The Evidence Chamber

Fast Familiar

"Very interesting concept! It's unlike anything seen in ICIDS art-exhibits.This project opens several questions around the nature of theatre itself."

ICIDS 2020 Jury

The Evidence Chamber: a case study in adapting digital performance from a co-located experience to an online one

Abstract

The Evidence Chamber is an interactive digital theatre experience in which twelve members of the public take on the role of jurors considering a difficult case in which the case for the prosecution relies heavily on forensic evidence. Prior to the COVID 19 pandemic, this piece happened with co-located audience members using iPads. During the pandemic, we converted this tablet-based experience to an online event, using an adaptation of our bespoke software platform. This conversion process posed various challenges, focusing on how to enable discussion between jurors, how to adapt the software to work on different browsers and devices and adapting to different broadband strengths and speeds. Here we place the piece in its context as a piece of playable theatre and cyberformance that explores legal themes and we describe how we overcame these conversion challenges and what benefits doing so produced.

To enable discussion between jurors we embedded a web-based video chat into the existing software platform. To adapt the software to different browsers and devices we altered the video syncing, changed the document viewer and built a range of debugging tools, which we discuss. To adapt to different internet speeds we used adaptive bitrate streaming, using MPEG-DASH encoding.

Keywords

digital theatre, interactive theatre, playable theatre, cyberformance, human-computer interaction

