The Interview Box:
Notes on a Prototype System for Video-Recording Remote Interviews

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Video-recording remote interviews can sometimes be necessary or desirable, such as in news broadcasting or documentary-making. However, remote interviews are not currently well-supported by digital tools. Unresolved questions about best practices and the kinds of support needed to facilitate remote interviews have become increasingly relevant since the Covid-19 pandemic. To reflect on these questions and explore the design space for systems to support high quality, remote video-recorded interviews, we conducted an exploratory Research through Design study, drawing on professional media-making techniques, innovative interviewing methods and a bespoke intervention: *The Interview Box*. In this paper we provide a detailed summary of our design process and, reflecting on both the successes and failures of our interventions, construct two contributions: technical insights relating to the practical challenges of designing and implementing a remote video interview system, and general insights into the broader interaction design challenges of designing for remote video-recorded interviews.

CCS CONCEPTS • H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Additional Keywords and Phrases: interviews, video, telecommunication, documentary, research through design, ethnomethodology.

1 INTRODUCTION

This paper revolves around an experimental documentary project about *Design Research* that we (a small team of UK-based researchers) embarked upon in 2021. We planned that the documentary would be based around

interviews with domain experts. Our interviews were framed around three foundational questions; "what is *Design*?", "what is *Research*?", and "*what is Design Research*?". Inspired by the interactive documentary project, *Question Bridge¹*, we also asked our participants to *ask* a question for the next interviewee/s to answer. So, the next person we interviewed would answer the three foundational questions *plus* a fourth question that was posed by the previous interviewee, and, depending on the flow of the conversation, more questions from other interviewees further back in the chain. The more people we interviewed, the more the bank of questions and answers grew and the deeper our insights into the breadth of our foundational questions.

Social distancing guidelines in the UK at the time prevented in-person interviews. Like many people, our working practices had moved online, and we were working from home. We considered using the recording features of video conferencing tools (e.g., *Zoom*, *Teams,* or *Meet*) to conduct and capture the remote interviews, but we were reluctant to do this for several reasons. One reason was that we wanted to capture high bitrate video, use professional microphones and studio lighting, such that finished documentary would be of 'broadcast quality'. Beyond our concerns with fidelity, however, we also wanted to make the experience of participation closer to what it would have been in-person, and—from our participants perspectives—distinct from being *just another video call*.

In-person interviews often involve complex social interactions that extend beyond the interview itself [29]. Professional interviewers commonly engage with interviewees beforehand, for example during the unpacking and setting up of equipment. This serves to 'break the ice' and relax interviewees [23]. For similar reasons, when working on location, documentary makers sometimes involve participants in decisions like choosing where to set up to film. Setting up and configuring cameras has a necessary technical purpose, but it also has a subtle *social* role in establishing relationships, building rapport, and nurturing a sense of shared responsibility for the interview. Simple actions, such as deciding where to place the microphone, can be vital in establishing trust. Conversely, if handled insensitively such activities can be intimidating, or even anxiety-inducing. The interactions which take place *around* the interview play a significant role in the quality of the interview, the captured material, and the finished result.

With these practical and more nuanced social considerations in mind, we created a prototype *Interview Box* – a professional camera, sound, and lighting rig housed inside a small flight case. We also developed an interview protocol which was aimed at integrating some of the key interactions from in-person interviews into this remote interview approach. We sent the Interview Box out to eight interviewees. In this paper we provide an account of what happened and what lessons we learned from the things that went well, as well as the things that went wrong [12].

The paper proceeds through four major sections. Our background section discusses interviews and interviewing, situating our contributions in the research landscape. A brief methodology section describes what data we consider and our epistemological foundation. The findings section gives a detailed account of what we learned through designing, building, and using the Interview Box, including some accounts from our participants. The discussion section provides a further analysis of the project, surfacing general themes and offering contributions relating to the design of remote interview systems.

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¹ Question Bridge - http://questionbridge.com/

2 BACKGROUND

From news reports to ethnographic research; from documentaries to the criminal justice system; from vlogs to job applications – video interviewing is a widespread practice and often includes rich interactions. As an increasing portion of life and work becomes conducted remotely, there is a new need for interaction design research relating to remote interviews. In this work, we focus on interviews that are both *recorded* (as opposed to *live*) and *remote* (as opposed to those where the interviewer and interviewee are *co-located*). We refer to these kinds of interviews as 'remote video-recorded interviews.' In this section we unpack salient aspects of interview practices, framing both *why* we needed to create the Interview Box, and the significance of the paper's contributions.

2.1 Remote Video-Recorded Interviews

There are some key differences between *recorded* interviews and *live* interviews. Whereas live interviews such as news broadcasts stream to audiences in *real-time*, recorded interviews are released to audiences afterwards, hence there is a delay between the interview happening and audiences seeing it. This means that recorded interviews are commonly *edited*, a process that involves cutting and/or rearranging the footage, as well as incorporating additional imagery or 'cutaways' [24]. Editing is typically used to streamline and clarify the interviewee's points, but it can also subvert or distort them [25]; it essentially empowers editors to decide on the final output from an interview. As such, there are power dynamics involved and ethical issues relating to trust and consent [29]. Furthermore, recorded interviews can be orchestrated in a variety of different ways (e.g., 'breaks' and 're-takes' are possible in recorded interviews but not in live interviews). These considerations are important for the design of systems to support recorded interviews of all kinds.

Another important distinction concerns the relative location of interviewer and interviewee. In the broadest terms, *remote interviews* are those where the interviewer and interviewee telecommunicate; via telephone, video conference, or otherwise. As a convenient alternative to in-person interviews [13], remote interviews boomed during the pandemic [24], enabled by videoconferencing systems. Although the user experience of these systems has been criticised [1][18][27], remote interviews are predicted to remain popular, not least because of their lower cost and energy overheads [18].

Video interviews that are both remote *and* recorded tend to fall into two categories. The first category – *the 'location-based interview'* – is a staple of contemporary news broadcasting. This style of interview, which includes home-based interviews, gained infamy in 2017 when a BBC interview with Professor Robert Kelly was gate-crashed by his wife and children[2]. In this example, the interviewee was communicating with journalists via videoconferencing software, using a personal computer as an all-in-one audio-visual capture, playback and communication device. The interaction between interviewee and interviewer can be similar to a live interview and, indeed, many interviews in this category are streamed live first and then replayed. Albeit few as frequently as the Kelly interview, which at the time of writing has 46 million views on *YouTube*. Viral sensations notwithstanding, current videoconferencing systems do not do a good job of facilitating location-based interviews because they *disrupt* the social connections that form the basis of trust between interviewer and interviewee [1]. Furthermore, there is a disparity between professionally produced media interviews and footage captured from videoconferencing. It is not enough to say that interviewees should light themselves better, or frame themselves better, or upgrade to a better webcam. Shifting the onus entirely onto interview subjects undervalues the craft of interview production and generally results in *poor quality interviews*.

