Listening is Believing: *Exploring the Value of Sounds in an Audio Drama Board Game for Shaping Technology Futures*

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We conducted a qualitative study to explore the felt experiences of players of Once Upon a Future, a storytelling game aimed at encouraging future co-creation. Design fiction or speculative design has been commonly adopted as a novel approach to shaping futuristic experiences. Existing research has primarily focused on the effects of visual rather than audio stimuli in efforts to facilitate imagining. In this study, sound design is shown to play a crucial role in opening imaginative space and in evoking alternative experiences. In this study we took a phenomenological approach and conducted a revisiting interview some time after the storytelling game had ended. The research findings focus on the experiences of participants that were evoked by the audio stimuli and audio fictions captured by a voice recorder, AudioRecap, in Once Upon a Future. We reflect on these experiential accounts and explore the potential value of our sound design for envisioning futures.

Keywords – Auditory Experiences, Design Fiction, Futuristic Experiences.

Relevance to Design Practice – This paper explores how audio stimuli could shape technology imagination and how self-created audio fiction could evoke believable feltness. The study also establishes a way to discuss the value of sounds, and counterbalances current speculative approaches that rely heavily on designing visual and textual prompts.

Introduction

Exploring alternative technological imagination for futures is relatively challenging. Recent research in human–computer interaction (HCI) suggests that design fiction can help visualize the implications of new technologies (Kozubaev et al., 2020; Tanenbaum, 2014; Wong et al., 2017) or experiment with non-existent entities (Dunne & Raby, 2013; Lindley & Coulton, 2015). A well-worded story or narrative can be beneficial to world-building in design fiction (Blythe, 2017; Markussen & Knutz, 2013) and aid people in making sense of fictional worlds (Elsden et al., 2017; McDowell, 2019). McDowell claims that world-building practices in storytelling have been commonly adopted to listen to experts' opinions from diverse domains that exceed those proposed by their design teams. Tanenbaum (2014) has further argued that situating new technology within narratives and stories enables HCI researchers to question social norms, envision new futures, communicate innovative ideas, and find inspiration for future research. Therefore, we designed Once Upon a Future—smart factory version (https://onceuponafuture684413674.wordpress.com/), a design research artifact, to inquire into people's experiences in the collaborative world-building of future scenarios. We also conducted a pilot study (Cheng et al., 2018) in collaboration with three interdisciplinary teams at the NTU IoX Center, a large-scale IoT research center, to investigate how the game supported future co-creation and fostered creativity.

Design fiction and speculative design have been deployed in HCI as approaches to evoking imagination about the future (Blythe & Wright, 2006; Candy et al., 2006; Dunne & Raby, 2013;

Sturdee et al., 2017), stimulating critics (Coulton et al., 2017; Dunne & Raby, 2013; Wong et al., 2017), and communicating futuristic ideas (Bleecker et al., 2014; Brown et al., 2016; Dunne & Raby, 2013). Some works highlighted scenario writing (Blythe, 2014, 2017; Blythe & Wright, 2006; Dalton et al., 2016; Markussen & Knutz, 2013) and visual design (Bleecker et al., 2014; Brown et al., 2016; Wong et al., 2017) as techniques to *suspend disbelief* about emerging technologies (Sterling, 2013). For instance, Blythe and Wright (2006) used pastiche scenarios to explore the *felt-life* and complex social issues of people's experiences with technology. These pastiche scenarios required the writing of good imitation scenarios and provided diverse cultural perspectives by drawing on well-known literary characters. Blythe (2014) presented a way to identify problem space through writing imaginary abstracts. The Future IKEA Catalogue (Brown et al., 2016) was a notable case that used the format of a retail website to inspire new furniture that employed innovative technologies and to address sustainability issues from a scale perspective. Some scholars argued that an experiential approach may elicit futuristic experiences (Candy et al., 2006;

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Candy & Dunagan, 2017; Kozubaev, 2018). For instance, Candy and Dunagan showcased an engaging approach to designing and staging experiential interventions for their participants. Kong et al. (2019) used Confabulation Radio to elicit people's possible-world experiences by mixing everyday soundscapes. The abovementioned studies appeared to engage people by staging experienceable futures as a perceptual bridge (Auger, 2013).

Most speculative approaches have heavily relied on visual (e.g., Bleecker et al., 2014; Brown et al., 2016; Wong et al., 2017) or textual (e.g., Blythe, 2014, 2017; Markussen & Knutz, 2013) ways to design futures. However, there is a noticeable absence of efforts to create futures using experiential approaches that rely on sound materials. In multimedia, sound design has played a crucial role in shaping scenarios (Belton, 1992; Crook, 1999; Whittington, 2007). Although its means of activation is subconscious, sound design appears to be equally as powerful as visual design (Crook, 1999; Whittington, 2007). Informed by the tension and expressivity of the sound design demonstrated in audio drama practice, we found that auditory immersion could help people stay engaged and imagine invisible things. In our previous work, we used sounds as design materials to build an audio drama board game (detailed in the next section), which we called Once Upon a Future (https://onceuponafuture684413674.wordpress.com/). The *audio stimuli* were designed to engage participants in an alternate reality during their storytelling (Figure 1). For each act, each team in our pilot study (Cheng et al., 2018) summarized the plots into a meaningful audio fiction by using a voice recorder named AudioRecap. For inspirational purposes, replaying it might support imagination of technological possibilities after game play.

On the basis of the game and our pilot study (Cheng et al., 2018), we discovered complex user experiences, which precipitated some very interesting potential topics, including (a) the value of sound design, the effects of audio stimuli, and the value of using AudioRecap; (b) approaches to evoking future scenarios; and (c) methods to co-design futures. In our first attempt to gather feedback, we conducted three pilot workshops with a duration of 1 hour each (Workshops #1, #2, and #3). Right after each workshop, we held a reflection session about user experiences to probe how our design sparked imagination. However, in the pilot study, whether the audio stimuli within the storytelling game provoked imagination of futures remained unclear. The majority of the participants' reflections were around the story outcomes, game playing, and the visual design, while our sound design was just described as a game effect. What experiences were provoked by the audio stimuli was unknown. In particular, little could be ascertained about how the audio fiction retained in AudioRecap prompted participants' technology imagination or inspired their future research. Moreover, what experiences were evoked by the audio fiction was also unknown.

To better understand what user experiences were like for our participants, we needed to go deeper and conduct a revisiting interview, which took place one year after the game was played. In order to frame the complex problem space and to observe the experiences that emerged from the game, the study employed an explorative approach rather than a problem-solving approach. We tried to explore experiences evoked by the visual and sound design, and the approach of this study is based on "a degree of open-mindedness" (Smith et al., 2009, p. 42). In essence, the study conducts a qualitative inquiry into emergent experiences that are meaningful for each participant, but which he or she may not be explicitly aware of. In this sense, *interpretative phenomenological analysis* (IPA, Smith et al., 2009) is appropriate for the study in understanding experiences "which are of particular moment or significance to the person" (p. 33). Using IPA for data analysis, in the revisiting interview we focused on exploring the personal meanings and particular experiences of the participants' digital encounters with the sound components in Once Upon a Future.

