporalities.

5.3 Participant Practice-Led Methodology

In designing the workshop study (as described in Table 3.2), I knew early on that I wanted to incorporate playwriting in some way. Like all artists, I felt that there are some ideas are best conveyed through my art. Building on Vine et al.'s work on configuring participation, I wanted to center the participatory design process around my participants' unique skills to allow them to engage how they saw fit and shift some power from researcher to participant [83]. When studying creative practitioners, incorporating their practice can be a way of engaging in practice-led research that centers *participants*, rather than researcher, as practitioner [17]. Having conducted these workshops, I want to reflect on how this playwriting-based methodology presented opportunities for participants to leverage their creative expertise, feel comfortable engaging with the research activities, and connect with one another and the research team.

Asking participants to express themselves through their craft allows them to

utilize their creative expertise and helps lead to practice-specific insights. When deciding how to run the design fiction activity, scene-writing felt like the obvious choice: of course I should ask playwrights to write plays! For these participants, playwriting was both a technical skill and an important channel for creative expression. Given that my research goal was to learn about playwriting as a practice, having participants write scenes during the workshop gave them an opportunity to reflect on those practices in the moment. Participants' scenes would typically set up a problem for a fictional playwright that the tool could somehow solve. Most setups were realistic writing scenarios that they may have personally experienced, while others poked fun at our reliance on technology—P9's scene opened with, "Oh my god! I cant believe that we're falling from this plane and the only thing that will save us is writing a short scene on this playwriting software!" In some cases, one character would walk through the tool while others expressed initial resistance (P8: "Let me guess, another digital headache?"), followed by interest ("Okay. That's... actually cool."). Like in these examples, participants used action, humor, and character development to convey reactions to potential software. These creative expressions contextualized the paper prototypes to be less about interface design and more about *how tools affect playwrights' attitudes toward the writing process*, which was what I actually sought to learn.

The process of writing and reading scenes also offered multiple ways for us (myself and the participants) to experience and process their ideas. For each playwright, we were able to (1) hear their verbal description of their design fiction, (2) see and touch their prototype, and (3) act out their scene. Participants played the roles of not

only playwright but actor, director, designer, and audience. For researchers studying creative practice, embodying different creative roles and experiencing a variety of sensory phenomena can lead to insights about a practice that are difficult to uncover through interview alone. Giving participants the chance to reflect not only *about* but also *through* their medium can lead to rich and layered data that is unique to the practice at hand.

Incorporating activities that are familiar to participants can help them situate themselves in an unfamiliar research environment. I chose to do this by asking participants to both write a scene and read their writing. For playwrights developing new work, readings are one of the best and most common ways to get feedback on a piece—seven participants said they had participated in readings before.² Participating in a research study can be stressful, particularly when introducing activities that participants have no experience in, like sketching and paper prototyping. Likewise, discussing technology can be intimidating for people who may not feel technically experienced; while describing the steep learning curves of specialized writing software, P3 remarked, “I’m a creative person. I can’t learn technology,” a sentiment that P6 and P9 later shared as well. Including a familiar process can be a reprieve in the process of meeting strangers and learning research techniques; participants have an opportunity to think, “oh, I know how to do this, I’ve done it before.”

The short excerpt reading in the *Contextualizing* workshop phase helped build rapport and camaraderie between participants by familiarizing themselves with each

²Seven participants explicitly described bringing their work to reading groups or classes. Based on what participants shared about the organizations they belong to and their theater backgrounds, I think it is highly likely that even more have participated in readings but did not bring it up during the workshops or interviews.

other's work. I chose to include this in the study protocol but intentionally exclude it from data analysis because I wanted participants to feel comfortable sharing their opinions and creative writing with one another by the time we began the *Telling* and *Making* phases. Researchers might implement similarly practice-specific strategies based on their subject population: a study on traditionally-trained oil painters might style their methods after formal art critique; design fictioning with poets might involve an unrelated freewrite and short poetry reading to break the ice; a workshop with knitters could invite them to bring a current project to work on while they talk, like a social knitting circle. The inclusion of a practice-specific process can signal to participants that the researchers are also practitioners themselves, or that they have at least done their due diligence into the craft. Creating an environment where participants feel comfortable engaging is necessary to conducting good research.