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[2] - BBC News - Children interrupt BBC News interview - https://www.youtube.com/watch?v=Mh4f9AYRCZY

The second category of remote video-recorded interview – *the 'studio interview'* – attends to some of these issues, albeit at a cost. Studio interviews use facilities such as professional recording equipment, acoustic-dampening, lighting rigs and dedicated high-bandwidth network connectivity to achieve a much higher technical quality. They also provide a level of care for interview subjects that is uncommon in other remote contexts. But they are often expensive, time-consuming, and need dedicated technical support. The normalisation of home-based interviews during the pandemic has side-lined many of the benefits of studio interviews. At the time of writing, there is a big gap between convenient low-quality solutions (the norm) and inconvenient high-quality solutions; no 'Goldilocks' system marries high-quality media recording with the convenience of a teleconferencing system. Here in the 'middle ground' between home-based interviews and studio interviews is an opportunity for innovative design. In this study, we explore this middle ground and consider ways to get studio-quality results in the remote home-interview context.

2.2 'Quality' Interviews

A salient parameter of the design space for remote interviews is the 'quality' of the interview. To unpack what this means, we can start by distinguishing two *kinds* of qualities relating to interviews: one relating to the interview *process* and one relating to the interview *media*.

2.2.1 The Quality of the Interview Process

Interviewing is a broad and complex practice – "*as old as the human race*" [3] – with long roots in social sciences [8], anthropology [28] and ethnography [29], as well as nonfiction media [36]. It encompasses a range of functions and styles from conversational to confrontational [5] and diverse conceptualisations of 'best practice' exist across several disciplines [32]. What we mean by 'quality' in terms of an interview *process* is invariably contextual. However, it will typically involve ethical considerations such as the power dynamic between interviewer and interviewee, the quality of the flow of information (before, during and after the interview), the context in which questions are asked and answered, and the style of the questions and answers. Reflecting on the opportunities for remote interviews, particularly in sensitive, remote or inaccessible contexts, Braun and Clarke [4] highlight qualities such as 'convenience' and 'accessibility' (pertaining to both interviewer and interviewee). They also consider how the lower overheads of remote interviews potentially allow for more interviews with the same resources (i.e. larger sample sizes), and the opportunity for parallel multimedia communication channels (e.g. text chat). However, they also highlight contexts where remote interviews are *less* accessible and *less* convenient and warn of the disruptive potential of technical issues. In the broadest terms, the quality of an interview process reflects the quality of interactions between *people*. A quality remote video-recorded interview should enable clear, uninterrupted communication between interviewer and interviewee and all parties should feel heard, valued, and understood [30]. From this perspective, it is clear to see why some attributes of videoconferencing (e.g., latency, fatigue, distractions) make it a poor choice for conducting video-recorded interviews. Furthermore, even for experienced interviewers and interviewees, the social conventions around videoconferencing are nascent; nobody yet *knows* how to behave [1].

2.2.2 The Quality of the Interview Media

The output from a remote video-recorded interview is usually digital media. The 'quality' of this media is defined by a combination of quantifiable data (e.g., resolution, bitrate, focus, exposure) and qualifying descriptions of its

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content (e.g., richness, depth, insightfulness, etc). It is helpful to consider these qualities from the perspective of an *audience* [21][33]. Whereas the interview *process* concerns the interaction between interviewer and interviewee, the media output connects a third key role: the audience. A 'quality' interview is therefore one that balances a quality interview *process* (the interaction between interviewer and interviewee) and quality interview *media* (bridging this interaction to an audience).

Based on the premise that current videoconferencing systems have been shown to undermine *both* the interactional quality of the interview *process* and the technical quality of the interview *media*, our research question asks, *how can interactive systems better facilitate remote video-recorded interviews?*

3   RESEARCH METHODOLOGY

To explore this question, we used a *Research through Design* (RtD) methodology, with design and making at the heart of our enquiry [8]. Within this framing, informed by prior HCI work that uses documentary-making as a key element within the research process [2][14][15][16][19], eight documentary interviews – scheduled as part of a pre-existing documentary project – became the focus of our study. Several factors derived from this context informed the design of the study.

Firstly, due to pandemic measures, we had to conduct the interviews remotely. The eight interview participants we wanted to speak to were all based in our shared geographical region in North-West England, but we were unable to interview them in-person.

Secondly, the documentary is a *transmedia* project. The interviews would be syndicated across three media formats: A long-form documentary film, a series of short-form (*YouTube*) videos, and an audio-only podcast. We therefore needed to ensure that the media we produced would be suited to each of these formats. Matching the technical standards of the highest common denominator (i.e., the long-form documentary) would maximise technical compatibility, but we would need to adapt aspects of the interview *process* to the different stylistic traits of each format.

Thirdly, the subject of the documentary, and the focus of the interviews – *Design Research* – is ambiguous, broad and contested [17]. We therefore needed to ensure our interview process, which intentionally set out to ask big, open-ended questions about this topic, also scaffolded some necessary *focus*.

Finally, one of the aims of the documentary project was to build and strengthen connections within and across the Design Research community, so we wanted to connect perspectives from participants across the interviews.

Based on these requirements, we designed a multifaceted intervention, composed of four main elements:

i.   *'The Interview Box'*, a prototype interactive device, designed and built to simultaneously support remote communication and capture professional-quality video and audio.
ii.   A flexible, playful *pre-interview set-up session* that combined the necessary technical configurations with collaborative, co-creative activities – inspired by the way professional interviewers engage with participants during the equivalent pre-interview process in co-located, face-to-face interviews.
iii. A *question-bridging* interview technique (inspired by *Question Bridge*) that uses two activities to incorporate questions (and answers) from previous interviews, as well as providing an opportunity for interviewees to pose new questions for future participants.
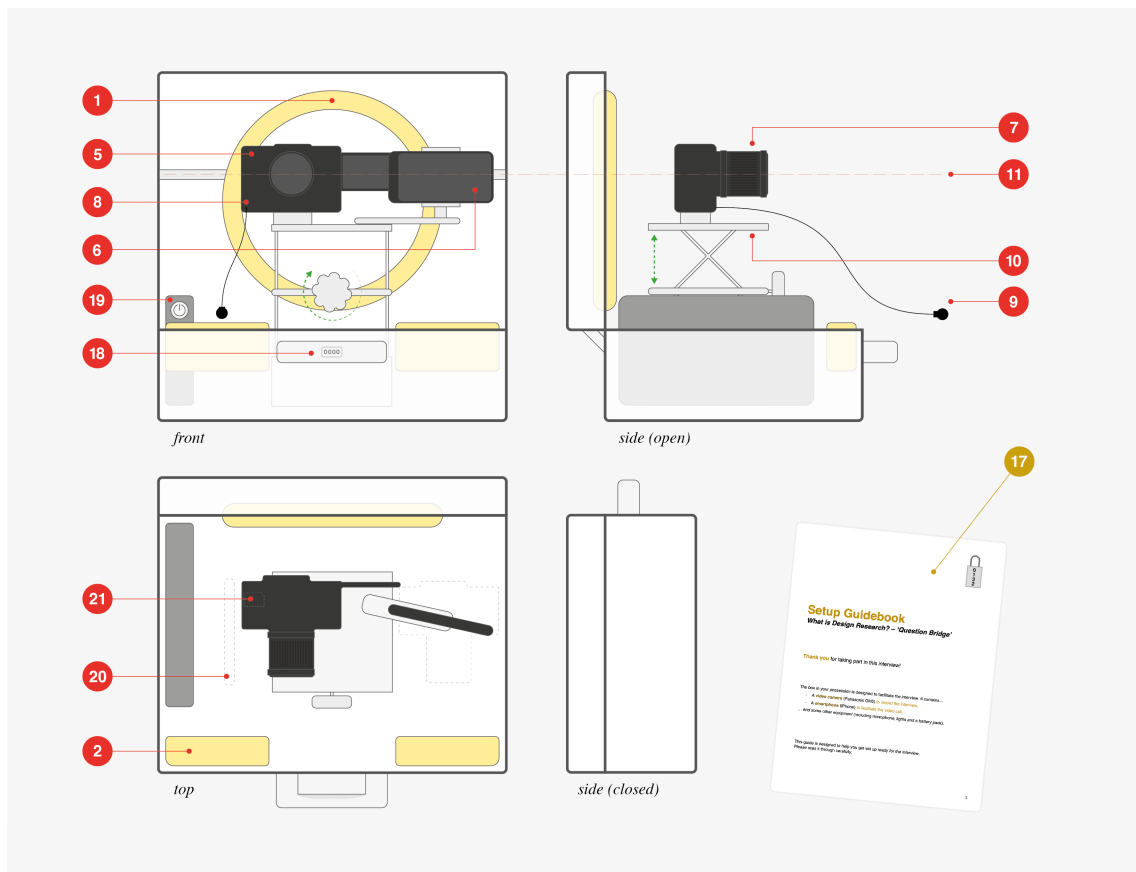
iv.　　A *two-headed interview*, inspired by radio and podcast formats and informed by visual ethnographic methods [29], that could be used to generate a more conversational / dialogical tone in some parts of the interview.

Our research data are from two sources. The first data source is a reflective account by the authors of the design challenges we faced. This is grounded in the ethnomethodological tradition, which considers researchers themselves to be a primary research instrument [6], and the ethos of *Research through Design*, where the practices of designing and making are considered to be a legitimate form of knowledge-building [8]. The second data source is feedback from interview participants, collected from a detailed, anonymous evaluation survey, containing a combination of qualitative Likert-scale questions and open-ended questions such as, 'Were there any ways in which you felt the interview was better or worse than a face-to-face interview?' and 'Were there any ways in which you felt the interview was better or worse than a remote (e.g. *Zoom*) interview?'. We obtained full university ethical approval from Lancaster University's before the study.
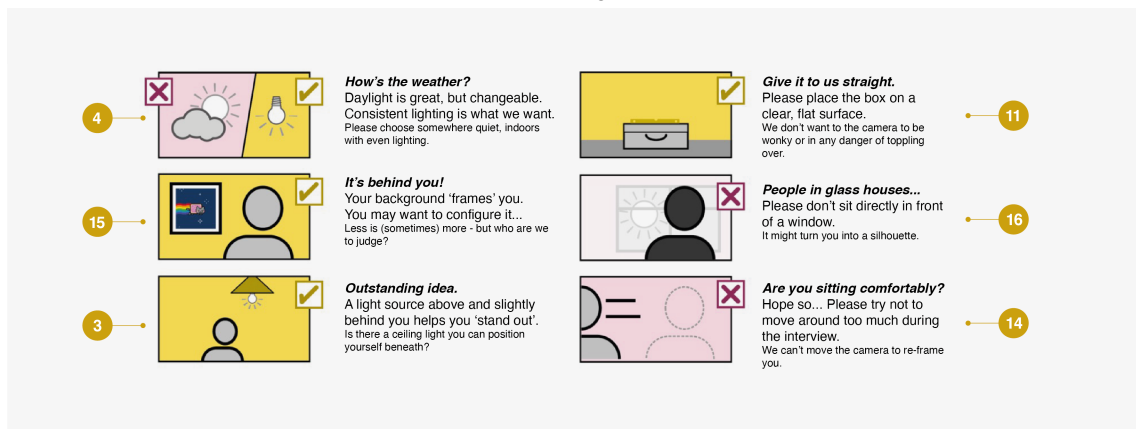
4　FINDINGS

4.1　Designing the Interview Box

At the time of writing, to the best of our knowledge, no portable system exists that combines low-latency videoconferencing and high-bitrate, high-resolution (4K) video capture with integrated lighting and sound recording. For this reason, we designed and built a working prototype system, incorporating several devices including two cameras (one to capture high quality video and one to facilitate telecommunication) as well as integrated power and adjustable lighting. The system needed to be *portable, sturdy and secure* so we built it into a lockable lightweight aluminium flight case (*Fig 2*). We experimented with various configurations and, in doing so, encountered a wide variety of design, engineering and usability challenges, which we addressed through an iterative design process. Some of the challenges we encountered had technical solutions, others we addressed as part of the interview process. We summarise the main challenges we faced - and how we overcame them - in the outline below (*Fig 1* / Sections 4.1.1 - 4.1.5).

front

side (open)

top

side (closed)

Setup Guidebook
What is Design Research? – 'Question Bridge'

Thank you for taking part in this interview!

The box in your possession is designed to facilitate the interview. It contains...
- A video camera (Panasonic GH5) to record the interview.
- A smartphone (iPhone) to facilitate the video call.
- ... and some other equipment (including microphone, lights and a battery pack).

This guide is designed to help you get set up ready for the interview.
Please read it through carefully.

Fig 1a – The Interview Box (above) and excerpts from the printed, graphical *Setup Guidebook* (below / top of next page: see also *Fig 4*). **[Red]** numbers correspond to considerations and solutions that were integrated into the box design. **[Gold]** numbers correspond to solutions we co-creatively resolved in dialogue with participants. We expand on each of these considerations in sections 4.1.1 – 4.1.5.

How's the weather?
Daylight is great, but changeable.
Consistent lighting is what we want.
Please choose somewhere quiet, indoors with even lighting.

It's behind you!
Your background 'frames' you.
You may want to configure it...
Less is (sometimes) more - but who are we to judge?