As shown in the above literature review and problems, first, few approaches to designing futures focused on the power of sounds, and we had no knowledge of how our sound stimuli engaged the participants and further prompted their future imagination. Second, most design workshops produced insights through a follow-up discussion or prototyping (e.g., Cheon et al., 2019; Markussen & Knutz, 2013; Nägele et al., 2018), while how the photos or audio recordings in workshops supported participants' imagination over time was unknown. The specific benefits of our AudioRecap remained unclear. Accordingly, to address the issues outlined and to fill gaps in the previous research, this study was designed to ask the following questions, which are *open* and *exploratory* towards meanings, based on IPA (Smith et al., 2009):

1. How did the participants describe their experiences separately evoked by the visual and sound stimuli of Once Upon a Future?

2. When the participants separately revisited the self-created audio fiction and the photo records retained from the workshop, what experiences that were particularly significant and meaningful for them emerged one year after the workshop?

We make two contributions. First, this study provides new understandings of how the sound stimuli in a storytelling game can facilitate participants' imagination about future technologies. Second, the results show a particular example of how self-created audio fiction can suspend people's disbelief about possible futures. Additionally, the study shows that the audio fiction served as an inspiration that encouraged participants to broaden their research.

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ONCE UPON A FUTURE

Audio Drama Board Game for Shaping Technology Futures

Informed by the tension and the expressivity of the sound design in audio drama practice, we design the audio stimuli to engage participants in an alternate reality during storytelling. After a game play, replaying the audio fictions recorded with AudioRecap by participants may encourage their technology imagination.

How To play ?

There are four acts on the plot board ⓪. Each act is comprised of immersive story opening with ①②③, improvisational storytelling with ④⑤⑥, and summary with ⑦⑧.
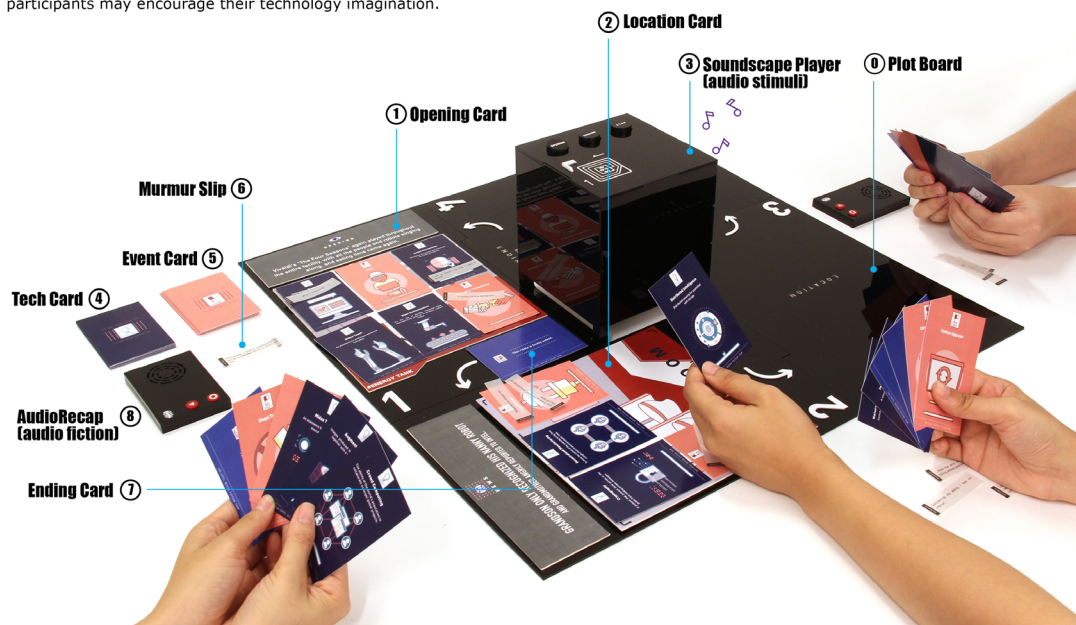
② Location Card

③ Soundscape Player (audio stimuli)

⓪ Plot Board

① Opening Card

Murmur Slip ⑥

Event Card ⑤

Tech Card ④

AudioRecap ⑧ (audio fiction)

Ending Card ⑦

Figure 1. Once Upon a Future: An audio drama board game for future co-creation.

Structure of the Article

The main objective of this explorative study is to understand what felt experiences are evoked by the sound and visual designs in Once Upon a Future. This paper has five parts. First, we briefly describe our audio drama board game, Once Upon a Future, and how it can be used to evoke the co-creation of imagined futures. In the second section, we describe different novel approaches to designing futures. The sound design tactics of audio drama describe the experiential ways in which auditory experiences can shape the creation of alternative realities. The third part then describes a rigorous five-phase phenomenological inquiry that was used to analyze interviews with the study's participants and to inquire about what kind of felt experiences were evoked by each stimulus that we provided to them. The results section presents four themes that emerged from the experiential data. Lastly, we reflect on the specific benefits of our audio stimuli and AudioRecap designed to stimulate technology imagination. We also discuss how the revisiting interview after a period of time can be used to observe and to explore alternative experiences elicited by the sound design.

Previous Work: *Once Upon a Future*

Figure 1 shows each visual and auditory component of Once Upon a Future, a game with a four-act structure. Each act comprises an RFID-embedded story opening with Opening and Location cards and corresponding audio stimuli (Figure 2, left). During the game, the participants take turns in improvising stories, randomly using

Tech cards (describing emerging future technologies), Event cards (representing possible activities in a smart factory), and Murmur slips (short colloquial sentences for encouraging conversations among players). For each act, the player who places the Ending card should summarize the plots into a meaningful audio fiction recorded with AudioRecap (Figure 2, right). The study employed AudioRecap to capture four improvisational stories in a game.

In pilots (Cheng et al., 2018), we designed auditory means to engage the participants in an imaginative story world. To contextualize future scenarios through sound experiences, we designed audio stimuli. Players use Opening or Location cards to trigger breaking news music or ambient soundscapes through the Soundscape Player at the center of the game board (Figure 2, left). Certain textual contents of the Opening cards imply different timelines, while the visuals on the Location cards represent various spaces. Opening cards with breaking news music act as an *auditory what-if* to provoke and question the status quo.