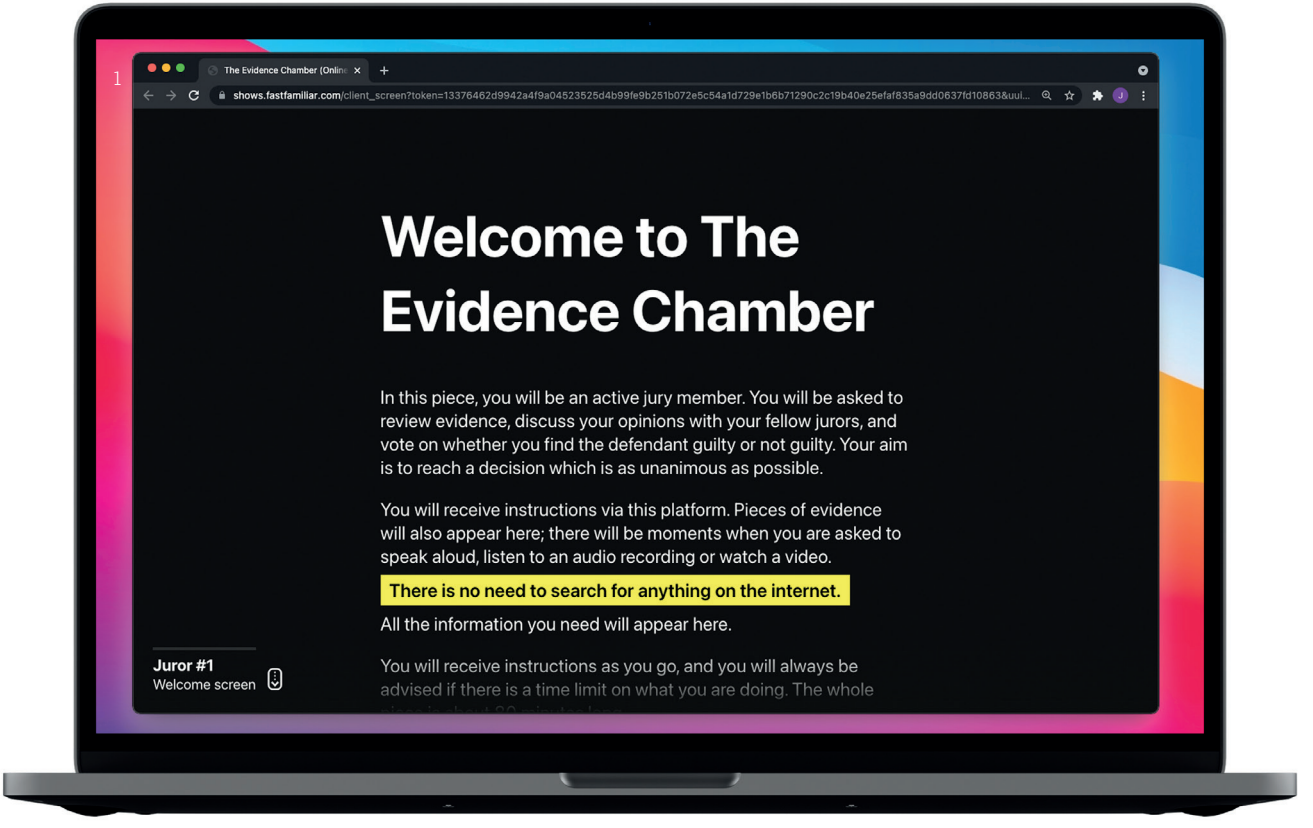
Introduction

The Evidence Chamber is an interactive digital theatre experience in which twelve members of the public take on the role of jurors considering a difficult case in which the case for the prosecution relies heavily on forensic evidence. It was created by digital arts studio Fast Familiar in collaboration with the Leverhulme Research Centre for Forensic Science at the University of Dundee.

Prior to the COVID 19 pandemic, Fast Familiar had created a version of the piece in which members of the public gathered in person, sometimes in real jury deliberation rooms. In this co-located version of *The Evidence Chamber*, each "juror" has a tablet on which they receive 'evidence' in the form of video testimonies from witnesses and forensic experts, various documents, legal definitions, comics which explain key concepts in forensic science and prompts to interact with each other and discuss the case. These discussions frequently become detailed and are sometimes passionate. At various stages, they are also asked to vote whether they think the accused is guilty or innocent, culminating in a final decision of the group. This in-person version of the piece was performed several times before the outbreak of the pandemic.

During the pandemic, we converted this tablet-based experience to an online event, using an adaptation of our bespoke software platform. This online version was performed many times, including as part of ICIDS 2020. This article outlines the steps that the authors undertook to achieve this and discusses some of the challenges we faced and how we overcame them.

The table below (table 1) outlines the structure of the piece. Columns 3 and 4 show what differs between the co-located and online versions of the piece. Video indicates a pre-recorded video and video-call indicates a live video call.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Welcome to The Evidence Chamber
In this piece, you will be an active jury member. You will be asked to review evidence, discuss your opinions with your fellow jurors, and vote on whether you find the defendant guilty or not guilty. Your aim is to reach a decision which is as unanimous as possible.
You will receive instructions via this platform. Pieces of evidence will also appear here; there will be moments when you are asked to speak aloud, listen to an audio recording or watch a video.
There is no need to search for anything on the internet.
All the information you need will appear here.
Juror #1
Welcome screen
You will receive instructions as you go, and you will always be advised if there is a time limit on what you are doing. The whole

