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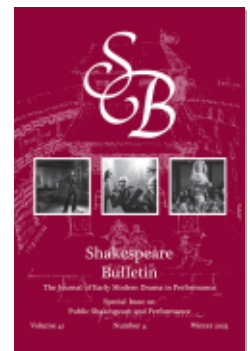
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Screens as Anthropomorphic Interfaces: How AI Changes Shakespearean Theatrical Publics

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ABSTRACT: Whom does the screen interface serve, and how do artificial intelligence (AI) tools affect theatrical publics across both the playing space and the playgoing space? Screens are a site where cultural and performative meanings are generated and negotiated. This article draws on interface theories to analyze the roles of screens in regulating publics' access to performance, producing new ambient conditions of theatergoing and changing the publics' relationships to themselves and to performance. Screens in *All the World's A Screen*, an Irish Sign Language production, served and became co-spectating theatrical publics. The organizers encouraged the theatergoing public to use an AI app on their phones, their anthropomorphized "machine guests," to obtain auto-captioning based on pose analysis of the actor and to receive retail suggestions that the AI deemed relevant. Operating both within and beyond the fabula of the performance, screens as anthropomorphic interfaces create multiple theatrical publics through an imperfect spectatorial proxy.

When AI goes to theater with humans, it changes the dynamics of the social space. One example is *All The World's A Screen*, an Irish Sign Language performance. Alvean Jones and Lianne Quigley signed select passages from *Macbeth*, *Romeo and Juliet*, *As You Like It*, and *Hamlet*, as well as Sonnet 18, with Shakespeare's text and modern English captions displayed on a big screen behind them. Staged by SignOn, the production was part of a research project funded by the European Union's Horizon 2020 program and led by Shaun O'Boyle, a science communication specialist, and Elizabeth Matthews, an Inclusive and Special Education scholar. The production experimented with machine translation in order to explore the boundary between the human and the nonhuman as well as the dynamics of human-machine relationships. This experimental community engagement event was staged in person in Dublin in 2022 and again with minor updates in 2023, before being developed into a short film entitled *That Is the Question*. O'Boyle's production was designed as

an inclusive event for “people and machines,” according to its leaflet. The organizers encouraged the audience to use an artificial intelligence (AI) app on their smartphone during all iterations of the performance.¹ Equipped with Google Lens, the app provided real-time auto-captioning based on pose analyses of the actors. During the final scene, the organizers asked the audiences to set the app to retail mode, revealing to those using the app several links to clothing items it had recognized onstage. Co-opted into commerce, the app linked the public of the theater with larger consumer publics.

The app was an alternate pathway for audiences into both the performance and the world beyond the physical theater. The actors, meanwhile, remained solely within their analogue sphere, without interacting directly with any screens, on- or offstage. As the actors signed their lines, interpreters provided a voice-over in English, which was auto-transcribed on an upstage screen. The auto-transcription of spoken words (themselves a translation of the sign language) was distinct from the auto-caption of sign language based on pose recognition on individual phones. The auto-captioning of sign language was flawed and incomplete, because the AI was only able to translate syntactical contents. In addition, a live video feed, also on the onstage screen, showed computer analysis of the actors’ poses and gestures, which illustrated how sign language machine translation works. Akin to a series of doorways enabled by content generators (actors and apps) and containers (interfaces), screens constructed contrasting patterns of dramatic vision of: (1) Irish Sign Language and its auto-caption based on pose analysis; (2) verbal simultaneous interpretation and its modern English transcription; and (3) Shakespeare’s text. As such, O’Boyle’s production differed from other Deaf performances in its uses of screens as anthropomorphic interfaces for aesthetic and inclusive purposes.²

As a form of intersectional, public Shakespeare, *All The World’s A Screen* highlighted the value of Deaf theater. It centered Deaf culture in Shakespearean interpretation.³ It also flipped the theme of accessibility, which is typically framed as a minority issue in “performances of spoken-language theater rendered simultaneously to Deaf spectators through a single interpreter using sign language” (Richardson 63), by granting hearing communities and individuals raised in “an oralist tradition” (Yates 80) textual access to a Deaf performance. Further, reflecting d/Deaf people’s increasingly common self-identification as non-disabled (Brueggemann 12), the multimodal production created a space that was hospitable to differently abled individuals with different modalities of cognition.

Whom does the screen interface serve, how do artificial intelligence tools affect theatrical publics, and how does the screen conjoin or disconnect people and ideas across the playing space and playgoing space? Screens in *All The World's A Screen* served and became co-spectating theatrical publics, as they also subverted minoritizing discourses: it was the public not versed in sign language who needed accommodation. These questions and iterations are particularly relevant in an era when the formerly spatial notion of live performance is becoming a temporal one. In theater circles, there has been a paradigm shift from “site-specific” to “platform-specific immersion” experiences, as Pascale Aebischer writes of Creation Theatre and Big Telly’s *Tempest*, produced during the global COVID-19 pandemic (57). These questions are particularly relevant, too, when the concept of “a public” has expanded from a collective of identifiable individuals who gather in the same space for a common purpose, such as patronizing a production, to include groups of self-identified or anonymous people with dovetailed, but not entirely overlapping interests, whose copresence is facilitated by screens as interface. These publics may or may not see each other’s faces or acknowledge the presence of others. Indeed, there may be multiple publics within a performance.

Screens are a site where cultural and performative meanings are generated and negotiated. In theater and film, the screen as interface is a dramaturgical agent of affect and effect. When characters’ presence is an integral part of the dramatic narrative, characters on a screen-onstage or screen-within-a-film have as much an embodied presence as characters onstage or within a film’s frame. Scholars in fields such as translation studies are also beginning to analyze how “matter matters;” that is, the ways in which “physical forms (including digital forms) not only allow the grasping of meaning but indeed shape and construct that meaning” (Goldfajn 455). A new force to be reckoned with now is the presence of AI on screens in the hands of theatergoing publics.

