Facets of Performance in the Design Process of Future Agents

Abstract
Design fiction in its many forms, including written narratives, film, and live performance, has become an important design practice that serves designers and researchers in creating and thinking about future technologies. However, is there additional value that emerges when completing the process with a final narrative or performance that is presented to an audience? Or are the critical benefits already gained in the creation process itself? We examine a case study of an interactive performance with robots in the home and discuss three facets of the process and their potential benefits.

Author Keywords
design fiction; performance; robots; HRI; agent design; human-agent interaction; theatre

CCS Concepts
• Human-centered computing → User centered design;
Interaction design process and methods; Scenario-based design;

Introduction
Design fiction methods have become a prominent method for designers to think critically and design for future interactions with technology. Some design fiction practices have adopted methods from theatre and performance to inform design processes, as these methods can, among other ad-
vantages, spark novel ideas for design, support interdisciplinary collaboration, and create new ground for discovery [6, 11, 9].

Performance and fiction generation have been used in all stages of design processes, from group building [5], to ideation [10] and all the way to evaluation of a design product [8]. Yet a question that remains unanswered is whether there is value in developing a design fiction piece to the extent of a full performance, and how might it inform the knowledge that was generated in the process.

To better understand the knowledge that can be generated through an extended process of creating a performance piece, we break performance into three facets: devising, performance, and audience response. We examine a case study of an interactive performance, *Robotic Futures*, in attempt to identify what each part of the process contributes to the overall generated knowledge, and how they all fit together into a compelling design fiction method.

**The Performance**

*Robotic Futures*, a design fiction interactive performance, told the story of a family of five: a couple with two teenagers, a boy and a girl, and their grandmother. The performance scenes were focused on interpersonal interactions and stories, but with a total of eight agents and robots integrated throughout these people's lives. The agents fulfilled a range of potential roles, from assistive to entertaining ones.

The performance was somewhat interactive, where audience members were invited to move “on stage” among the actors and agents. A robotic agent also helped the audience navigate the scenes by leading them from one room to another. Following the performance, audience members were also invited to interact with the robots that were part of the performance.

The performance was made of eight scenes and lasted about 30 minutes. Two performances were held on the same day in the city of Pittsburgh, PA, and included between 20-30 audience members per performance.

We describe three facets of devising a full performance as a method of design fiction and their part in the knowledge generated for design.

**Facet 1: Devising**

Devising a theatre performance is a long, iterative and somewhat unstructured process that moves the team towards the end performance step by step. In our work of devising a theatre performance about agents in the future, we combined performance and design disciplines. We used performance methods such as improvisation, “image” and “composition” exercises that generate snapshots of a narrative [2] (Figure 1 top). We also used generative design methods, like brainstorming, bodystorming [11] and design fiction exercises (such as “What If” questions and “Postcards from the Future” [1], see Figure 1 bottom).

Over several months we generated new scenes and narratives every week to explore a range of diverse topics, situations and characters for the performance. The process allowed us to expand the initial goal of using design fiction to the many elements and potential design space of future robot design for the home. Devising the performance and exploring narratives week after week resulted in identification of interactions and design decisions that would be interesting for further inquiry. For example, personal ownership of an agent kept coming up in a range of scenes and exercises, and suggested it is critical to determine who owns and controls a robot based on the agent’s function—this decision tends to influence how that agent behaves and interacts, and how it is perceived by its users.
Facet 2: Performance
Once we had an idea of the topics we were interested in through devising the performance, we began another cycle of iteration, this time with a flexible script in addition to the generative methods we used. Unlike the generative phase of the process, here we iterated on targeted topics that we previously identified, with actors, creators and the technology all shaping how interactions play out.

We find value in continuous refinement of narratives into a final performance, in contrast to some methods that borrow from performance only for the generative stage of a design process [11, 4]. The felt-experience of refining scenes towards a performance that eventually meets audience members generated knowledge about what interactions “work”—design and interactions choices that were interesting and compelling naturally surfaced and persisted throughout the process, while interactions and experiences that felt unnatural or awkward organically dissolved in the making.

Thus, we believe the existence of a final performance has value even before it meets the audience—by analyzing the resulting performance as an artifact [7], designers can generate knowledge about compelling and interesting felt-experiences with technology.

Facet 3: Audience Engagement
The third facet is the final engagement with an audience. Previous work has used the encounter with audiences as a method to educate them about a design-related topic, such as privacy of technology [12] or to help them think about current decisions and how they might influence the future [3]. Other work has used audience members to receive direct feedback about a design product or a service that was presented as part of the performance narrative [8].

In addition to these explicit benefits of engaging with audience members, we suggest an additional implicit advantage of doing so. We believe the value in engaging audiences with a live performance, as opposed to design fiction in other formats, such as written stories or movies, is in the

Figure 2: Images of three characters and their agents: The grandmother with her assistive agent (left), the mother with her emotional support robot (center), and the boy with his self-reflection agent (right). The performance itself is a proposition of designs that worked well—interactions that were uncomfortable or undesirable organically fell apart in the process.
encounter of the actors with the audience. The audience members observe the scenes and respond, and as a result fuel the actors, who in turn respond back to the audience, changing their behaviors, expressions and even their text. This is especially true in performances that are somewhat interactive and open-ended—in Robotic Futures the audience could move freely “on stage” among actors and robots and interact with the home. By observing the reciprocal interaction between actors and audiences, designers can gain additional feedback and generate knowledge about what aspects of interaction are interesting and valuable for further exploration.

Conclusion
Using performance as a design fiction method has many benefits, and has been shown to assist in a range of challenges that arise during design processes. It can enable designers to think about what should be designed, as opposed to how to design something that might have little value [13]. Nevertheless, a single performance can carry multiple facets of knowledge at the different stages of its development: devising, performance and audience engagement. We discuss the three and the benefits of each.

While the knowledge generated by each facet could perhaps be used separately in the design process, we believe the combined process of devising a topic, generating and analyzing a final performance and presenting it to an audience has value in the extensiveness of topic exploration that it proposes. The process is also funnel-like, moving from a broad exploration, towards a narrower set of topics, and finally back-and-forth with the audience about specific selected interactions.

Furthermore, in order to present a compelling performance to audience members, performance creators must go through devisoring and finalizing a performance. We encourage designers to take part in the two parts that precede the last and use them as additional resources for design knowledge about a particular design space.

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REFERENCES