We learned from audio drama (Crook, 1999; Hand & Traynor, 2011) and deliberately chose notable breaking news music for certain Opening cards that displayed clear cultural references that were easily identifiable to the target participants. In addition, we selected ambient soundscapes for Location cards to convey an atmosphere for the target contexts. For example, we selected an echo ambience with continuous ventilation noises to represent an unmanned spacecraft. This soundscape was open to interpretation by the participants, a few of whom associated it with a fictional character's mind.
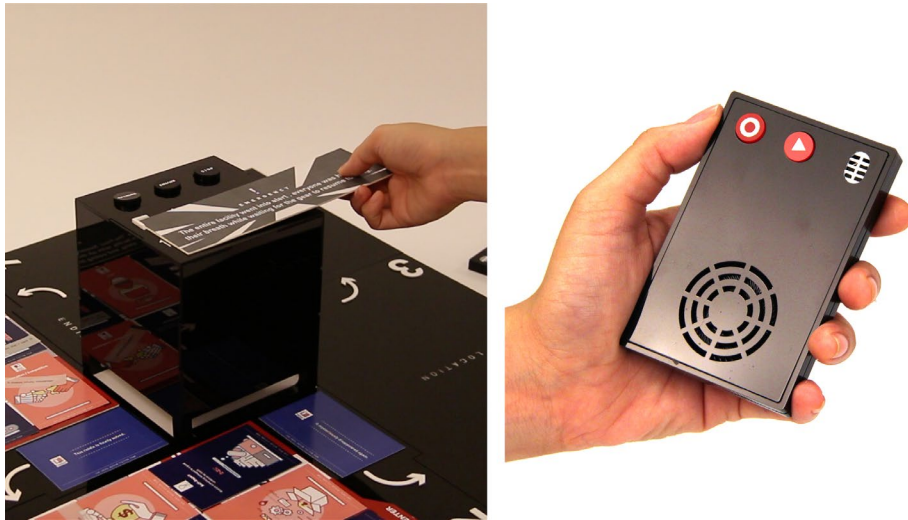
Figure 2. Soundscape Player (left) **and AudioRecap** (right).
Players use Opening or Location cards to trigger breaking news music or ambient soundscapes through the Soundscape Player.
In the recapping activity of each act, the player who places the Ending card should summarize an audio fiction with AudioRecap.

For communicating information, we found that spoken words (e.g., in broadcasting) had a fleeting effect, while written words (e.g., newspapers) were more effective in conveying details (Hand & Traynor, 2011). However, when spoken words are used to express emotion or stimulate the imagination, Hand and Traynor (2011) argued that audio drama was the most potent. Based on this finding, we designed AudioRecap (Figure 2, right) as a source of inspiration for the researchers involved in this study. AudioRecap was customized with a recordable voice module with a capacity of three minutes. Players can save one track for each use (i.e., the recapping activity of each act) by pressing the circle button, and can play back an audio fiction by pressing the triangle button. Recorded tracks in four acts structured a story world. Scenarios retained in auditory form were used as prompts to enable our participants to generate future possibilities or to relive game experiences.

Literature Review

Strategies for Designing Imagined Futures

Designing Fictions for Evoking Imagined Futures

In recent years, the HCI research community has embraced a range of speculative approaches (Blythe, 2014; Blythe & Wright, 2006; Candy et al., 2006; Coulton et al., 2017; Dunne & Raby, 2013; Elsden et al., 2017; Sturdee et al., 2017; Wong et al., 2017) to evoking imagination about or provoking critiques of emerging technologies. One approach that was commonly used is design fiction. Some scholars suggested the use of scenario writing to explore future possibilities. For instance, Baumer et al. (2014) curated a fictional conference set in 2039, with the expectation that HCI researchers may imagine things that can shape contemporary technological innovation. Looking backward and forward at the same time, ubiquitous computing (ubicomp) was highly entangled with science fiction (Bleecker, 2009), which allows researchers to explore and materialize some interesting ideas. Markussen and

Knutz (2013) demonstrated that linking literary work and design practice could produce future scenarios and shape speculations about the future. Some researchers adopted visual forms to elicit imagination about the future. For instance, Coulton et al., (2017) used comic strips to encourage the imagination of potential elements of fictional worlds. The fictional BCI (brain–computer interface) API by Wong et al. (2018) was thought-provoking and surfaced the situated positionality of technology developers as opposed to end users. Beyond the use of visual forms, scenarios, persona, and drama techniques in a film can foreground nuanced experiences regarding fictional technologies in the future. For instance, the SFUture project (Hauser et al., 2014) used design fiction as a method to create a fictional reality, set at Simon Fraser University in 2065, that includes a series of diegetic prototypes, artifacts, a fictional timeline, a fictional campus map, and created characters. Films on a YouTube channel were used to communicate the envisioned campus life. In the early stage of the design process, Briggs et al. (2012) presented the Invisible Design approach using film-based scenarios to stimulate critical discussions about imagined technologies that were not shown on screen.

Using Bodily Understanding as a Way of Anchoring Imagination

Some researchers have used physical props to evoke preferable futures. Brandt and Grunnet (2000) used props from the magic world to understand the thinking of users. By observing the way users employed these props in dramatic settings, the authors were able to elicit new design possibilities. Tsai et al. (2020) proposed a Speculative Kit in the form of fictional catalogs and props that embodied technologies developed in an IoT research center for technology imagination. Drawing on Walton's (1990) make-believe theory, Dindler (2010) exemplified how fictional space emerges when props are used in children's game worlds. As Walton identified, props in games may "serve as prompters of the

imagination," "act as the objects of imagination," or "assist in the generation of fictional truths" (Dindler, 2010, p. 76). The physical props in the workshops that Dindler and Iverson (2007) conducted (e.g., Fictional Inquiry), served an *anchoring* and *transcending* role for imagining. The abovementioned studies articulated how speculative approaches can successfully encourage design speculation through literary works, visual designs, films, or physical props.

Toward Staging Experiential Engagements

In recent years, there has been another approach in future studies, called *experiential turn* (Kozubaev, 2018). The approach involves staging and designing stories and artifacts that shape the experiences of a particular future. Those future settings allow participants to perceptually "witness" (Kozubaev, 2018) future scenarios. Perceived scenarios may situate participants into a fictional reality to experientially envision new technologies. Candy and Dunagan (2017) proposed an Experiential Futures Ladder and presented how they staged interventions to enable a deeper engagement for "feeling" future possibilities. Dunagan et al. (2019) further used the Experiential Futures Ladder as a guide to lead students to stage experiences in a Mars colony in the future. For example, they used space food, dirt, and an orange-colored infrastructure to create an evocative and compelling atmosphere. Bespoke Booklets (Desjardins et al., 2019) positioned in participants' living space encouraged an *experiential engagement*. The physical deployment of conceptual sketches in a situated way was intended to elicit lived experiences. Nägele et al. (2018) proposed PDFi, a mixed method combining participatory design and design fiction to shape medical futures by collecting science fiction narratives that involved the participants themselves. The abovementioned studies focused on shaping immersive experiences to encourage future imagination, in contrast to those approaches that emphasized crafting diegetic prototypes to provoke design futures.

As shown in the above literature review, few approaches put an emphasis on auditory methods. Thus, the present study seeks to fill this research gap to some degree by exploring the potential benefits of staged auditory experiences that are designed to shape imaginative space as well as craft future scenarios by using auditory components.

Auditory Experiences Stimulate Alternate Reality

The study observes that sound design plays a crucial role in opening imaginative space (Belton, 1992; Cheng et al., 2018; Crook, 1999; Marker, 1962; Whittington, 2007) and shaping futuristic experiences (Kong et al., 2019) in filmmaking, audio drama, and design research. Belton (1992) claims that film sounds create another temporal and spatial dimension to an imagined world. The director of *La Jetée* (Marker, 1962) used audio narration and photomontage experimentally to provoke imaginative mental images. The film *2001: A Space Odyssey* (Kubrick, 1968) exemplified how audio mixing can lead listeners from the first-person perspective to a narrative commentary perspective

(Whittington, 2007). Whittington claims that the self-reflexivity of sounds in the film brings imagination to a broad audience. In *Moon Graffiti* (Mitchell, 2015), staging using sounds made a fictional documentary appear realistic. Even without access to visuals, listeners still felt the mysteries and dangers of a lunar landing story. Kong et al. (2019) crafted Confabulation Radio to explore how mixed soundscapes combined with personal recordings create convincing experiences. Some participants in their study seemed to experience an alternate reality. From these cases, we learned that auditory experiences can envelop people in fictional worlds and encourage imagination at an experiential level.