Playing new roles beyond more typical intermediality (“inter-exchanges of media in performance,” Mancewicz 3; “performance transacted through silent film,” Cartelli 47), screens big and small (and public and private) in *All The World's A Stage* were heuristic, prosthetic, commercial, and metacritical devices that constituted the publics’ relationships to themselves, to the society at large, and to the actors. Significantly, these screens were positioned beyond, but connected tangentially to, the fabula of the production. As a machine-learning model, the AI app made predictions by comparing what it saw with its dataset of sign language. Screens constructed both part of the object of vision (the performance) and its sub-

jects (the theatrical public). Aiming to promote cultural exchange among Deaf, hard-of-hearing, and hearing individuals through emerging AI technologies of representation, producers and actors of the show referred to the publics' phones as "machine guests" whom they "have brought to watch the show together" (SignOn). The production was a rare instance of multimedia theater work that: (1) framed screens as co-spectators (rather than as a tool or delivery device); (2) gave screens anthropomorphic roles of participation; and (3) expanded the notion of the publics to include humans and machines. The theatrical publics were recruited by the organizers to test and care for the new AI technology in the context of stage performance, to help train and refine that technology of representation, and to rethink their relationship to fellow theatergoing publics and to their "machine guests." And as mentioned, the app's translational and retail features merged theatrical and consumer publics.

Thus, the production, in its expansion of the publics through the copresence of anthropomorphized machine guests (screens in the hands of spectators), differs from "intermedial" works, such as the Wooster Group's *Cry, Trojans!*, that tend to elicit discussions of the technicity and affordances of screens as a narrative tool (Cartelli 5; Mancewicz 3–4). *All The World's A Screen* was also distinct from what some scholars regard as a mediatization trend to evacuate "a living human presence from Shakespearean reproduction" (Cartelli 256), such as Annie Dorsen's algorithm-driven *A Piece of Work* and Ben Rubin's algorithmic installation artwork, *Shakespeare Machine*, in the lobby of New York's Public Theater. Going beyond intermedial ecology, this article draws on interface theories to analyze screens' roles in constructing and facilitating multiple publics within a performance event. Screens regulate the publics' access to performance, produce new ambient conditions of theatergoing, and change their relationship to performance.

Co-Spectating Multiple Publics in *All The World's A Stage*

Beyond participating in the Anglophone tradition of using Shakespeare to launch new media and technologies, the actors in *All The World's A Stage* chose Shakespeare for artistic reasons.⁴ Situating themselves among the publics for classical theater, Deaf actors Jones and Quigley chose Shakespeare because it is an "important part of Irish history" with multiple versions to work from, including Shakespeare's and modern English versions (O'Boyle). According to O'Boyle, they were drawn to speeches that contain affective and informational contents (O'Boyle). These speeches

encourage, and even demand, a wide range of signing. They signed side by side in contrasting manners to activate and draw attention to different aspects of the same speeches.

Jones and Quigley use the same strategy of signing side by side in a short film, *That Is the Question*, which is a two-actor performance of Hamlet's "to be or not to be speech." Produced by O'Boyle in August 2023, the film was not public at the time of writing, but I had private access to it. Using AI tools such as the pose recognition program MediaPipe in the making of the film, O'Boyle's team retain glitched moments to show how the app failed to track all of the signing, similar to how artist Mark Amerika uses AI's "glitch potential" to "defamiliarize language for aesthetic effect" (5). They also use Adobe Podcast, an AI-driven tool, to clean up background noises in Caoimhe Coburn Gray's voice-over.

One important element being showcased here was the Visual Vernacular, or "elements of signing that portray emotional contents" of the speech (O'Boyle). Deaf actors employ this physical mime theater technique as an expressive tool, though current machine translation technologies are unable to parse performative aspects of the Visual Vernacular. For example, in *All The World's A Screen*, Jones and Quigley signed Macbeth's "Tomorrow, and tomorrow, and tomorrow, / Creeps in this petty pace from day to day" (5.5.22–3) in contrasting styles to emphasize, respectively, the more formal, informational contents, such as "tomorrow" as a temporal marker of the day after today, and the more expressive dimensions of Macbeth's disillusionment about the futility of life. To highlight how sign language privileges temporal markers and verb tenses grammatically, Jones and Quigley revisited the word tomorrow after signing "a tale told by an idiot . . . , Signifying nothing" (5.5.29–30), with the former signing it passionately and rapidly and the latter much more slowly and meditatively. The words they elided, "full of sound and fury," bear ironic weight here. They concluded with a line from *Romeo and Juliet*: "Farewell. God knows when we shall meet again" (4.3.55).

When it comes to sign language, machine translation has limits. Deaf Studies scholar Brenda Jo Brueggemann raises an important question about the implications of technologies' ability to render fluid sign language into textual forms to be "shared across distance, time, and space" (34). Sign language is more elastic and mobile than auto-caption, which fixes embodied performance in a textual form. In *All The World's A Screen*, the translation and its circulation are delimited by current technological limits. O'Boyle's team combined Google Lens's image recognition feature, mobile operating systems' auto-captioning functionality, and an API (ap-

plication programming interface) for pose recognition through wireframe tracking of the actors. Actors were transcribed by the app into wireframe figures. The app then translated the sign language contents into the modern English text (O'Boyle). Since sign language's grammatical structure differs from that of spoken English, and since the app is currently only capable of capturing the word-level grammatical, rather than emotive, meanings of hand gestures, the app produced fragmented English sentences. The fragmented translation may still work in some instances, such as "tomorrow, tomorrow, tomorrow" in *Macbeth*, but the app only captured partially and mixed up the passages signed simultaneously by different actors, when Jones signed at a fast pace and Quigley signed at a slow pace the same passages next to her at the same time. Part of the challenge lies in the algorithmic segregation of temporal and spatial information. Sign language, akin to embodied performance, conveys information spatially and temporally. Efforts are under way to capture spatial and temporal information separately and "perform late fusion" in order to move on from word-level sign language recognition (WSLR) to a holistic rendering of "subtle body motions, hand configurations, and other movements" (Tunga et al. 31, 37). For O'Boyle's purpose, however, the imperfection of the "machine guests" was the point of the experimental production, because the AI co-spectators would provide a different perspective on the production (O'Boyle).