Chapter 6

Design Considerations

To create playwriting support tools is to develop tools which **support the messy creative practice of playwriting over the productive act of document creation**. I view playwriting practice through Chung et al.'s lens of artist support networks, to call for tools which support both the play (artifact) and the playwright (artist) [18]. I foreground the unmet needs and speculative tools of our participants to offer four design considerations for software that empowers playwrights in their writing practice.

6.1 Bringing Speech into Writing

In 4.2.1 and 4.2.3, our participants expressed the importance of incorporating spoken text into writing and the frustration of lacking adequate tools to do so. I envision tools which **bring speech into all stages of the writing process**. Playwrights exhibit a breadth of speech-based playwriting behaviors across the cognitive process

model of writing [22], including collecting audio and video materials for script *planning*, speaking out loud while *translating* from mind to tool, and hearing dialogue to support draft *reviewing*. I encourage tool designers to enable these behaviors and more, such as factoring speech into the often overlooked pre-writing stage [91]. One example is Rambler, a research tool built to meaningfully support writing with speech [49]. It bridges the gap between spontaneous talking and intentional writing by focusing on behaviors like macro-revision—a process similar to the scene rearrangements practiced by playwrights in 4.4.2. I echo Lin et al.’s stance that “writing with speech can be more than just dictation,” looking towards tools which celebrate the aliveness of speech rather than flatten it into static text. I also recognize that text-to-speech AI, as suggested by P1, may be an intuitive approach to this consideration. For researchers implementing speech AI, I emphasize the importance of critically engaging those communities first, and draw attention to how the development of speech AI has led to the exploitation of voice artists [2].

6.2 Visualizing Performers on Stage

Reflecting participants in 4.2.2, tools should **help playwrights track performers’ movements across a script**. I echo Zhao et al. [91] in highlighting the gap in tools for visualizing writing in non-textual formats; several participants proposed stage visualizations to help them coordinate and recall all the moving pieces on a stage. Toyteller [19] and PlayWrite [81] are tools which leverage movement and play as input

modalities for creative writing, allowing writers to manipulate character and prop representations to tell their story. Cardinal is another research tool with a similar goal of visualizing a film script from several perspectives, including a character interaction diagram and 2D and 3D spatial representations [53]. Providing the ability to see a script in many forms can support playwrights in understanding stage space and movement, as well as anticipating potential needs from theater cast and crew (4.1.1). However, these tools tend to implicitly or explicitly assume that there is a singular final output that the writer is working towards. For instance, a filmmaker might use such a visualization tool to help define a shot. In theater, tools should instead leave room for director and performer decision-making, aiming to ensure that a playwright is not being overly constraining. Visualization tools should aim to support playwright awareness, to “know who’s there” (P1), without overly imposing constraints on future theater-makers.

6.3 Contextualizing Script Version Management

Playwrights described how their collaborators, settings, opportunities, and project timelines require many different versions of the same script to exist simultaneously. In lieu of built-in support, and in defiance of the linearity of their tools, playwrights develop their own (often messy) systems for saving many versions of their work (4.3.2). I call for tools that **contextualize playwrights’ version management within their theater ecosystems**, and amplify Serman et al.’s work on *creative version control systems* which “foreground the roles version control systems play in creative

process” [78]. From their themes, I want to highlight playwrights’ use of versions as a *palette* when accessing many formats and iterations of a script, and multiple *fidelities* of versions when prototyping script viewing modes. Quickpose is an example of one such creative version control system [67]. By providing an interactive visual version history for creative coding, Quickpose supports practitioners in meaningfully engaging with past versions as useful creative *material* that helps articulate goals through iterative practice. Building on this work, I emphasize how, for playwrights, version management is also a way of engaging with communities of theater practice. Participants often created versions of scripts for specific people, such as production crews (4.1.1), co-writers (4.1.3), and competition judges (4.3.1). In the case of parallel multi-editor revisions, like mid-rehearsal script changes (4.1.2), version management can also mean reconciling different conflicting versions of the same script. Moreover, playwrights navigated versions through their creative networks, treating past email threads and collaborators’ files (4.3.3) as a sort of extended archive. Rather than remaking the “desktop folder” version control systems that our participants have implemented themselves, playwrighting version management systems should help playwrights orient themselves and their work within their creative ecosystems, making visible the connections between a piece of writing and its audience.