At the beginning of our game design, we found that audio drama can be an engaging way to bring people into a story world that includes fictional characters, non-existent artifacts, and imagined plots. Without relying on visuals, the radio dramatists and storytellers made their fictions believable and amazing. Drawing on a notable history of audio drama, the first radio play written for French radio in 1922 was banned by the Sea Ministry (Crook, 1999), because the realism of the sound play was seen as a serious threat to society. A sophisticated storyteller can be skillful in suspending disbelief (Crook, 1999), which is surprisingly concordant with the core interests of design fiction research. As Sterling (2013) stated, design fiction involves the use of diegetic prototypes to suspend disbelief. We do not intend to design a platform for producing audio drama. Instead, the study seeks to identify the advantages of audio drama, which may shed light on designing digital experiences in sound design.

In audio drama, sounds can enable visual spatialization in listeners' imaginations and create multisensory experiences (Crook, 1999), such as olfactory perception, colour and visual depth, etc. We drew on the sound design vocabulary of audio drama, in particular the *conventionalised effect* and *evocative effect* according to Sieveking's laws in Crook (1999) to design our audio stimuli (the breaking news music and ambient soundscapes) in Once Upon a Future. In conventionalised effect, identifiable sounds chosen from the listeners' cultures were used to create a stereotypical image (Crook, 1999). For instance, the sound of Big Ben gave an image of London. In evocative effect, soundscapes were often carefully designed to create an atmosphere of fictions. Sometimes, radio producers also used *abstract rhythm* to shape the mood or feeling of a protagonist. Taking the use of sounds in the radio comedy series *The Hitchhiker's Guide to the Galaxy* (Adams, 1978) as an example, in order to give the drama a "hitch-hiking feel" (Adams, 2003, p. 95), dramatist Douglas Adams deliberately selected an electronic tune with a banjo tone in it. In other words, the feelings and emotions that sounds evoke in people shape their mental images.

Research Methods

As previously discussed, the pilot studies (Cheng et al., 2018) failed to produce data that revealed information about the forms of auditory experiences that may be evoked by auditory components. Therefore, a more expansive explorative study was conducted to specifically examine the details of experiences evoked by auditory

components on future imagining. Toward this end, the study used interpretative phenomenological analysis (IPA, Smith et al., 2009). Furthermore, we intended to explore particular phenomena and further understand individuals' personal meanings and sense-making in digital encounters through the sound components of Once Upon a Future after a period of time. IPA is a qualitative research approach that aims to examine meaning-making of experiences that people engage with despite the lack of explicit awareness of such experiences. IPA helps us look in detail at what is happening to our participants. We formulated a five-phase semi-structured interview to frame phenomena in greater depth and to discuss emerging experiences, to better help the participants describe and reflect on their feelings as a result of the different components of the design.

Data Collection

In our pilot study (Cheng et al., 2018), all the participants in Workshop #1 (W#1, held on 6 October 2017) and Workshop #3 (W#3, held on 13 October 2017) were researchers with HCI, interaction design, industrial design, or commercial design backgrounds, in the NTU IoX Center, a large-scale IoT research center, while participants in Workshop #2 (W#2, held on 11 October 2017) were students outside the NTU IoX Center. Considering the knowledge backgrounds of the participants, in this study we

only chose W#1 and W#3 as our targeted cases. We also recruited five out of all the participants to revisit the retrospective data in December, 2018 because of the enthusiastic way they had recapped fascinating audio fictions using AudioRecap in the workshops. As Table 1 shows, the five key participants were PJ and PYU in W#1, and PM, PT, PYH in W#3. The first author conducted one-on-one interviews to avoid herd behaviour. In these interviews, each participant revisited the visual and auditory components used in their game play and the photo records and audio fictions retained in the workshop. Each revisiting interview took about 1.5–2 hours.

Interview Protocols for the Revisiting Interviews

Using IPA, we explored the concerns of our participants through their *experiential claims* (Smith et al., 2009) and planned interview protocols as follows. Figure 3 illustrates that the participants were asked to experience each retrospective piece of data separately in order to better express their experiences in the digital encounters. First of all, no retrospective data were provided to them. Instead, they were given a formal introduction to Once Upon a Future as a starting point for opening the conversation between the participants and the first author. The interviewer then used open-ended questions to dialogically inquire which parts of the game play they were most impressed with as well as which experiences they found inspiring. In Phase II, we provided them with the audio

Table 1. Interview recruitment. Five participants, coded PJ, PYU, PM, PT, and PYH, were recruited for the revisiting interviews. We inquired about their felt experiences by conducting a five-phase interview. The table shows what retrospective data each participant encountered.

Workshop	Participant	Code	Background	Audio Fiction	Revisiting interview	Phase I: no retrospective data	Phase II: audio stimuli	Phase III: audio fiction(s)	Phase IV: used cards	Phase V: the photo record
W#1	Facilitator	FD	HCI							
	Player	PV	HCI	Act #2						
	Player	PJ	HCI	Act #1	X	Game introduction	Act #1	Act #1	Act #1	W#1
	Player	PJO	HCI							
	Player	PHAO	Interaction design	Act #3						
	Player	PYU	Industrial design	Act #4	X	Game introduction	Act #4	Act #4	Act #4	W#1
	Player	PGU	Industrial design							
W#3	Facilitator	FD	HCI							
	Player	PM	HCI	Act #3	X	Game introduction	Act #3	Act #3 & #4	Act #3	W#3
	Player	PT	HCI	Act #1	X	Game introduction	Act #1	Act #1 & #4	Act #1	W#3
	Player	PLIN	HCI							
	Player	PLU	HCI							
	Player	PHEN	Commercial design							
	Player	PBOK	Industrial design	Act #2						
	Player	PYH	Industrial design	Act #4	X	Game introduction	Act #4	Act #4	Act #4	W#3

stimuli they experienced in the workshops. At this point, the interviewer focused on understanding their auditory experiences by asking targeted questions, such as "What did you see from the audio stimuli in the workshop, if you remember?" or "What do you see now?" In Phase III, the participants revisited their created fictions in AudioRecap. In the cases of PM and PT, one additional recording from the same workshop was also provided to them, because they found difficulty in responding to their feltness. Interview questions in Phase III tried to elicit their user experiences and felt experiences of AudioRecap. For instance, "What future scenarios do you perceive?" "How do you feel when you listen to the audio fictions?" "Why?"and "What felt experiences do you have?" We not only probed what future scenarios they perceived but also asked why and how their audio fictions inspired them. In Phase IV, the follow-up stage, the interviewer exposed the Opening and Location cards used in the workshop. In contrast to the participants' responses to the sound material, we were interested in how the visuals stretched their imaginations and what cards they considered inspiring. We asked, for example, "Choose the most inspiring visual component and tell us why you chose it," "In contrast to the auditory components to which you listened, how do these visual components stretch your imagination? Why?" and "What were your challenges at the beginning?" In the final phase, we exposed the entire storytelling photo record of the workshop. We encouraged the participants to share their experiences in detail regarding the visual records. We also asked, "Did the experience inspire your research?" "How?" "Why?"