Members of the public who deferred to their "machine guests" to follow *All The World's A Screen* may "see" a very different performance from those who understood sign language, because, in its present form, the machine translation technology cannot adequately convey poetic contexts, as shown by *That Is the Question*. In both the 2022 stage production and the 2023 short film, sign language performance of the actor's inquisitive line about "tomorrow?" in *Macbeth*, for instance, came across in auto-caption as a bland phrase, "the day after today" or "tomorrow." Hearing individuals became deficient and were at the mercy of their "machine guests" who often under-translated or mistranslated, essentially creating a cover or remake of the sign language performance.

This arrangement reflected O'Boyle and Matthews's conception of theater as a co-spectating and collaborative space. Theatrical publics are traditionally understood to be produced through "a unified and unifying process by which the viewer becomes the subject inscribed" in a performance (Hansen 240). O'Boyle's team used the notion of co-spectatorship to constitute a new type of theatrical public and to individuate the traditionally singular and collective theatrical publics. Multiple publics are also

produced by the meta-theatrical framing of simultaneous interpretation and machine translation. This multimodal performance is possible because vision is more capacious than hearing as a mode of perception. Peripheral vision enables the theatrical public to appreciate two actors signing simultaneously, whereas the audio channel operates differently. Typically, one can only discern with meaningful clarity one actor speaking at a time. In various iterations of *All The World's A Screen*, O'Boyle's team expanded the idea of multi-channel performance to include textual and sign language translations. In 2023, a new version was presented with a human captioner and a Google auto captioning app, producing two sets of competing, and sometimes complementary, subtitles on the screens beside the stage. An interpreter also verbalized in real time the words being signed in the form of voice-over narration. Additionally, there were two interpreters standing by the stage to provide International and British Sign Language translation simultaneously for those who were not proficient in Irish Sign Language, or who wished to compare these languages. The team wished to center, rather than "accommodate" (O'Boyle), traditionally minoritized communities' mode of cognition through the notion of co-spectatorship. The show highlighted multiple and equally valid ways of engaging with the world.

O'Boyle's concept of "machine guests" echoes the theory of co-spectatorship developed by one of the projects by the Society in Innovation and Science through CODEsign (SISCODE). Supported by SISCODE, TRACES is a nonprofit project promoting "participatory science engagement and social inclusion" with a strong focus on theatrical publics (Merzagora et al. 129). TRACES "embedd[ed] AI as [a] public of theater plays" in order to "increase the public awareness of the impact of algorithmic decision making in society" (Merzagora et al. 129). The team designed a prototype project, a theater play "involving AI and humans" to foster "co-spectatorship with artificial agents" in "the moments [. . .] when machines that can hear and see cease to be tools, when we stop being users" and "when we become public together" (Merzagora et al. 134). Shakespeare was the central focus of both TRACES's 2020 and O'Boyle's 2022 productions. In 2020, TRACES staged *Hamlet in the Gym with MTV* in Paris. TRACES reported that in the play, the prince worked out in a gym and dictated a soliloquy, in English, to his cell phone. The public used a variety of AI-driven apps on their phones to translate or transcribe the speeches (Merzagora et al. 134).

Similar to O'Boyle's production, *Hamlet in the Gym with MTV* encouraged participants to think of their AI apps as companions rather than as

mere assistants. TRACES framed participants as chaperones of the AI co-spectators whom they brought to the show, “as one would have accompanied a child or a disabled person” who would see the play in a new light, distinct from how human participants would parse stage actions (Merzagora et al. 134). For instance, insisting on a more rigid worldview based on object and pattern recognition, Google Lens labeled a character female when they lay on a pink mat. Another notable aspect of this co-spectatorship is the AI’s disregard of conventional theatrical etiquette, since they are not discrete and do not “remain silent during a theatrical performance” (Merzagora et al. 135).

In both *All The World’s A Stage* and *Hamlet in the Gym with MTV*, the AI’s outputs were a pixelated mirror image or a ghost of the publics, because the algorithms draw on collective datasets as well as individual users’ digital footprints to generate results, whether they were retail suggestions, translations, or transcriptions. These co-spectators produce what Marvin Carlson calls the “ghosting” effect in theater by representing former iterations of artworks in another medium (7). The co-spectators perform various versions of, and become integral parts of, the collective consciousness of theatrical publics. Humans who interact with these apps during a performance engage in a conversation with their own shadows. Like King Lear, whose question, “Who is it that can tell me who I am?” (1.4.229) prompts the Fool’s witty answer, “Lear’s shadow” in the Folio text (1.4.230), human spectators develop reflexive self-knowledge through their co-spectators’ outputs; this fun house mirror image is refracted through technological limitations and implicit biases in design.

According to O’Boyle, the “artificially intelligent app” watched the performance with human spectators so that they could “see what a machine sees when it watches theater” (“All The World’s A Screen”). The language in both the online (“All The World’s A Screen”) and print programs (SignOn) anthropomorphized the screen as a “machine guest” rather than presenting it as a form of assistive technology. Here, the screen as interface was neither an ideologically neutral blank canvas nor an artistically integrated framing device for dramatic narratives. O’Boyle’s team used the production as a platform through which to change humans’ relationship to technology, which is evident from their choice of term, “machine guest.” The phone screens are co-spectators who extend definitions of theatrical publics and require care by the public.