6.4 Moving Textual Material

Playwriting is often a process of collage: playwrights collect materials (4.4.1), work across a spread of documents (4.4.3), and reorder text (4.4.2). At the same time, however, cutting-and-pasting scripts leads to formatting breakdowns across both programs (4.1.3), and timelines (4.3.3). Tools for playwriting should **allow writers to visualize and rearrange text across documents** to support the non-linear writing process. Recent work like Masson et al.’s visual story-writing system [55] and Textshop [54] offer new ways to write through visual interactions like repositioning text and events, or visualizing a story as an editable timeline. Writing is an embodied practice, where authors work with text as an elastic material that changes in form (handwriting, on-screen text, speech) as much as content, as playwrights recontextualize their writing for the ever-shifting needs of reading groups, software tools, submission requirements, and performances. Calderwood et al. attend to these needs in their guidelines for designing *material writing support* tools; they introduce Phraselette, a poetry-writing interface which aims to “produce textual material and desired perturbations in landscape” by providing text suggestions that the poet can manipulate, transform, and constrain as they write [16]. I build on their recommendations of *contextualizing relationships between textual elements* and *permuting existing works* as they pertain to playwriting. As described by participants in 4.4.3, playwrights often “cannibalize” their own work, transplanting excised pieces of old plays into new ones and vice versa. Tools might allow therefore allow writing to exist *between* projects, similar to the “graveyard”

files of unused lines that some participants kept, or the notes-to-self I wrote in our research Discord that made their way into this thesis. Playwrights should be able to freely move text as they see fit, to remember where it came from, and to understand where it ought to go.

Chapter 7

Conclusion

7.1 Limitations and Future Work

I conducted this work through the lens of HCI research, where participants were aware that the research team may be tool developers as well. This framing influenced our analysis and perhaps the way that participants engaged with us in workshops (compared to, for instance, what they might share with researchers in performance studies).

This participant group represents a set of English-speaking playwrights practicing in a region with an active theater community. Because workshops were held in-person on weekdays, the majority of participants were students, retired, or had flexible working hours. The study took the form of workshops in order to foster conversation between playwrights, rather than starting with individual interviews to increase depth with each participant. Future work might seek to understand how different playwrights' needs and values are informed by their cultural, socioeconomic, and political

contexts; studies may achieve greater depth by exploring playwrights' individual workflows through contextual inquiry, interviews, or a longitudinal study.

Playground is a research prototype in active development. Following the formative study, our team intends to iterate on the tool design to address the feedback and insights from our participants. Once the tool is in a testable state, I plan to run an extended user study, where participants use Playground to write short works over the course of several weeks. This semi-longitudinal study would allow participants to develop a version management workflow within the tool that would not be possible in an interview-style contextual inquiry or user evaluation. This study may culminate in both follow-up interviews and a final workshop with scene readings and group interview-style discussions to understand how the affordances of Playground shaped playwrights' creative processes.

7.2 Conclusion

Through workshops with 13 local practicing playwrights and subsequent tool development processes, I found four key themes in playwrights' software use. Playwrights sought tools to scaffold the communities that form around their work, incorporate voice and body into writing processes, manage script elasticity across changing needs and timelines, and write through collaging collected and created materials. I encourage future creativity support researchers to expand our understanding of how body and time shape creative practice, and to design methodology that centers participants'

creative expertise. Looking forward, I move towards playwriting support tools by offering considerations for designing tools that engage with the particular needs of writing for theater communities. The lessons we learn from studying playwrights—whose writing often goes unseen, even by their audiences—set the stage for researchers to enable and empower unique creative writing practices.

Appendix A

Playwriting Tools

Tool	Target Users	Stage Play Templates	Planning Features	Script Listening
Final Draft	Screenwriters	✓	✓	✓
WriterDuet	Screenwriters	✓	✓	✓
Highland Pro	Screenwriters			
YouMeScript	Screenwriters		✓	
Celtx	Screenwriters	✓	✓	✓
Fade In	Screenwriters	✓	✓	✓
Scrivener	Novelists		✓	
Google Docs	General/Office			
Microsoft Word	General/Office			
LibreOffice	General/Office			
WordPerfect	General/Office			
Mac Pages	General/Office			

Table A.1: Overview of writing support tools submitted in recruitment survey.

Table A.1 shows a brief overview of commercially available tools for playwrights and some relevant features, based on the tools submitted in our recruitment survey. Of these tools, our participants did not report using Celtx, Fade In, or Scrivener.

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