By IPA, all of the abovementioned interview questions aimed to explore the personal meanings of the feltness that the participants were perceiving. The interview questions in Phases II and III were designed to explore participants' auditory experiences, while those in Phases IV and V were set to explore how visual elements stimulated their imaginations. Sometimes the interviewer, the first author, did not follow the sequence of the protocol or the structured questions. Following IPA, the interviewer can act as a *curious listener* and try to understand the participants' lived experiences by asking for further details and ensuring the dynamics of the interaction with the participants.

In contrast to most previous design fiction studies, where the audience was not the creator, the participants in the present study were the storytellers of the audio fiction. This study aimed at understanding what experiences were evoked when people revisited the audio records.

Data Analysis

Based on the analytic process in IPA, for this study we adopted a *healthy flexibility* in the method used for analyzing the data. The procedures were as follows. (1) A voice recorder was used to record all interviews. Afterward, the recorded interviews were transformed into detailed transcripts for further research. The first author iteratively reviewed the transcripts, including all audio fictions that the participants listened to. (2) The first author selected and noted participants' *experiential claims* that they considered important during each phase of the revisiting interview. The first author listened again to the audio recording to understand the feelings taking place for each participant. Moreover, to better understand the *key moment* (or the particular experience) of each participant, the first author listened again not only to the interview recording but also to the workshop recording. This helped us experience every temporal moment of each participant and better identify the constellations or contextual elements within the collected data. (3) All authors iteratively discussed and developed themes that demonstrated felt experiences from the experiential data in each phase. Subsequently, four themes and sub-themes were identified (Results section). Theme 1 reported the experiences that most impressed the participants in Phase I; Theme 2 described the auditory experiences of the audio immersion in Phase II; Theme 3 demonstrated the use and felt experiences through AudioRecap in Phase III; and lastly, Theme 4 emphasized experiences with the visual stimuli and photo records in Phases IV and V. (4) Particular experiences or patterns emerged when relationships across the themes were analyzed. Both authors then generated rich descriptions which may address the major concerns of the study. These observations were interpreted and reflected on (Discussion section).
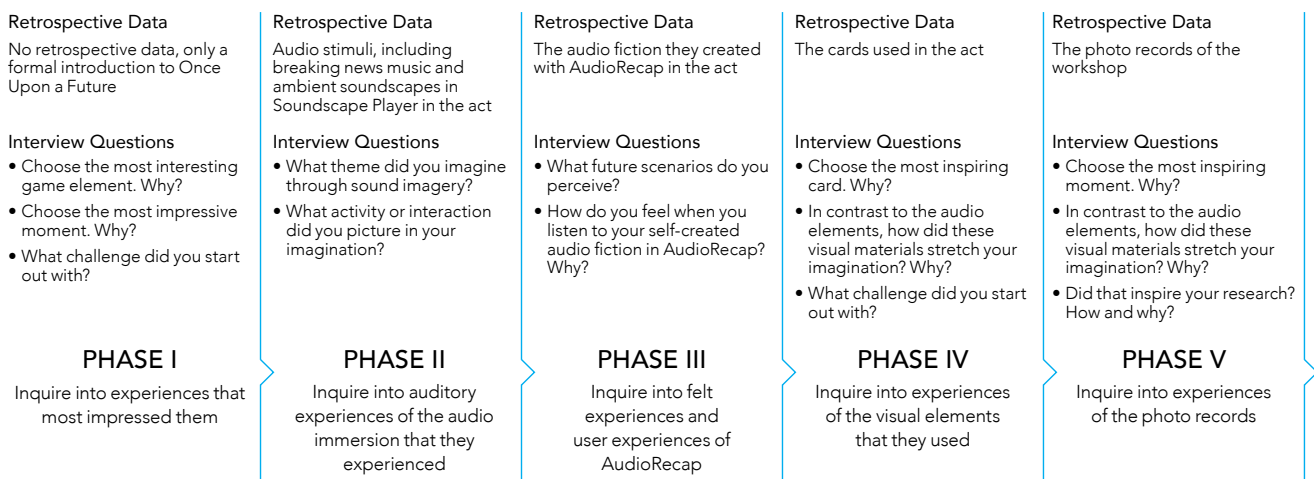
Retrospective Data	Retrospective Data	Retrospective Data	Retrospective Data	Retrospective Data
No retrospective data, only a formal introduction to Once Upon a Future	Audio stimuli, including breaking news music and ambient soundscapes in Soundscape Player in the act	The audio fiction they created with AudioRecap in the act	The cards used in the act	The photo records of the workshop
Interview Questions	**Interview Questions**	**Interview Questions**	**Interview Questions**	**Interview Questions**
• Choose the most interesting game element. Why? • Choose the most impressive moment. Why? • What challenge did you start out with?	• What theme did you imagine through sound imagery? • What activity or interaction did you picture in your imagination?	• What future scenarios do you perceive? • How do you feel when you listen to your self-created audio fiction in AudioRecap? Why?	• Choose the most inspiring card. Why? • In contrast to the audio elements, how did these visual materials stretch your imagination? Why? • What challenge did you start out with?	• Choose the most inspiring moment. Why? • In contrast to the audio elements, how did these visual materials stretch your imagination? Why? • Did that inspire your research? How and why?
PHASE I	**PHASE II**	**PHASE III**	**PHASE IV**	**PHASE V**
Inquire into experiences that most impressed them	Inquire into auditory experiences of the audio immersion that they experienced	Inquire into felt experiences and user experiences of AudioRecap	Inquire into experiences of the visual elements that they used	Inquire into experiences of the photo records

Figure 3. The interview protocols of the revisiting interview.

Results

Interestingly, most experiential data were about auditory experiences, while few were about visual experiences. There were two major dimensions to the audio experiences. The first dimension focused on the felt experiences evoked by audio stimuli involving breaking news music and ambient soundscapes produced by Soundscape Player. The second dimension focused on the felt experiences evoked by the voice recordings of the audio fictions in AudioRecap. Most interviewees' feedback in Phases I, II, and IV belonged to the first dimension, and their feedback in Phases III and V belonged to the second dimension.

1. Revisiting after a Period of Time Encourages Evocative Experiences

In Phase I, most participants had forgotten all details due to the lack of retrospective data. Participant PYU even could not remember the game rules. However, they were still able to share some auditory experiences elicited by the audio stimuli even after one year.

Some participants stated that the most impressive moments they experienced were evoked by the breaking news music. For instance, PM, PYU, and PYH were impressed by the Opening Cards with breaking news music, especially the emergency effect in the 3rd act.