This strategy turns the performance venue into a “counterspace,” which is defined as a “supportive, identity-affirming community space” (Margherio et al. 772). Building upon the principles of inclusive communica-

tion, “intentionality, reciprocity, and reflexivity” (Valdez-Ward et al. 2), O’Boyle’s production deconstructed compulsory able-bodiedness: the unexamined assumption that privileges one form of expression over another or one channel of perception over another. Members of the hearing public witnessed their machine guests’ viewpoints, while those proficient in sign language missed out, in some sense, on shadow performances put on by machine guests.

Screens also cast the publics as voyeurs who intrude, via their machine guests, into characters’ private space, such as by singling out their outfits for shopping purposes. The in-person theatrical public at *All The World’s A Screen* shared physical copresence through visual or aural confirmation of others’ presence. However, this visible public, which bore witness to itself in a predefined social space, was simultaneously siloed, because its members were not privy to each other’s private interactions with their phone-machine guests. This setup produces a theatrical public that is at once a visible collective and a group of individuals siloed in their own emotional and physical spaces as facilitated by their machine guests. The publics as mediated by the screen, in this case, are isolated in siloes by algorithms or communication technologies.

Interfacing Performance and Theatrical Publics

Performances are intentioned enactments of dramatic texts. As Diana Taylor suggests, these enactments are bracketed and separated from the “social practices of daily life” by theatrical narrative structures and conventions (*Performance* 15). As much as it bracketed the actors’ performance through onstage screens, O’Boyle’s production deconstructed the notion of performative bracketing (i.e., the separation of spaces) through its use of offstage screens. It operated on the premise that its anthropomorphic “machine guests” would provide linkage to publics at large beyond the theatrical public in the auditorium; through its retail suggestions and pose recognition, the AI app frequently pointed the theatrical publics toward consumer culture beyond the performance event itself. Performers, the theatrical public, and their anthropomorphic screens became one another’s mirrors, to borrow Marina Abramović’s concept of theatrical mirroring (ix). The theatrical publics were not engaged in deliberative democracy but in participatory consumerism through performance.

At the center of performance events are various interfaces that frame, deliver, or narrate that event, and thereby confront and construct various publics. To examine screens as interfaces is to go beyond conventional explications of the narrative contents of screens within the fabula or the

technical affordances of broadcasting performances. It requires theorization of the ways that interfaces structure the various publics' self-knowledge, their relationships with performance, and their relationships with one another, including with publics beyond the auditorium.

The word "interface" was first used to denote a place of meeting between entities in the modern sense by media studies scholar Marshall McLuhan in 1962, who analyzes the "interficiality [of] the metamorphosis of two structures" (*The Gutenberg Galaxy* 149). More recently, moving from mere contact points to mechanisms for mutual transformations, Alexander Galloway frames the interface as "the point of transition between different mediatic layers within any nested system" (*The Interface Effect* 31). Examples of nested interfaces include various types of media containers that enable access to specific contents within them, such as a codex book, a theater stage, a cinematic screen, and the World Wide Web as containers for text, image, and multimedia contents.

The AI screens in *All The World's A Screen* are another example of nested containers, for they contained complementary and, occasionally, competing versions of the Irish Sign Language performance. Screens in the theatrical publics' hands, typically forbidden but actively encouraged in this production, had the potential to enhance meta-cognition. The app did so by showing audiences flawed wireframe tracking and auto-captions, both of which contrasted and competed with (1) the sign language performance; (2) fuller auto-captions of oral interpretation of the performance, projected on the big screen; (3) personalized retail suggestions; and (4) Shakespeare's text which was also projected upstage. Even when transcribing the same scene, the auto-captions differed slightly from phone to phone, similar to how the same prompt generates cognate but different outputs from generative AI apps for each user. Each instance of rendition is unique. Mobile phones in *All The World's A Screen*, like prostheses, helped audiences develop alternative relationships to technology and the surrounding world. This instance resonates with Maria Kapsali's research on the role of mobile phones in actor training where phones are "a repository not only of individual memory [. . .] but also of collective and spatial memory through the storage and circulation of the data generated out of the phone's multiple functions" (230). Similar to O'Boyle, Kapsali regards the mobile phone as a *pharmakon*, a notion derived from Plato's *Phaedrus* (227–8), that fosters "attentive modalities" and "different ways of paying attention" as a cure rather than poison (232). Replete with repetitions with a difference, *All The World's A Screen* may support portability and individuated experiences in a paradoxically collective space. These screen interfaces enhance cognition of the playmaking and theatergoing conditions.

Interfaces, then, also facilitate human relations. Building on Brandon Hookway's idea of the interface as a "zone of relation that comes into being between human beings and machines [. . .] even organizations" (39), my working definition of interface highlights its role in enabling or delimiting the publics' access to performance and their relationship to it. Clifford Werier and Paul Budra argue that interfaces, such as codices and websites, with their antecedent mediating functions where "design meets cognition," condition "users' access to media" and "every contact with Shakespeare" (2). In other words, interface enables the "act of mediation" between "surfaces and literal human faces" (Werier and Budra 2). Screens are central to these acts of mediation.

By raising awareness of otherwise normalized features of theater, such as linguistic parity, the screen interfaces in *All The World's A Screen* fulfilled Werier and Budra's definition of interface approaches, in which interfaces "channel cognition in order to facilitate a user experience which anticipates the fulfilment of desire" (4). The interface is both a part of the infrastructure of theatrical meanings and a mode of expression that is interwoven with content creators and users. The medium may well be the message, as McLuhan famously declared in 1964 (*Understanding Media* 7), but the message is co-constituted by the ontology of the interface and the publics.