Outstanding idea.
A light source above and slightly behind you helps you 'stand out'.
Is there a ceiling light you can position yourself beneath?

Give it to us straight.
Please place the box on a clear, flat surface.
We don't want to the camera to be wonky or in any danger of toppling over.

People in glass houses...
Please don't sit directly in front of a window.
It might turn you into a silhouette.

Are you sitting comfortably?
Hope so... Please try not to move around too much during the interview.
We can't move the camera to re-frame you.

Fig 1b – Excerpts from the printed, graphical *Setup Guidebook* (see *Fig 1a* - previous page)

4.1.1 Technical Lighting Considerations

One of the three main technical considerations we faced was to provide studio-quality lighting for the interview subject. To achieve this, we used an adapted form of 'three-point lighting', a professional lighting technique commonly used in face-to-face interviews [23]. It works by creating constant, consistent illumination from a 'key light', with 'fill light(s)' used to soften shadows and a 'backlight' placed behind the subject to help them stand out from the background.

	Consideration	Description	Designed Solution
1	Key light	A primary light source to brightly illuminate the subject.	We installed a diffused, dimmable LED ring light into the lid of the box to create a bright warm white light behind the camera, in front of the subject. We tested it on ourselves.
2	Fill lights	Softens any shadows caused by the key light.	We installed LED lights in the front of the box, bounced against the inside lid to soften and diffuse the key light.
3	Backlight	Creates a 'halo' effect on the subject's head and shoulders, which visually separates them from the background.	We asked participants to sit somewhere with a light source (e.g. a ceiling light or a lamp) above and behind them.
4	Consistency	Maintaining consistent lighting minimizes distractions, controls the exposure, and helps facilitate continuity editing (splicing different parts of the interview together).	We encouraged participants to refrain from sitting anywhere with lots of (potentially changeable) natural light and to close curtains/blinds where possible.

4.1.2 Technical considerations relating to video

The second of the three main technical considerations was to maximise the quality of *both* the video recording and the remote video streaming, meanwhile addressing the underlying trade-off between video latency and video fidelity caused by domestic bandwidth limitations (e.g., a 10bit 4:2:2 4K recording stream is ~400mbps; average home broadband speeds are ~60mps). This discrepancy means recording remotely incurs a significant reduction in quality. A related quality consideration was to create shallow depth-of-field while ensuring the subject remains in-focus during the interview.

	Consideration	Description	Designed Solution
5	Image Resolution	High resolutions (e.g. 4K) produce a clean, clear image that maximises the visibility of the subject. Combining this with shallow depth-of-field creates an visually appealing image, in which the subject clearly stands out from the background.	We installed a high quality 4K camera (Panasonic Lumix GH5) + lens (12-60mm f3.5-5.6) specifically for recording the video. We considered using an iPhone and a GoPro for this camera, but we chose the GH5 based on its high bitrate, fast sensor and ability to accommodate professional lenses that would enable us to capture shallow depth-of-field.
6	Image Bitrate / Compression	Compression significantly reduces bitrate, thereby enabling live streaming, but it also significantly reduces visual image quality.	We installed a secondary camera device – an iPhone11 – that would be used only for videoconferencing. We set it up with a 4G SIM card and Facetime as the only button on-screen.
7	Focus	Keeping the eyes in-focus ensures facial expressions are clearly visible.	We enabled the autofocus setting on the GH5 and pre-configured it to focus on the subject's face.

4.1.3   Technical considerations relating to sound

The third of the three main technical considerations was to maximise the quality of the sound recording. To achieve this, we used a lapel microphone, positioned close to the interview subject's mouth to maximise signal-to-noise ratio. Audio compression also reduces quality, so we also recorded audio with the video, separately from the telecommunication.

	Consideration	Description	Designed Solution
8	Audio Quality / Compression	High fidelity audio recording ensures the subject's voice can be heard clearly.	We installed a lapel mic and connected it to the DSLR for recording. We then used the built-in microphone on the iPhone for live communication only.
9	Background noise	Minimising background noise also helps ensure the subject's voice is heard clearly.	We instructed participants to place the lapel mic close to their mouth and pre-configured the camera to a correct level for voice recording (peaking at about -9dB).

4.1.4   Considerations relating to visual composition

Challenges relating to the composition of the video include making sure the interview subject is framed and composed in a way that either conforms to – or creatively responds to – standard interview practices. While there is no reason not to *intentionally* break these rules, doing so *unintentionally* can be distracting and we resolved early on to avoid it.

	Consideration	Description	Designed Solution
10	Vertical angle (eye-level)	It is standard practice to place the camera at eye-level with the subject.	We integrated a manually adjustable scissor-lift with camera brackets mounted on top. The lift packed down into the box for closing and extended up to eye level for when in-use. We also incorporated an eye-level guide into the lid of the box and instructed participants to ensure the camera lens was raised to this level using the scissor-lift.

	Consideration	Description	Designed Solution
11	Angle (straight)	It is standard practice to ensure the image is straight and stable.	We included a rubber mat on the bottom of the box for sturdiness and a spirit level onto the camera bracket to help ensure it was straight.
12	Interview eyeline	A form of best-practice for video interviews is to frame the subject in a medium closet-up, and slightly to one side, so they talk into the negative space to the interviewer, who is usually sat next to the camera. This is called a 'long sided interview'.	We positioned the iPhone in the position where the interviewer would normally be to ensure their eyeline matched a traditional long-sided interview.
13	Framing	A standard framing for long-sided interview subjects is called the *medium close-up* (MCU).	We positioned the flip-viewfinder to function as a 'mirror' that would enable participants to see how they appeared and how they are framed. We provided instructions on how to position themselves in the frame to achieve an MCU.
14	Keeping in-frame	Interview subjects naturally move around a bit. In face-to-face interviews, a camera-operator gently tracks any movement to maintain consistent framing.	We asked participants to keep as still as possible during the interview. Alternative solutions such as actuating face-tracking systems and cropping (during editing) were deemed too impractical / costly and resolution-reducing, respectively.
15	Background (personality)	The background of an interview can often be used to frame the subject in a meaningful context, revealing something about their character or interests.	During the setup, we had conversations with participants about how their background can be configured and discussed the opportunity to configure the background in a meaningful way; in most cases, participants opted for neutral backgrounds.
16	Background (silhouette)	Sitting in front of a bright light source creates a 'silhouette' effect, whereby either the subject is under-exposed, or the background is over-exposed.	During the setup, we asked participants to refrain from sitting in front of any windows or other bright light sources, such as doorways to brightly lit rooms.

4.1.5   Practical Issues

We considered a wide variety of practicalities to ensure the overall user experience of the interview was streamlined, and to minimise the need for complex technical configuration or logistical effort from participants.