PT and PYH recounted being inspired by the ambient soundscapes. PT mentioned that two different ambient soundscapes across two different acts helped him relocate the imagined scenes. Four ambient soundscapes in the four acts that implied scene changes had the most obvious effects. For PYH, sound elements allowed her to imagine an object or an interaction. This exploration went far beyond what the visual elements could provide.

Some participants reflected on the benefits and challenges of our sound design. For instance, PYU claimed that each act began with a clip of RFID-triggered breaking news music as a start to help them stay focused. PM appreciated our sound design and argued that mass media (e.g., movies and virtual reality) without sound left little impression. During Phase I, PYU, PYH, and PJ expressed doubt as to whether the ambient soundscapes kept them engaged. Ambients were seen by PJ and PYH as common (normal) noises or ordinary backgrounds in the environments that they experienced. In other words, the ambient soundscapes seemed immersive and were often overlooked, because participants were focused on playing and narrating during their storytelling game.

2. Auditory Experiences Foster Future Scenarios

In Phase II, the participants described in greater detail what images were evoked by sound imagery when they listened again to the audio stimuli that had been played in the workshops. PJ, PYH, and PT felt that the soundscapes appeared to work well for contextualizing narrative worlds, but at an unconscious level. Three dimensions about what they felt emerged, as follows.

First, the ambient soundscapes provided interactions, qualities, and event details and boosted technology imagination or technology stories. For instance, the ambient soundscapes allowed

PJ to create an unknown human or non-human entity who was doing something with intent and emotion. The constant frequency of one ambient allowed PT to imagine a totally automated environment where technologies were self-operating. Second, blending visual imagery with different audio imageries, triggered by the Location cards, opened different fictional worlds and changed what participants perceived. For example, when using the Training Center card and a peaceful ambient, PT imagined that all individuals in the center focused on binge-watching TV series, instead of on the meeting. Third, the interviewees' opinions highlighted the dramatic tension that may occur in the case of a clash between a piece of breaking news music and the embedded ambient soundscape. For instance, PM felt strange and confused when encountering a randomly composed conflicting moment when the breaking news music had a fire alarm effect and the embedded ambient soundscape represented a leisure room atmosphere. We saw such *serendipitous and sarcastic combination* (Cheng et al., 2018) as an imaginative way to foster future scenarios.

3. User Experiences and Auditory Experiences of AudioRecap

We categorized the user experiences and auditory experiences elicited by AudioRecap into the four sub-themes (details in 3.1–3.4) outlined below.

3.1 Turn-Taking Play Generates Inspiring Story Branchings

The participants found that turn-taking narration would result in multiple branchings of a tale. PYU's fiction is an example, where the protagonist's biomechatronic body parts would fight for data privacy when he is facing uncomfortable surveillance (remote surveillance in a company toilet). Using turn-taking narration, an object in the story (the protagonist's biomechatronic eye) was given diverse agencies, which led to a story with various "unexpected turning points" (PYU). PYU also reflected on his product design background, where designers always focus on one-dimensional storylines. He argued that designers sometimes "limited their imagination themselves" if they imagined futures only by starting with technology. Our collaborative activity fostered multiple storylines in technology scenes and that enriched the plots. "Nonsensical and incredible scenes" were generated (PYU). He also had numerous inspiring moments when listening to AudioRecap in Act#4 of W#1, which enabled him to "gain more ideas," "generate branching stories," and "produce technological applications within a short time." PM, however, expressed that he would opt for a more focused theme to extend or a more specific problem in one act because the stories were too divergent to lead to a better discussion in W#3.

3.2 Audio Fiction Broadens Techno-Social Space

Participants found that stories in an auditory form may encourage creativity in their research. For instance, PT said, "I'm not sure it directly helped my research, but it would provide me with more

opportunities than I ever thought before… collaboration makes me find something inspiring." He expressed a strong desire to deploy our audio drama board game for his lab novices. He said, "to give them an overall introduction to HCI is not easy by myself, but we can adopt this as an exploration purpose to broaden their techno-social space."

3.3 Recapping Mediates Joint Speculation

The results showed that the recapping activity not only fostered collective co-speculation but also encouraged interactive dialogues. For instance, the first author found that PYU, the storyteller (Act#4 of W#1), seemed to deliberately pose a question during his narration to promote increased engagement or follow-up discussions within the team. In the recapping activity of Acts #1 and #2 in W#1 with AudioRecap, the storytellers forgot and missed some details of the narration of other participants during their storytelling. The other participants who were not responsible for summarizing the act were eager to complete it with the storyteller. In PJ's case, from AudioRecap she heard some players aggressively contributing their versions after she summarized the story. Because she ended the story with an open-ended scenario, all the other participants were eager to complete the fiction and critically discuss another version. An open-ended narration embraced a broader imaginative space and allowed participants to interpret and speculate about the scenarios.

Some participants noted that the recapping activity elicited their empathetic co-narration about the fictional protagonists. For instance, PYU found that AudioRecap allowed all participants to co-construct the struggles and feelings of a non-human protagonist as it underwent certain crises. PT heard other participants engaging in the fictional storyline. What the fictional actors faced aroused their own emotional reactions and prompted further narratives.

We argue that the recapping activity itself shifted our participants toward being active imaginers (Dunne & Raby, 2013) and mediated the development of collective visions among them. The technology futures speculated about by the participants were products not only of a puzzling card game but also of a collective sonic world.

3.4 Listening Is Believing: Self-created Audio Fiction Suspends Disbelief

The following two particular cases in Phase III highlight how the audio fiction component of our study facilitated technology futures and suspended the participants' disbelief about those fictions.

PYH told us what she felt while listening to the audio fiction she had created. She said that the technologies in the fiction were "not just at the application level," but instead that they could be "felt" in her daily life. She was convinced that a brainwave product would be living with her:

> Some technological details are described in the story. *It makes me feel it's real.* When I listen to this story, it sounds very ridiculous but reasonable... such as a brainwave technology to support working during a non-working status. I have never thought this before. It sounds new and interesting; the story titled "Virtual Sports Competition" is funny....

After experiencing the audio fiction that she created herself, she began to imagine and picture several scenarios of how people in the future will work in bed by using a brainwave technology. For her, to imagine the next step of brainwave technology was very difficult. She was willing to envision a futuristic design driven by such a fictional scenario. This particular case stimulated our curiosity to question why voice recordings can convey *believable* future scenarios.

PJ was surprised by some consistencies between the moments that impressed her the most and her audio fiction because she could not remember the entire story until she re-experienced the record. "When I was listening to my storytelling, all the details came back." The revisiting helped PJ to remake each connection between "all the [story] elements and the scenarios" in her mind. Furthermore, "the revisited story sounded like a reasonable story, nothing strange…. It's possible that the story is associated with the plot of the movie which I have seen in the past," said PJ. According to her experiences with the digital encounters, she further tried to explain the reason why the revisited story seemed so similar to scenes she had impressions of:

> "I often used the most impressive scenes I have ever seen in movies or novels as my storytelling elements... storytelling is an immediate ability and I might compose the story with those familiar plots [from movies], again and again."

Based on the experiences of PJ and PYH, we infer that the audio fiction narrated in their own ways made the fiction personal and meaningful. Listening to the audio fiction thus allowed them to experientially revisit the entire context of the story and make the fiction reasonable. We will further interpret these phenomena in the Discussion section below.