Publics, in the basic sense, include artists, audiences, readers, students, educators, and interest groups who learn from and evolve with each other. They may be paying customers who patronize live performances or film screenings, or students who pay tuition to study for a degree. They may be individuals who make a living from motifs and artifacts that are grouped under the name of "Shakespeare." In the early twentieth century, John Dewey defined publics as groups of people who are collectively "affected by the indirect consequences of transactions." As opposed to a private person whose affairs are of no public concern, publics as a collective are rewarded, harmed, or influenced by transactions that have "consequences [that need to be] systematically cared for" (16). However, a public is not only about collectivity. In more recent theorization of the collective, Dewey's view of the division between publics and private individuals is being replaced by a nuanced understanding of private life as "constructed by [. . .] public life" rather than being separated from it. In other words, the formation of a public does not "threaten individuality" (Tratner 19). Individuals do not always need to escape a crowd to "become themselves" (Tratner 19), as evidenced by interlinked but individuated algorithm-driven social media apps, including the Google Lens app that was deployed

in O'Boyle's production. When deployed at public performances, the app's retail suggestions, which are based on user histories, intrude into and expand upon its translational and auto-captioning functions. Connecting public and private life, the AI is characterized by its "interrelations [. . .] with humans and data" (Durt 69).

It is also important to consider the social space and discourse in academic studies of publics, because social and political transactions now take place in both physical and virtual spaces. Michael Warner theorizes a public as "a crowd witnessing itself in visible space, as with a theatrical public" who would not exist beyond "the discourse that addresses them" (54). Publics are defined as much by social spaces as by discursive relations, but the discourse does not address every member of the public in equal manner or with equal impact. In his formulation, Warner considers even "someone sleeping through" a show as a member of the performance's public, because "the act of attention involved in showing up is enough to create an addressable public" (61). Echoing this strand of thought, Tyler Quick stresses both collective identification and "self-constitution" as key elements in the formation of publics who "receive recognition and confirm that such an identification is legitimate" (30).

Publics are not only collaborative entities but also sets of dynamic relations that govern and are produced by ambient conditions of social life. Specifically, a theatrical public is formed first within a social space defined by culturally-specific codes of what constitutes theater before gaining coherence and shared purposes through the dramatic discourses that address it. Similarly, interfaces are not mere entities, either; they are sites where these relations solidify. A public is formed in relation to, and within, a performance space, as well as to discourses that address them as facilitated by screens as interfaces. These discourses are not unidirectional, for they address actors and audiences alike, and interfaces play a key part in constituting and shaping the situated discourses. Suffice it to say that theatrical publics are self-selective as participants both in the suspension of disbelief and in their continued mutual constitution—the continuous acts of affirming their identification as a public and of recognizing their situated dimensions.

All The World's A Screen fostered multiple publics. The actors' performance was mediated by simultaneous interpretation, AI pose recognition, and textual rendition of their performance. The theatrical publics could focus on the visual dimensions (sign language and/or AI pose recognition), vocal aspects, and/or auto-captioning of the performance. In reviewing video recordings of the event, I noticed that as much as the AI app may

have been helpful in deciphering sign language, its suggestions may also have been potentially distracting. The audiences would have divided their attention between their phones and the onstage action. The app itself also featured multiple channels: wireframe tracking, auto-captioning of the sign language performance, and retail suggestions with hyperlinks to stores that would open up in a browser. The fragmented auto-captions of sign language led me to divide my attention while following this multi-modal performance. By engaging in channel-surfing and in what Walter Benjamin might call distracted attentiveness (“casual noticing” 120), the theatrical public occupied various positionalities throughout the show as spectators, consumers, and beta-testers and caretakers of new AI technologies. Attending a play while distracted seems feasible when there is a set of familiar, canonical texts at the center.

In fact, by virtue of encouraging audiences to use their phones during the performance, the production cast diverse modalities of attentiveness in a positive light. The presence of the AI app thus reframed questions of attention with implications for disability studies. N. Katherine Hayles distinguishes between “deep attention” as the act of “concentrating on a single object for long periods,” and “hyper attention” as a mode of working with “multiple information streams” and “switching focus rapidly between different tasks” (187). Historically, the former is exalted as a “de facto norm” of cognition and the latter is regarded as “defective behavior” (Hayles 188) that might structurally inscribe consumers “on the short-circuit of obsolescence” and “of deinvestment in objects of consumption” (Stiegler 49). However, this may be an ableist tendency. Different modes of attention are productive in different contexts, just as there are multiple ways to relate to one’s surrounding environment beyond oralist modes. Hyper attention is suitable for “information-intensive” environments (Hayles 194) akin to the one in *All The World’s A Screen*. In the production, mobile phones defined the “regimes of attention” (Kapsali 232) as one that favored and rewarded hyper attention.

The big screen onstage and the small screens in individual hands formed multiple and variegated interfaces that connected or excluded different members of the theatrical public. Through their collaborative and co-constitutive agency, the actors and interpreters, as well as members of Deaf and hearing communities, formed multiply determined publics who shared a physical space for cognate, though formally different, experiences (some may have attended to sign language, others may have focused on simultaneous interpretation, and still others may have deferred to auto-caption). In my viewing of incomplete video recordings of the event, I

found myself in a combination of all of these modes of engagement. The “machine guests” contributed to both the bracketing and unbracketing of the performance by drawing attention to the publics’ situated dimensions.