	Consideration	Description	Designed Solution
17	Usability	Opening, setting up and interacting with the system should be as easy as possible.	We provided all participants with a printed *Setup Guidebook* (Fig 4) containing step-by-step, graphical instructions on how to open, configure and use the Interview Box.
18	Physical security	The system needs to be tamper-proof and physically robust – in-transit and in-use.	We integrated a combination lock for security and ensured the equipment was covered by insurance in-transit and in-use.
19	Power	Most of the system components use power, so a safe, continuous power source is required.	We incorporated a 50,000mAh USB power bank battery with sufficient capacity to need charging only once per participant, and sufficient output to fully charge and/or provide continuous power to all the items in the box.

🔴 20	Postage / Portability	The system needs to be portable and delivered and collected from participants.	We designed the box so its components would pack down securely into foam-padded compartments for transport. We delivered and collected the Interview Box from participants.
🔴 21	Data transfer	The media files need to be transferred to the interviewers once the interview is complete.	We collected the physical SD cards between each participant. We considered alternative postal solutions, but we decided to deliver and retrieve the boxes ourselves.
🔴 22	Data security	The data is (potentially) sensitive and needs to be handled, transferred and kept securely.	We collected the data between participants and provided blank SD cards for each participant.

Fig 2 – *The Interview Box* final working prototype, which was sent out to all participants. The image on the left shows the box packed down, as it appears when it is first opened. The image on the right shows how the box appears while in-use, with the two interviewers shown on the iPhone (right) and the GH5 viewfinder flipped open to function as a preview monitor for the interview subject.

4.2 Developing the Interview Process

In this section, we reflect on the interview *process* (summarised in *Table 1*).

	Timescale	Activities	Duration
4.2.1	~5 days before interview	'Four Envelopes' activity delivered to participants	~
4.2.2	2 days before interview	Interview Box delivered to participants	~
4.2.3	1-2 hours before interview	Pre-interview video chat (Zoom/Teams)	30-90 mins

4.2.4	The interview:	Remote recorded video interview (Interview Box)	60 mins
		(i) Warm up question → Conversation (5-10 mins)	
		(ii) Foundation questions: Envelopes 1 / 2 / 3 (10-15 mins)	
		(iii) 'Question Bridge' part 1: Envelope 4 → Conversation (10-15 mins).	
		(iv) 'Question Bridge' part 2: Browse + answer question(s) / Ask question. (20 mins)	

Table 1 – Overview of the interview protocol.

4.2.1   Four Envelopes

To scaffold some brevity and encourage concise responses to our open-ended foundational questions, we designed a pre-interview activity to help participants think through their answers in advance. The paper-based activity took the form of a series of four envelopes (*Fig 3*), which we sent to participants 4-5 days ahead of the interview. The first three envelopes each contained a question – (1): What is Design? (2): What is Research? (3): What is Design Research?
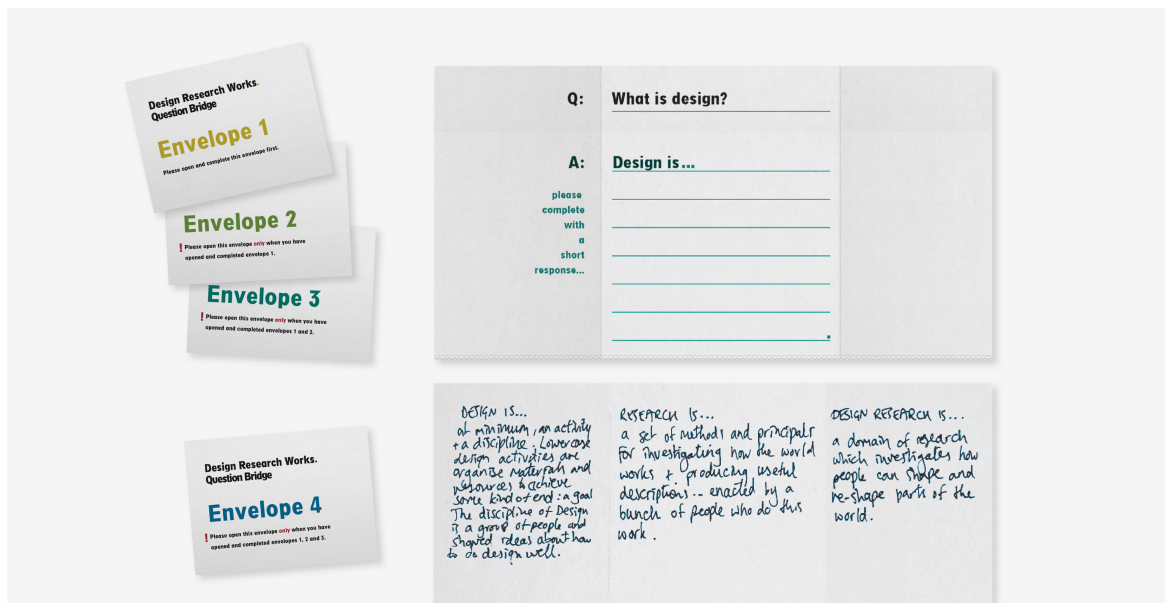
Fig 3 – The Four Envelopes.

Inside each envelope there was space to write an answer of ~40-60 words. The limited space also meant that – when the fourth envelope was revealed to contain a previous participant's answers to the same questions – those answers were concise (and ambiguous) enough to provide a stimulus for discussion. We asked participants to complete the envelopes in numerical order, since questions 1 and 2 ('Design' and 'Research') combine to form question 3 ('Design Research') and we wanted participants to reflect on these inheritances. At this stage, we also gave participants an information sheet with an outline of the whole interview process, and a consent form (as per our ethics agreement). We asked participants to complete the activity and keep hold of the envelopes until the interview. We collected the completed envelopes and consent forms only after the interview.