4. Auditory Experiences Forge Scenarios for Future Imagination

Few accounts in Phases IV and V showed how visual elements inspired the participants' imagination, although they only revisited visual data. Unexpectedly, all the participants gave us more feedback about how sound elements fostered their speculation. We discuss these experiences in Phases IV and V together in this section.

Accounts in Phase IV showed that the visual cards were less inspiring for the participants. In contrast to the visual cards that PT used, the ambient soundscapes were considered "believable" fictions for imagining non-existent scenarios. For PT, the corresponding ambient soundscape was a very rich stimulus for shaping envisioned scenes, while the used Location cards were only "a visual representation of a specific aspect" of a space. PM reported that he felt a much richer imaginative texture in response to ambient soundscapes than corresponding visual stimuli. He expressed a desire for nuanced ambient soundscapes to be included in the game, which may inspire possible events or human–computer interactions. Both of these participants in this phase aggressively suggested that a revision should be made to our game in terms of redesigning the sounds. They even suggested a new game with only sounds and without visuals. PYH provided a different opinion. For her, the ambient soundscapes and visuals of the Location cards both

worked together to structure an imagined spectacle. A "futuristic" visual and the corresponding ambient allowed her to speculate about a context for "experiencing what it looks like."

In Phase V, when talking about whether the photo records inspired their technology imagination, PJ expressed that the photo records were "unfamiliar" to her. This unfamiliarity was not because she was encountering these visual records after one year. She strongly argued that visual records would be "meaningless" to her even if she revisited them only a short period of time after the workshop. She further stated, "Listening to the story was enough. On the contrary, the photo records stopped me from [imagining]... I was thus forced to review all the visuals and made a new story which was totally not the same one." In contrast to the participants' reactions to the photo records in the workshop, accounts in Phases III and V showed that a self-created audio fiction can create a more personal and meaningful context with which they could resonate.

Discussion

In analyzing the data, three main themes emerged. The particular and rich experiences elicited by the self-created audio fictions in AudioRecap further directed our focus onto discussing the benefits of AudioRecap in this section. We also reflected on the contributions that came from using sound design to support imagination.

Audio Fiction as a Generator for Constructing Possible Worlds

AudioRecap Encourages Diversity in Storytelling

Our attention focused on the participants' use of AudioRecap, and the experiences which resulted. The recapping activity with AudioRecap fostered the diversity of future stories. In the case of PJ, after she summarized the act all the other participants were eager to complete the audio fiction or develop their own version (in Theme 3.3 in the Results section). In other cases, the participants were unsatisfied with a single storyteller and mentioned that they would like to collaboratively build up a possible world by taking turns in the recapping activity (e.g., in Act #4 of W#1). The activity also broadened the participants' research boundaries (PT) when we investigators recruited experts from different domains into the storytelling process. Each one contributed to the audio fiction about what they believed in the futures, and that fostered more diverse stories.

Listening is Creating

Listening to the audio fictions also catalyzed scenario constructions after one year. PYU said that listening to the audio fictions provided him with "rich context and temporal [anchors]" for "generating branches of a tale." According to him, the diversity of the audio fiction supported him in producing many technological applications. The revisiting itself made PJ personally process the scenes in such a way that "the story sounds flexible and I can zoom in or zoom out across different spaces within it." The audio fiction was not simply a single story. It could also be reused and prompted our participants to generate different technology worlds.

The findings contribute to a fresh understanding of how the making and the revisiting of audio fictions prompted diversity in world-building in design fiction and speculative design practices. We argue that AudioRecap can be viewed as a *possible-world generator*. As a result of their experiences with AudioRecap, the participants improvised new multidimensional and diverse storylines about technologies. They recapped these possible worlds in AudioRecap and developed their personal stories inside those worlds. The present study also envisions its potential use, that is, all recruited researchers can reuse these stories to inspire their future research.

Listening Is Believing:
Self-created Audio Fiction Suspends Disbelief

In both PYH's and PJ's cases in Theme 3.4 in the Results section, the audio fictions they created produced reasonable and believable future scenarios. We observed that by making their world sonic, the participants experienced these worlds in much greater depth. PYH described a feltness when her vision of a new technology became real for her. In the 1938 radio adaptation of H.G. Wells' novel *The War of the Worlds* (Hand & Traynor, 2011), the scenario designed as a news broadcast successfully built a sense of horror and made listeners believe that there were aliens slithering out of a landing ship in real time. In our study, we learned that a calculated experience with an audio form may create *a greater impression of authenticity*. As suggested by Walton's (1990) make-believe theory, we realized that our participants could be emotionally moved by a perceivable reality. An emerging sense of plausibility or familiarity can shape an individual's sense of what is real. We successfully shifted PYH toward being an active imaginer when she described how she believed that certain features of her fictional world of the future actually existed.

Furthermore, we agree with Kirby's (2010) argument that good storytelling requires *scientific authenticity* (note #15). In PYH's case, the scientific authenticity of the brainwave wearables in her audio fiction resulted in a convincing vision that successfully suspended her disbelief. This phenomenon is related to a bridging technique which Auger (2013) termed *verisimilitude*. The technological believability of PYH's creation led her to enter into the fiction and allowed her to start to envision a futuristic design while listening. In this case, the audio fiction becomes a *perceptual bridge* (Auger, 2013).

In PJ's case, the audio fiction created a sense of *déjà vu*. We argue that her voice records may have evoked connections among segments that impressed her the most. On the other hand, the personal style within the storytelling may have made the story sound particularly familiar to her.

A comprehensive review of the accounts from Themes 3 and 4 in the Results section prompted us to revise our impressions of the 3-minute voice records. We had initially believed that photo records would be more evocative than audio records. However, we found that photo records failed to evoke further discussions about future applications. Contrary to expectations, the effect of the audio fictions was less of a workshop record and more the most effective means of stimulating our participants' imaginations. It

was audio records which stimulated PJ and PYH to capture the details of their imagined futures in the workshop. PYH's ability to envision new applications one year after the workshop was also attributable to the audio records. In most of the brainstorming sessions at the time when the goals for the project were still only concepts in a research center, designers consistently considered the visual record as the main source of future inspiration. However, the present study showed that it was very difficult to capture the essence of the stories developed collaboratively in the workshop solely through visual means. In contrast, the revisiting with voice recordings after a period of time helped participants recall the details of their experiences during the story development process, and that helped them to make sense of their improvised story worlds.

Reflecting on the data produced in this study, the study argues that the verisimilitude and *evocation* of audio fiction might be two keys to evoking the types of convincing future scenarios produced by the participants. In our study, scientific authenticity or technological believability was a potent way to convey the verisimilitude of a technological world. For research on design fiction or speculative design, the findings highlight some of the advantages of audio fiction. The development of a good design fiction relies on the willingness of the participants to suspend disbelief. Staging convincing audio fictions will allow them to experientially speculate about their possible futures.

Here we also have to emphasize that the abovementioned phenomenological experiences were very personal. We should not expect the particular experiences of these participants to occur in other participants in a similar setting. Each experience was special and particular.