Screens as Interface

An interface refers to any point of interaction between different systems, environments, and individuals. Defined by Werier and Budra as the “liminality between media and cognition” (1), interfaces consist of a wide range of mediating processes of signification. Information, whether textual, aural, enacted, or embodied, is always regulated and presented through interfaces. Some examples from the performing arts include:

- (1) visible, conventional interfaces (such as a proscenium stage);
- (2) demarcated playing spaces (such as a market square for street performance);
- (3) less immediately apparent interfaces such as screens-within-the-diegesis, digital screens as co-spectators, silver screens for image projection, screens on personal devices, television screens that are commonly shared in private settings, silver screens in multiplexes as community spaces, digital platforms hosting user-generated videos, motion capture technology for live in-person or virtual performances, and conferencing tools that enable connection via video, audio, and real-time feedback.

The performing arts consist of textual, gestural, visual, aural, verbal, and other embodied forms of representation. In stage performance, these diverse elements operate as conjoined and synchronous composite media. They are delivered through a number of visible and less apparent interfaces. In some instances, the entire interface, such as the Zoom application, is both the framing device and the setting of born-digital performances such as Creation Theatre’s *Friar Lawrence’s Confessional* (Paton 252). In other cases, screens-within-the-diegesis can evoke discrete plot elements in parallel universes in “transformative or disintegrative reenactments,” or be used as a narrative device to break the fourth wall such as the Wooster Group’s *Hamlet* (Cartelli 12).

Screens as interface condition the publics’ access to information and activates mediated messages, similar to the operation of other interfaces such as the codex, bound printed material, XML codes used to display play-texts online,⁵ and the theater stage itself. As nested “mediatic layers” (Galloway, “The Unworkable Interface” 31), interfaces are “mediums of perception and transport” (Eckmann and Koepnick 1), revealing the

embodied characteristics of not only human experience but also of cultural meanings themselves. Far from an impassive vehicle for the conveyance of information, interfaces “set the framework within which something like meaning becomes possible at all” (Littau 83). Screens as interface in performance expand and complicate the meanings of embodiment.

The screen as interface has been an important element in the performing and cinematic arts since even before the global pandemic of COVID-19 moved theater works online in 2020, as evidenced by the launch of the open-access International Online Theatre Festival (IOTF) in 2016. The festival went on to receive the Elliott Hayes Award from the Literary Managers and Dramaturgs of the Americas in 2018. It is still going strong; in 2023, when theater has largely returned to producing in-person performances, the festival featured thirty-nine online productions from twenty-three countries of such works as Margaret Atwood’s *The Penelopiad*. The screen, for the IOTF, is a tool for democratization and access, one that that became even more prominent during the COVID-19 pandemic, as Susan Bennett points out in her contribution to this special issue. Screen as interface is sometimes assumed to be ideologically transparent because “interfaces are often taken to be synonymous with the media themselves” (Galloway, “The Unworkable Interface” 936). When used as the backdrop to create a sense of spectacle, the screen interface can be self-effacing in such a way that its aesthetic function is rarely questioned.

What is new in O’Boyle’s production was the use of screens to enable its theatrical public to derive individuated dramaturgical meanings that may not have always been integral to the narratives being enacted. The screens coproduced the publics’ desire for textual translation of the sign language performance without efficiently fulfilling that desire. Partial and flawed captioning of sign language on these screens also produced what Brueggemann calls an “epistemological and ontological between space” (5). This space “between writing and signing” (21) is one “of longing, yet also one of belonging” (Brueggemann 2).

Screens therefore created a shadow performance that evoked but did not reflect fully what was being signed. Screens were also a shadow public. Since the app generated cognate but disparate results for each user, these screens multiplied the theatrical public’s positionalities and experiences of the dramatic vision. Screens here were integrated into the design of the production and its reception; as such, they operated both within and beyond the fabula of the performance. As facilitators and imperfect translators that processed word-level meanings and not sign language sentence structures, these screens compelled the theatrical publics to per-

form “reciprocal acts of caring” by enhancing meta-cognition (Thompson 215). As anthropomorphic devices, their unreliability may actually amplify “inter-human forms of care that demonstrate a mutually reliant [. . .] form of sociality” (Thompson 215), since they were not a hermeneutic tool but a guest requiring care. The show’s producers called the app a “machine guest” (SignOn), which echoes Maria Kapsali’s theory of care. When using the mobile phone, one needs to practice care and attend to “the ethics of its production” and “the politics of its operation.” Through the mobile phone, individuals “may become ‘care’-fully attentive towards the world and others” (232).

Screens have one property that distinguishes them from stages as interface. If the stage—in all its proscenium, thrust, open-air, arena, black-box, platform formats—evokes theatrical contingency, the screen, due to its association with film as a highly editorialized medium, tends to be understood as fixing “the time, space, and dimensions” of a unique “space of appearance” (Taylor, *jPresente!* 61). This understanding, however, is merely an illusion—a misunderstanding—as Taylor writes in her theorization of screened performances. The bracketing of a performance by stagecraft and theatrical interfaces “gives the illusion of fixity in terms of space and time,” though, as shown by the AI app in O’Boyle’s production, screens exist “in relation to, and alongside, other spaces and other times” (Taylor, *jPresente!* 61) as well as other publics beyond the auditorium. The pose-recognition technology is at an experimental stage, which generates differing visions of the sign language performance in each iteration. Similarly, retail suggestions (pointing to the world beyond the stage) and auto-caption (distorting the world onstage) differ for each user due to individual browsing histories and user preferences. As such, these screens are “not merely liminal or threshold spaces through which users pass, but sites of constitutive interaction, in which Shakespeare and his users become knowable and distinct” (Lamb and Tanner 129). The feedback loop of the app promoted self-reflexivity, since results obtained by each user reflected their past interactions with algorithmic technologies. Cultural meanings of the production emerged from the friction among the screen as interface, actors’ somatic presence, and the theatrical publics’ self-understanding.