4.2.2 Delivering the Interview Box

One or two days before the interview, participants received The Interview Box, which was delivered to their home. We considered passing the box from participant to participant, but instead decided to take it back between participants and ensure it was sanitised, charged, and functional. This also enabled us to retrieve the media data from the SD cards, thereby resolving any data privacy concerns that would otherwise have been a consideration. Attached to the box was a 10-page *Setup Guidebook* (*Fig 4*), with detailed explanations of how to open the box, where (and how) to set it up, and advice relating to the start of the interview. We kept in-touch with interviewees via email to confirm receipt of the box and to provide support as required.
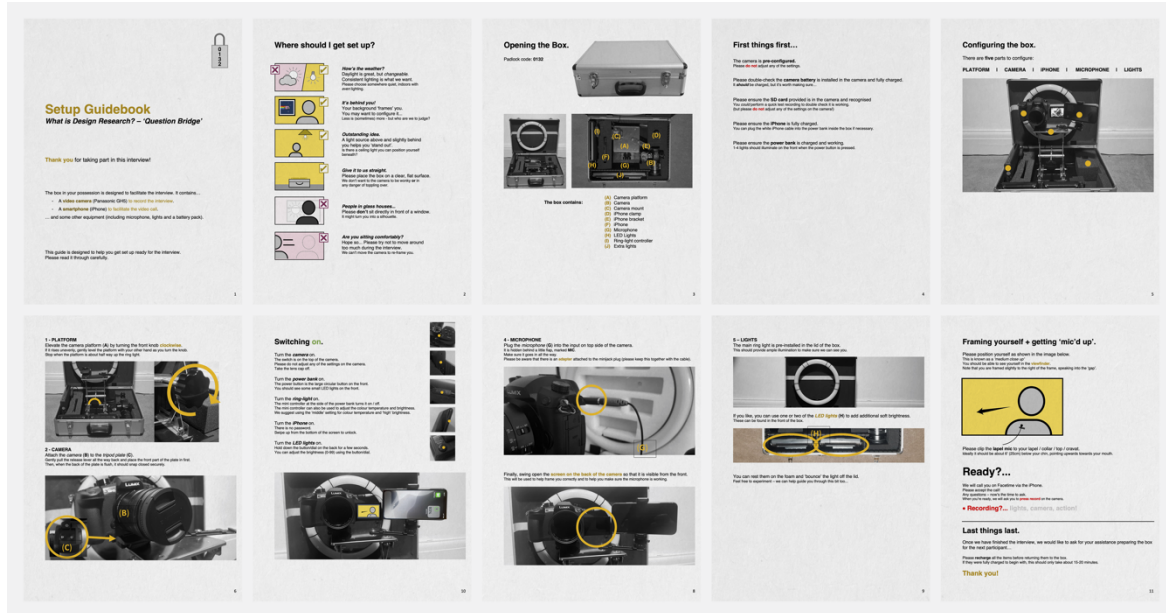

Fig 4 – *The Setup Guidebook*. A full resolution version is included with the submission.

4.2.3 Pre-Interview Setup Session

Immediately before each interview, we had a remote setup session with each participant, lasting 30-90 minutes, that was adapted to individual participants' needs. The aim was to guide participants through the setup, configuration and testing of the Interview Box. The session included decision-making about where to set up, choosing a backdrop, and mirrored the fun, informal, conversational tone of the Setup Guidebook (*Fig 4*). In some cases, the setup was simple and we were able to begin the interview on-time (or early). In most cases, however, it involved creative discussions (often enabled by informal mobile video calls) that allowed us to see their context and helped us collaboratively balance different requirements and needs. These sessions invariably involved answering questions about how the interviews would be conducted and edited, and who the audience(s) would be, and enabled us time and space to offer reassurances and guidance.

4.2.4   The Interview

The main interview consisted of four main segments (Table 1: (i)-(iv)). To achieve the different styles we were aiming for, we included a combination of conversational segments (i)/(iii) and relatively formal segments with specific questions and uninterrupted answers (ii)/(iv). We conducted the interviews via Facetime on the iPhone (via 4G network / Wi-Fi as a backup) and recorded in 4K/60fps/400mbps on the Panasonic GH5. We began each interview by asking the participant to 'press record' on the camera and check the red light was on to indicate recording had started. The two lead authors of this paper were the remote interviewers and were also remote from one another, so the interview was (technically) a teleconference. To facilitate the conversational segments, both remote interviewers took part, appearing together via split-screen on Facetime. In the more formal sections, a single interviewer took over.

The first part of the interview (i) was a warm-up conversation, which began with a single question, with follow-up questions for about 10-15 minutes. In the second part of the interview (ii) we asked participants to respond to our three foundational questions. With reference to their pre-prepared envelopes, some participants read their answers out, while others spoke freely. In the third part of the interview (iii), we asked participants to reflect on a previous participant's answers to the foundation questions, noting points of agreement or disagreement. This expanded into a conversation involving both interviewers. In the fourth part of the interview (iv) we wanted to experiment with facilitating connections *between* participants, so we used another *Question Bridge*-inspired activity, which began with an invitation to participants to answer questions posed by other participants. This was facilitated by a simple web interface that we designed and implemented for the study (*Fig 5*)

Fig 5 – Prototype '*Question Bridge*' interface. Thumbnails linked to videos of previous interviewees asking their question. Included a 'starter' question, seeded by the researchers primarily for the benefit of the first participant. Transcribed questions appear in a log at the bottom of the interface. The colour bars link to an instruction page. Yellow border indicates current question. Yellow ticks indicate previously viewed questions. Monochrome filters improve the salience of the colour interface.

Participants could browse the questions posed by previous participants and answer (to camera) whichever questions they wanted. The website was accessed via participants' own mobile devices. We considered incorporating this intervention into the box but, due to time constraints, this wasn't implemented. Nevertheless, participants were happy to use their own devices. In the second part of the exercise, we asked participants to pose their own question – addressed directly into the camera. To round-off the interview, we asked participants to introduce themselves. Afterwards, most participants were happy to pack-down the box themselves without support, once we had signed off. We collected the box from participants within two days after each interview.

4.3 Feedback from participants

Feedback from participants included both supportive and critical perspectives. Participants generally reported enjoying taking part in the interview, with most rating the experience highly (> 7.50/10) for *enjoyment* (M = 8.00, SD = 1.40). We also received high scores for feeling *valued* (8.20, 0.50), *heard* (8.30, 0.81), and *understood* (8.20,

0.70). There were lower scores (mean ≤ 7.50) for feeling *relaxed* (7.50, 2.07), *focused* (7.50, 1.87) and *confident* (6.50, 2.25).

Most (but not all) participants considered the interview box concept to be a good idea (7.00, 3.89). However, the open-ended evaluation questions revealed some more critical perspectives. A shared feeling among participants was that the interview box did *not* improve on simpler forms of remote interview; *"Zoom or Teams or Skype are now normal, so they would seem a better way to go, post-covid."*

Some participants described the setup as a *"faff"*, while others voiced concerns about its perceived 'expensiveness', or criticised the *"intimidating [...] James Bond aesthetic"*. Some participants questioned the need for such a complex technical setup; *"Is there really a need for all this expensive encased equipment? How much benefit does it have over a simpler interview via a smartphone, which everyone already has?"*

Among the criticisms, positive impressions stood out, such as, *"a sense of experimentation"*, "*less pressure than being filmed with people present*", "a *sense of a shared activity*", "*better quality*", "*lit my face nicely*".