To conclude, AudioRecap is able to record rich and well-established visions co-created by an interdisciplinary team. When the participants perceptually revisited the records after a period of time, the audio records were able to convey very personal, meaningful, and believable sonic worlds to the participants, while the visual records failed to evoke the scenarios in detail. Such voice recordings conveyed verisimilitude and authentic feltness that helped participants conceive of radical changes in imagined futures. Moreover, the audio records helped the recruited researchers to become perceptually involved in the fictions and to willingly envision technological novelty.

Methodological Contributions to Design Futures

This section further reflects on what methodological contributions the study may bring to the community. Surprisingly, the auditory experiences were better at stimulating future imagination than the visual records were, throughout the thematic accounts in the Results section. This finding prompted us to focus on discussing the following specific benefits.

Auditory Experiences Mediate Future Imagination

First, the openness of the ambient soundscapes led to improvisations of imaginative spaces (the accounts of PJ, PYH, and PT in Theme 2 of the Results section) and evoked rich future scenarios (PM's

accounts in Theme 4 of the Results section) in the psychological dimension, while the visuals of the Location cards left less space for people to fill in the details. In addition, experiencing breaking news music and ambient soundscapes together built the textures of the imagined scene. As a start, the participants seemed to build their own technology applications into their audio fictions. This study contributed new understandings of how breaking news music and ambient soundscapes could produce rich future scenarios that were imaginative as well as inspiring to technology developers. In our future work, we suggest a much richer sound library and a redesign of the audio stimuli. As Lindley et al. (2014) stated, a good story world covers nuanced circumstances and the design fiction within such a world situates people into a meaningful future scenario. We envision a better version of our storytelling tool and aim to explore the textures of audio stimuli that are more diverse and imaginative.

Secondly, the audio fiction in AudioRecap was able to quickly produce technological applications (PYU's accounts in Theme 3.1 of the Results section) and broaden the technology developer's techno-social space (PT's accounts in Theme 3.2 of the Results section), after one year. AudioRecap was not just used for collecting retrospective data. It can also be used as an auditory what-if to leverage technology futures. Learning from these phenomena, we argue that voice recordings could be an efficient approach for prototyping and generating diverse possible worlds. As Nelson and Stolterman (2012) have stated, "design is the ability to imagine that-which-does-not-yet-exist, to make it appear in concrete form as a new, purposeful addition to the real world" (p.12). In the present study, AudioRecap inspired the participants to shape non-existent futures in their minds using auditory means. The audio fiction in AudioRecap was a playful and non-purposeful way of inspiring the participants' future research.

In a traditional designerly approach, the majority of future studies suggested a textual or visual way to evoke new technology applications. In contrast, after examining the potential benefits of sound design in our storytelling game, this study found that it was audio stimuli that led to improvisations of rich scenarios. The study also demonstrated how our AudioRecap generated futuristic ideas and further supported the participants' future research.

AudioRecap Catalyzes Joint Research on Future Technologies

AudioRecap, as used in this study, is a platform designed to encourage democratic participation. As McDowell (2019) and Tanenbaum (2014) argue, the narrative space opened for storytelling can support interdisciplinary efforts to collaboratively build up an innovative vision. Each researcher is invited to actively voice out their own futures instead of adding to a centralized future chosen by the stakeholders in a technology center. They are encouraged to envision and claim futuristic alternatives about their technology. Although only one person gets a chance to recap for each act, the partial ideas contributed by the other participants are recorded into the final recap. The audio fiction still reflects what preferable futures they collaboratively envision. In other

words, the other participants' future statements are voiced and combined with the collective vision indirectly. Thus, AudioRecap exposes the hidden desires of all the researchers involved.

The co-narration made available by AudioRecap opened a conversation and enabled interactions among the participants which were observed in PJ's and PYU's accounts in Theme 3 of the Results section. The specific benefits included the production of open-ended questions and the generation of alternative possibilities. Such a playful and productive activity further catalyzed the visions of their future research. In addition, AudioRecap also served as a communication medium. For some technical researchers, expressing their techno-social dreams, not to mention performing and narrating, may be difficult as part of a large-scale interdisciplinary project. However, our AudioRecap liberated their inhibitions in communication and facilitated their collaboration. We learned from our participants and acknowledged the importance of AudioRecap. We observed the collective visions that emerged during recapping and replaying. We saw how AudioRecap encouraged their active participation and exposed what future technologies they desired. When the participants were replaying the recap, reflections on technological possibilities or challenges were discussed. Moreover, AudioRecap took a playful and non-directed path to catalyze the joint research of a team around future technologies.

Reflections

The revisiting interview that took place one year after the game was experienced appeared to provide an inexact or evocative opportunity for the participants to contribute their interpretations about auditory experiences. Although the results indicated that the majority of the participants had forgotten the details in Phase I of the revisiting interview, the results also revealed the aspects of the auditory experiences that the participants considered important, for instance, the manner in which the ambient soundscapes structured the imagined spaces (PT in Theme 1) or fictional interactions (PYH in Theme 1). All participants were impressed with the auditory experiences despite the lack of retrospective data in Phase I of the revisiting interview. Evidently, auditory experiences became significant to them. After one year, the collected accounts under such conditions do not necessarily preclude the findings of the abovementioned evocative experiences that the participants considered important and significant. The study did not seek precise feedback from the participants in response to the storytelling game. Instead, it focused on exploring the evocative experiences that made the greatest impressions on the participants.

Moreover, the study found that participants with different backgrounds displayed varying levels of audio sensitivity. PJ, PM, and PT, with HCI backgrounds, exhibited a greater interest in the audio design and auditory experiences, whereas PYH, with a design background, appreciated both the visual and audio stimuli designed for provocation and imagination. This finding complements the current understanding of the design research process: when conducting a cross-domain acoustic-related activity, design researchers should consider the stimuli used and the audio sensitivity of the participants.

Conclusion

To conclude, this study is a qualitative research study focusing on the exploration of sound design in a storytelling game named Once Upon a Future. A phenomenological approach is used, which focuses on the data that emerged from the study rather than testing a hypothesis. Thus, this study is open and exploratory. A particular finding is that verisimilitude and evocation in audio fiction may be crucial elements in efforts to evoke convincing futures. The results showcased one participant (PYH) who was emotionally moved by the audio fiction after one year. It can be reasoned that the scientific authenticity or technological believability of her audio fiction resulted in a convincing reality that felt real to her and led to a suspension of disbelief. The present findings contribute to the research community's understanding regarding methods for staging futuristic experiences by sounds, and that may prompt people's technology imagination or inspire their future research. Specifically, this study makes three contributions. One is to expose the experiences of how audio stimuli and voice recordings leveraged technology imagination and catalyzed joint research within an interdisciplinary team in an IoT research center. The second contribution is to showcase how a revisiting interview after a period of time using an auditory form can elicit alternative experiences. Finally, we established a way for discussing the effect of sounds, which counterbalances the current speculative approaches that rely heavily on designing visual and textual prompts. Furthermore, this study provides a descriptive basis for future studies about shaping believable feltness through audio fiction. There is a continuing need for exploring and applying different auditory means for eliciting futuristic experiences.

Acknowledgments

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