Theatrical publics are shaped and percolated by screens, because interfaces between humans (storytellers) and machines (technologies of representation) “remediate” explicit and implicit narratives by representing one medium within another, to use the term by Jay David Bolter and Richard Grusin (45), who theorize that representation is not a “window

on to the world” but rather is “windowed itself—with windows that open on to other representations or other media” (34). As such, screens produce theatrical publics through acts of bracketing and remediation. The screens of personal electronic devices exemplify the remediating function (Bolter and Grusin). *All The World’s A Screen*, whose title nodded to Jaques’s speech in *As You Like It*, used screens as a social media device that constituted the theatrical public and their “machine guests,” which was distinct from intermedial productions that deployed screens as world-making devices that were allegorized to contain a version of the world (i.e., screens contain the whole fictional universe). These screens participate in changing the relationship of the theatrical publics (who were at the venue) to non-theatrical publics (society at large), as well as the theatrical publics’ relationship to performance (throttled access to dramatic meanings due to flawed, partial auto captioning). While screens in such works as the Wooster Group’s *Hamlet* broke the fourth wall to show characters’ private thoughts and to transcend imaginary barriers between actors and previous enactments of the same play, screens in *All The World’s A Stage* were conceived of as humans’ co-spectators who captured spectators’ private thoughts and provided alternative perspectives on the show. Screens in this case were both part of the publics and an interface that defined the publics.

Other Uses of AI in the Theater Circles

Other artists have also worked creatively with generative AI, machine-learning models that create objects that are similar to artifacts in the datasets they trained on. Composer Douglas Boyce collaborated with visual artist Maryam Faridani to create an AI-generated film (“Tyrian Purple”). They used Melissa Raneg’s poems and Boyce’s music as prompts for AI to generate footage that resonates with their work. Avant-garde writer David Jhave Johnston uses AI as “an oracular vessel” to make words “live again” through a “modularized [. . .] system of language interchange” (5–6). This type of work involves AI only at the level of production and not in reception.

The multiple publics in O’Boyle’s production were distinct qualitatively from the collective publics in theater works that incorporate algorithmic text generators as an aesthetic instrument. One prominent example is the “algorithmic theater” created by Annie Dorsen (Starker). In 2010, she produced *Hello Hi There*, a dialogue between two bots “fueled by the language of a 1971 debate between Michel Foucault and Noam Chomsky”

(Starker). In 2023, she produced *Prometheus Firebringer* at Bryn Mawr College using commercially available AI tools (GPT 3.5 and Dall-E) to generate voices and theater masks. In 2013, wishing to explore “the relationship between technology and power” (Dorsen, “The Dangers of AI Intoxication”), Dorsen produced *A Piece of Work*, which juxtaposed a live actor’s performance with a godlike presence of an AI-driven, disembodied, synthesized voice reciting randomly re-sequenced lines from Shakespeare’s *Hamlet*, a play traditionally interpreted to be an exploration of interiority and inner life. The theme of ghosting in *Hamlet* made it an appropriately uncanny choice for this experiment with AI. The title riffed on Hamlet’s phrase “what a piece of work is a man,” and alluded to the ideas that AI-generated texts may have impressive characteristics or unpleasant character flaws and that part of the production was manufactured by a machine (“A Piece of Work 2013”).

In *A Piece of Work*, on alternating nights, actors Scott Shepherd or Joan MacIntosh performed alongside automated lighting systems and algorithm-generated new songs and visuals. The singular screen onstage, a remixer, signaled Shakespeare’s textual presence as a ghost rather than serving as a co-spectator or as an extension of the theatergoing public. Programmed to extrapolate the “frequency and infrequency of word patterns” in Shakespeare’s text, the algorithms remixed the source material (“Performing Arts Series”). As the event’s webpage concedes, the algorithms “don’t know what grief is, or revenge, or an entrance, or an exit. They make decision after decision, over and over, generating a non-stop flow of effects without causes, and causes without effects” (“Performing Arts Series”). Since the backstage was cast as a space for algorithms and the auditorium as a human space, it was appropriate that the actor emerged out of the audience to perform in tandem with the AI. Thomas Cartelli believes that the actor plays “second fiddle to a machine that shuffles the cards and deals all hands” (257). It is, however, more accurate to describe the production as a form of social collaboration in the form of a tug-of-war. The actor does not come second, for the algorithm-remixed words are human in origin. For example, from time to time the actor would paraphrase or misquote Shakespeare (“to be and not to be, this is the sorrow”) only to be corrected by the disembodied AI voice. The actor would carry on with a sense of defiance (“to be and not to be, those is [*sic*] the heartache”). The algorithms remixed Shakespeare’s words like a jazz musician intuitively skipping some notes rather than writing new texts. Through this “algorithmic wringer,” Gertrude’s speech about Ophelia’s drowning exhibited renewed and accidental affective attachments.

One might say that the speech now bears a traumatized form, “full of false starts, stutters, and non sequiturs” (Dorsen, “*Hamlet in the Age of Algorithmic Production*” 329).

The AI in *A Piece of Work* drew only on a set of clearly delimited texts, but the AI in *All The World's A Screen* bridged data from a live performance with user history and data beyond the confine of the theater. It should be noted that, after more than a decade's experimentation with AI, Dorsen has grown “ambivalent about having used these tools,” writing recently that “I doubt I'll do it again” (“The Dangers of AI Intoxication”). Echoing Dan McQuillan's critique of “thoughtlessness” that is amplified by AI's “computational opacity and technical authority” (62), Dorsen is concerned that AI in artistic creative processes may lead to an inability to critique instructions and reflect on consequences of decisions. These concerns are more pertinent in cases that employ AI as cocreators of art than in cases where AI serves as a co-spectator. The deployment of AI as both an enabler and a distractor in O'Boyle's *All The World's A Screen*, in contrast, did not substantively alter or affect the actors' performance, though it did throttle humans' access to it and created multiple theatrical publics. In Dorsen's case, the AI created artifacts (texts and images) that it deemed cognate with a specific dataset. In O'Boyle's case, the AI made predictions in the forms of auto-captions and retail suggestions based on its wireframe tracking of the actors, pattern recognition of attires, and user history.