Most participants enjoyed the structured interactions with the interviewers. One participant explained, "*...support and conversation through the activity is what made it for me! Setting up the box was a way of supporting that interaction. Thinking about it, there is something to be said for making it deliberately a bit complicated...*" Another said, *"it was the interaction with [the interviewers] that held it all together, provided a sense of connection and continuity with other participants and gave me space to prepare."*

Among our experimental interview techniques, the *Question Bridge*-inspired activities were well-received; *"I remember thinking this was a very smart, playful way of exploring what your participants perceive design research to be."*

5   DISCUSSION

5.1   What went well?

The interview box functioned as intended (with some caveats that we outline below) and all eight participants were able to successfully set-up and use it in their homes, participate fully in a remote, video-recorded interview, and pack up the box again securely, ready for the next person to use. During the setup, the combination of printed guidance and 'live support' enabled shared decision-making and established a positive, friendly tone for the interview.

The technical quality of the media we captured was much higher than would have been possible using videoconferencing alone (our recordings were 4K / 60fps / 400mbps). Given the bitrate of recordings for high-end cameras is invariably higher than the maximum streaming speed of domestic broadband connections, it was necessary to ensure the recordings were captured locally; in this case, on the camera itself. Transposing this approach from our research context to a consumer/product context, suggests exploring software and/or hardware to facilitate simultaneous recording and streaming with high-end camera equipment may be a fruitful line of inquiry for future research.

Fig 6 – Still images from some of the remote video-recorded interviews.

In each case, we successfully captured a 'long sided interview' (see *Fig 6*) by situating the teleconferencing camera (an iPhone displaying the remote interviewer/s) in a stable position adjacent to the recording camera, both at eye level. The difference between this approach and simpler videoconferencing solutions is a subtle shift in eyeline; on most laptops, cameras placed above the screen create a downwards eyeline, as users look at the screen *beneath* the camera. This unconscious grammatical rule-breaking can be distracting to audiences and even misleading (e.g., in films, high angles can imply dominance). Visual grammar evolves, but the talking head is useful as a stable reference point for video interviews that also helps maintain consistency *across* interviews, which can be useful when editing multiple interviews together.

We achieved a three-point lighting setup with minimal technical configuration and some simple co-operation with the remote interviewee. LED lights are lightweight, low-power, bright, and dimmable; integrating them into this system as key lights and fill lights was straightforward. Configuring a backlight was trickier. Despite considering many options (including a fishing rod!) we found no elegant technical solution to integrating a light source behind interview subjects. To achieve the backlight effect, we asked participants to set up lamps, or use natural illumination from windows. Although we recognise that some participants considered it to be "a faff" this process succeeded in nurturing a sense of shared investment in the interview as well as improving the captured images. Collaboratively configuring the interview background played a similar role. Of course, background subtraction masks enable infinite possible backgrounds, but filming interviews in-situ is an authentic touch favoured by professional interviewers. We should acknowledge and refrain from underestimating the value of framing interview subjects in a meaningful context, especially when it also nurtures a sense of shared ownership over the interview process.

We also succeeded in creating the variety of interview styles we wanted to make it possible that one interview could be incorporated in various types of output (e.g., film, *YouTube*, radio/podcast). This was another aspect that

was achieved through collaboration with interview subjects. Some participants more readily engaged with the process than others but in most cases briefly outlining the expectations as we moved into each new section of the interview worked well.

Our procedural interventions were well-received. One of the most promising outcomes was the concept of chaining questions between different interviewees (inspired by *Question Bridge*). All participants saw this as a positive feature of the experiment, and, within the context of *this* documentary there is scope to integrate this approach more closely with the underlying interview structure[3].

5.2 What went wrong?

Notwithstanding the things which went well, there are many aspects of the experiment which were not so successful which we elaborate on in this section. We encountered numerous technical issues including failed recordings (one interview needed to be repeated), issues with lighting (in one case, the incursion of natural lighting led to over-exposure), and issues with the auto follow-focus feature (which focused on framed pictures in the background rather than the subject). We also faced some logistical challenges related to postage (for instance, power banks cannot be sent via UK couriers, so we had to deliver the boxes ourselves) and interruptions during the interviews (doorbells, phones, cats). A related issue was dealing with these technical issues remotely, which necessarily involved our participants as co-troubleshooters, as well as interview subjects (and research participants!). Some participants enjoyed these interactions, but the distinction between creative problem-solving and unnecessary troubleshooting was sometimes blurred. Future work exploring the value of collaborative configuration in a remote interview context should aim for a more controlled co-creative strategy.

Another issue, which came up in both direct feedback from participants and in our anonymous evaluation survey, was that, despite our efforts, participants generally did not see the value in improving the quality of the interview media, instead suggesting simpler videoconferencing tools. Given that the main beneficiaries of the improvement are audiences rather than interviews subjects, this is not surprising. A means of offering 'live feedback' to interviewees showing the technical quality of the interview could demonstrate to interviewees the value in the more involved process.

Another aspect that worked less well than we had hoped was the two-headed interview. On reflection, an explanation for this is that there was no clear differentiation between the two roles. This meant that during the formal parts of the interview, the roles were interchangeable but, in the conversational sections, crosstalk and different interviewing styles interrupted the flow of the interview. Multi-headed interviews require a clear structure and clearly defined roles. Building the study around a real documentary project enriched the study, but it also contributed to this unforeseen tension. Arguably the attributes of videoconferencing tools (e.g., poor sound, latency) may have exacerbated this.

On reflection, the nature of our topic—the fundamentals of design-led research—was not entirely compatible with the way we wished to conduct the interviews. From a documentary-making perspective, it was desirable to ask specific questions eliciting short answers that combine well with other materials to form a narrative. From a research perspective, it was desirable to evoke more free-flowing, complex answers that can be analysed later. We did not fully recognise or resolve this tension during the study. Fortunately, configuring different interview styles

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[3] Since completing this research, we have developed and launched an iteration of our prototype '*Question Bridge*' interface (see Fig 5) online at https://qubr.designresearch.works. The online version is a moderated public forum, which we describe as "*an open-ended discussion about Design Research*".

created space for progressing both objectives. This is notable in two ways. First, for scholars studying design-led research, fully appreciating the need for carefully articulated and long-form answers is crucial. Second, for documentary makers/researchers, carefully aligning the proposed style of the output content and the complexity of the subject is advisable.

5.3 How can interactive systems better facilitate remote video-recorded interviews?

5.3.1 Stick to the rules or break them on purpose.

We have shown that professional interviewing techniques can be leveraged to improve the quality of remote interviews. This includes technical methods to improve the media, such as three-point lighting, lapel mics, and fast lenses to achieve shallow depth-of-field. It also includes conventions like the medium close-up, the long-sided interview, and the eyeline-match. Rigid adherence to traditional practices is not the objective, rather it is to avoid *unintentionally* breaking rules and confusing audiences. In the absence of clear standards for remote interviews, the visual grammar of in-person interviews is a resource we can, and should, use. Engaging interview subjects in this endeavour can be supported remotely through informal interactions (we used mobile video calls) and carefully designed documentation, such as the graphical materials we developed. The same principle applies to the interview process, where there is even more scope for innovative collaboration since audiences' needs are not a salient factor.