Conclusion

Publics have multiple and sometimes fraught relationships with materials that go under the name “Shakespeare.” These publics' experiences of performance are governed by customary rather than legal regulations. While their experiences may be shared, they are not the property of institutions. Beyond the organizational force of the market economy, other factors such as accessibility and the sociality of spectatorship also shape theatrical publics. Understandings of what constitutes a public have undergone a major transformation during the global pandemic of COVID-19, which shut down most venues for in-person performances and screenings. As a result, modes of content delivery and modes of communal and personal consumption of media have merged, including live performance in theaters, recorded or broadcast performances on screens, and films on multiplex screens, the small screens of laptops, television, tablets, home cinemas, smartphones, and other personalized interfaces. Live theater

used to be a synchronous communal affair taking place in an architectural space, while performances on private screens were thought to be more asynchronous, intimate, and individuated. In other words, “live” performances used to be distinguished from performance on screen or from film—a more editorialized medium—by the cachet of being “ephemeral” and irrecoverable. Live performances, in more conventional definitions, could not be re-experienced in the same format, time, and place, while film is commonly regarded as a re-playable medium. However, these distinctions are going away, because more and more theatrical and filmic performances are mediated by the same screen interface and now by AI-enhanced screen interfaces that carry residues of live performances long after the events. Performance studies scholarship is therefore evolving to reflect these convergences. As Bennett notes in her article in this issue, more and more performances are not only recorded but also repackaged to be experienced again asynchronously. Gemma Kate Allred, Benjamin Broadribb, and Erin Sullivan concede that it is no longer customary to “write about live theater productions in the past tense and recorded screen productions in the present,” because “lockdown performance [during the pandemic] has disrupted the binaries between these two mediums” (220). AI’s presence in the theater auditorium and on stage complicates these questions.

From a performance studies perspective, *All The World’s A Screen* accomplished three things: (1) the creation of multiple publics; (2) the deployment of interfaces as co-spectators who expand theatrical publics; and (3) the establishment of an imperfect spectatorial proxy. It expanded its theatrical public by introducing machine guests who enabled human guests’ self-knowledge. By creating multiple theatrical publics through, and with, private screens as co-spectators, the production deconstructed the conventional positioning of spectators beyond the “sealed reality” in some imaginary “transcendental vanishing point of specific spatial, perceptual, social arrangements” (Hansen 4). The production became a multimodal performance by virtue of its multiple theatrical publics, who were defined not by their physical placement relative to actors but by a “perceptual synthesis” (States 375) of acting, meaning-making, and self-reflection. Last, but not least, the machine co-spectators served as a proxy for and extension of human participants. The machine guests’ “spectatorial presence by proxy” (Sava 119), in turn, connected theatrical publics and publics at large.

This article set out to understand whom the screen interface serves, what the screen adds to our understanding of theatrical publics, and how it connects people and ideas across the playing space and playgoing space.

Answers to the research questions are evolving along with performance and AI practices, but it is clear that the screen as interface serves multiple publics as much as it conditions their relationships with performance and with one another. One of the possible future directions for research could be the use of a lens of theatricality to study generative and predictive AI's outputs as simulation and performance. As co-spectators, anthropomorphic screens can shadow theatrical publics as well as build bonds between them and performers.

Notes

¹This article analyzes the 2022 production through interviews with O'Boyle, photographs, video recordings, and other ephemera.

²For discussion of different types of Deaf Shakespeare performance, see e.g. Bradbury; for theater by and for Deaf communities, see Cohen.

³Throughout this article, Deaf is employed to refer to individuals who identify culturally as Deaf. The word is capitalized to “distinguish the culture from the audiological condition” (Baynton 48). However, people in the d/Deaf, hard-of-hearing, and hearing-speaking communities, as well as disability scholars no longer make as strong a distinction between prelingual and postlingual deafness, because some communities overlap (Brueggemann 14–15, 163–64 n1). Samuel Yates writes, for instance, that “where Deaf communities flourish, d/Deaf and hearing persons live alongside each other with Deaf persons modeling different ways of being in the world” (79).

⁴There is a long Anglophone tradition of using Shakespeare to launch new technologies—from telephone and celluloid film to the latest generative AI. In 1876, Alexander Graham Bell recited a passage from *Hamlet* to demonstrate his new invention, of the telephone, in Philadelphia. In Alan Galey's estimation, Bell chose Shakespeare to “convince the receiver of the message's validity” who would hear “Shakespeare's words through a strange new medium” (175). Across the ocean in Glasgow, Sir William Thomson told the British Association for the Advancement of Science, with awe and inspiration, that he had just heard “‘To be or not to be . . . there's the rub' through an electric telegraph wire.” (Thomson 427). The theme of ghosting in *Hamlet* anticipated the disembodied voice introduced by telephony and, later, phonograph records as “an etcher of voice” (Picker 112). In late 2022, Shakespeare was deployed to give credibility to one of the proof-of-concept chatbot applications that claimed to be able to simulate historical figures' voices based on the primary texts that it ingests; users could have a casual conversation with Shakespeare for amusement through the Hello History app. In 2023, Google named its conversational AI “Bard” to advertise its creative capacities.

⁵Extensible Markup Language (XML) is a file format for storing, transmitting, and reconstructing data that is both human-readable and machine-readable. This metalanguage allows editors to display documents on the internet in ways they define, which is especially useful for playtexts.

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