5.3.2 Make sure interview subjects stand out from the background.

Three-point lighting is an established method for illuminating interview subjects but configuring a backlight in a remote context is a challenge. We did not come up with a technical solution (although as far as we are aware, we are the first to consider the challenge from an interaction design perspective). Perhaps this *is* a job for a software solution. Using a subtractive background matte, the signature 'halo' effect could potentially be applied in a way that helps the subject stand out from the (otherwise real) background. Machine learning algorithms could be leveraged to ensure this is adaptive and naturally reflects the real lighting (a task that would be made much easier with an otherwise consistent lighting setup). Another way to separate the subject from the background is via a neutral backdrop or asking the subject to create some distance between themselves and the background and then using shallow depth-of-field to blur the background.

5.3.3 Fix the eyeline(s)

In our study, using two cameras—one to record, and one to telecommunicate—solved the problem of capturing high quality video. The configuration of the two cameras relative to one another also created more natural eyelines, both in the video recording, where it created the long-sided interview effect, and in the live communication video stream. Maintaining this configuration will help facilitate better remote video-recorded interviews by more accurately reflecting the framing of the traditional 'talking head' interview.

5.3.4 Improve the integration of (most) features.

To develop a more robust version of the 'Interview Box', key features need to be more seamlessly integrated. Some of these features require technical attention. Focusing and re-framing, for example, could be improved with better remote monitoring, for example, although transmitting this information to remote interviewers would be contingent on available bandwidth and/or means to compress/stream the video. From the perspective of providing an integrated solution for interview *producers*, an 'Interview Box'-type rental service might integrate sanitisation,

carriage, charging, data management, and so on. From the perspective of interview subjects, any integrated solution should aim to improve reliability and minimise the need for troubleshooting (or provide extensive material to support the troubleshooting activity). There is value in co-creative configuration. We (as interviewers) and (most) participants enjoyed collaborating during the setup process, but if it went on too long it began to be perceived as 'faff'. The balance of valuable co-creation and faff should be carefully calibrated.

5.3.5 *Support reflexive collaboration before, during and after the interview.*

Expanding the focus of interaction design to support activities *before* and *after* the interview (as well as supporting the interview itself) could help in scaffolding the care that has been lost in the transition from in-person to remote interviews. Our study hints at the potential of interactions beyond the interview recording. Pre-interview activities (e.g., our 'four envelopes' activity - see *Fig 3*) and technical configuration sessions (e.g., our setup session - see *Fig 4*) can help establish a tone for the interview, support participants to prepare, and create connections between multiple interview participants. One of our participants said, *"I didn't like the way I looked in the end"*, so, although involving participants in editing decisions, or giving them the right to veto footage is not something we explored within the context of this study, it has been advocated by others [31] and extending the interaction design to post-interview activities might be the key to nurturing a sense of shared ownership. However, conversely, providing interviewees with a large amount of editorial control may result in challenges constructing a meaningful narrative and/or significant portions of footage being vetoed. As another participant put it, *"being filmed properly is a responsibility."* This responsibility extends beyond the interview – in both directions.

5.3.6 *Consider why remote interviews might be necessary and how an interview box might help (or hinder).*

Designers of future iterations of the box concept should consider the many potential reasons for remote interviews – beyond pandemic-induced necessity. We are reminded by [4] of the importance of considering sensitive contexts. In some contexts, for instance, it might be important for the box to be discreet to minimise the chance of users needing to explain it. In some contexts, it might be necessary to integrate features that ensure participants' anonymity. There are also important questions about accessibility. How might a box address, for instance, the needs of people with mobility impairments, or users in locations that are noisy, humid, cold, dark, without power, etc. How might the aesthetic of the box impact users' perceptions of it? In this study, we did not have scope to address these questions in any significant detail, but it is fertile ground for future work.

5.3.7 *Remote interviews are limited by the quality of the telecommunication medium.*

A key reflection among our team was that most problematic aspects of the interviews we conducted would have not posed any notable problems if we had been in the same room. For example, being able to take advantage of reading body language cues and non-verbal communication would have made the issues relating to the two-headed interview and balancing collaborative setup activities against faff much easier to manage. The underlying limiting factor here is the telecommunication medium. Until readily available platforms (e.g., *Zoom*, *Teams* or *Google Meet*) offer higher fidelity interactions, which can capture and covey a fuller range of interactional nuances, remote interviews will be constrained.

In short, whilst we made the outputs *look* like an in-person interview, we were a long way from making the process *feel* like an in-person interview.

6 CONCLUSION

This inquiry relates to the design space for systems to support remote video-recorded interviews. It employed a Research through Design approach, framed around the development of our Interview Box intervention. The findings and discussion of the Research through Design approach were triangulated with feedback from our participants. We encountered various technical, engineering, logistical and procedural challenges, but sought to balance different qualities by deploying both traditional and experimental techniques. Our aim was to explore the simple question, 'how can interactive systems better facilitate remote video-recorded interviews?'

Remote video-recorded interviews can be facilitated by the built-in features of videoconferencing systems (e.g., recording calls), but dedicated features to support remote video-recorded interviews are currently missing from mainstream systems. Our study shows that we can enhance the quality of interviews by building out and away from the basic videoconferencing paradigm and drawing inspiration from traditional video interview practices. Without such support, the use of lower quality media—which was normalised during the rapid shift to remote interviews that took place during the early stages of the 2020 Covid-19 pandemic—will likely be maintained, which may reduce the efficacy of the interviews. Video interviews carry a variety of verbal and non-verbal signals which are often lost in lower quality media and there is a responsibility to both the interviewer and interview subject to meaningfully convey their interactions as faithfully as possible. Our inquiry reflects this aim and also contends that high quality media can increase legibility for audience, hence it is in the interests of, audiences, video interview subjects, and interviewers to maintain this quality.

The insights emerging from the design of the Interview Box prototype describes steps towards replicating the kind of technical quality that was previously only obtainable in a studio. Some ideas drew on established traditions; three-point lighting, the eyeline of the long-sided interview, mindfully configuring the background. Others, like using two cameras, were developed experimentally. Both avenues offer promising opportunities for future research.

However, technical quality is not the only hallmark of a quality interview. We also need to design for the interview *process*, which begins before the interview recording and continues after it ends. Engaging interview subjects at all stages of the process is desirable-yet-challenging and cannot easily be separated from the technical challenge of capturing high quality media. The Covid-19 pandemic rapidly disrupted the status quo and systems to facilitate remote video-recorded interviews should aim to maximise *both* qualities, striking a balance – or reaching a compromise – where necessary.

Whether we are considering interview traditions or technical innovations, we note that remote video-recorded interviews, whilst posing a very focused interaction design challenge (i.e., how to do the best interviews), may also provide profound insights pertaining to the qualities of all kinds of mediated social interactions.

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