tab. 1

Stage	What happens	Form (co-located)	Form (online)
Welcome	Audience arrive in the room (co-located version) or online lobby (online version) and are given a tutorial in how the platform works	Tutorial on iPad. No live performer. No audience member is given the role of jury foreman	Built in video call. The system is introduced by a performer playing the role of Stan (a court clerk). An audience member is given the role of jury foreman
Scene Setting	Audience watch a news broadcast, giving an overview of the case and explaining that the Defendant has been accused because his DNA was found at the crime scene.	Video on iPad	Video on web browser
Testimony from the ex-partner of the defendant	Audience hear the testimony of the ex-partner of the defendant	Audio on iPad	Audio on web browser
Telecommunications data of the defendant	Shows the movements of the defendant's phone on the night of the crime	Document on iPad	Document on web browser
Crime scene examiner's report	Shows where DNA was found, where the victim was found and where a French window was found open	Document on iPad	Document on web browser
Expert witness testimony: gait analysis	The testimony of an expert witness about the gait of the defendant and the gait of the figure caught on CCTV on the night of the crime	Video on iPad	Video on web browser
Statements made during the trial	Each audience member reads aloud a statement made during the trial by either the defence barrister or the prosecution barrister	Instructions and text given on iPads, audience members read aloud	Instructions and text given on iPads, audience members read aloud via video call
Blind vote 1	Audience members vote anonymously on whether they currently feel the defendant is guilty or not guilty. Results are then displayed to audience members.	Voting and display happens on the iPad screen	Voting and display happens on the web browser
A guide to understanding gait analysis	Audience members read a document which explains how gait analysis works and how it should be done (audience members realise the gait analysis was not done to the best standard)	Document on iPad	Document on web browser
Testimony from a colleague of the victim	Audience members hear about what happened shortly before the death of the victim and how her body was discovered.	Video on iPad	Video on web browser
Testimony from a friend of the defendant	Audience members hear from the defendant's friend, who alleges that the defendant spent the evening with him but that he was asleep at the time of the crime.	Video on iPad	Video on web browser
Testimony from an acquaintance of the defendant	Audience members hear about how this acquaintance met the defendant in a pub and subsequently worked as a waiter for an evening at the house of the victim.	Video on iPad	Video on web browser
Glossary of legal terms	Definitions of various legal terms, including murder and "beyond reasonable doubt."	Document on iPad	Document on web browser

Stage	What happens	Form (co-located)	Form (online)
Discussion 1	Audience members discuss how they currently feel about whether the defendant is guilty or not guilty.	Discussion in a room	Built in video call
Blind vote 2	Audience members vote anonymously on whether they currently feel the defendant is guilty or not guilty. Results are then displayed to audience members.	Voting and display happens on the iPad screen	Voting and display happens on the web browser
Records of online chat forum	Audience members see an online chat forum that demonstrates the defendant's violent past as a fotball hooligan (but one who spoke about limiting violence only to men who supported opposing teams)	Document/screenshot displayed on iPad	Document/screenshot displayed on web browser
Expert witness testimony about the DNA evidence	A video of an expert witness explaining the degree of certainty that the DNA at the crime scene belongs to the Defendant	Video on iPad	Video on web browser
Discussion 2	Audience members discuss how they currently feel about whether the defendant is guilty or not guilty.	Discussion in a room	Built in video call
Blind vote 3	Audience members vote anonymously on whether they currently feel the defendant is guilty or not guilty. Results are then displayed to audience members.	Voting and display happens on the iPad screen	Voting and display happens on the web browser
Testimony form the defendant	Video testimony of the defendant and his account of the night	Video on iPad	Video on web browser
A guide to understanding DNA evidence	An explanation about DNA and its role in evidence, including the possibility of "secondary transfer." Audience members realise the defendant's DNA might have been brought to the crime scene inadvertently by the acquaintance he shook hands with in the pub.	Document on iPad	Document on web browser
Discussion 3	Audience members discuss how they currently feel about whether the defendant is guilty or not guilty.	Discussion in a room	Built in video call
Summing up statements	2 audience members selected at random by the software read summing up statements from the Defence Barrister and Prosecution Barrister	Instructions and text given on iPads, audience members read aloud	Instructions and text given on iPads, audience members read aloud via video call
Discussion 4	Audience members are told this is their final discussion. They discuss how they currently feel about whether the defendant is guilty or not guilty.	Discussion in a room	Built in video call
Final Vote	Audience members vote on whether they think the defendant is guilty.	Voting and display happens on the iPad screen	Voting and display happens on the web browser
Divergent stages	If the audience are unanimous, the piece ends here and the verdict is displayed. If there is not unanimity, a further discussion and voting round occur, at which a majority of 11 to 1 or equivalent is accepted. If no majority of 11 to1 is found in the vote, a further discussion and voting round occur aiming for 10 to 2 or equivalent. If no majority is found, the defendant is found not guilty.	Discussions happen in the room, votes happen on iPads and are displayed on iPads.	Discussions happen on built in video call and votes happen and are displayed on web browser.
Debrief	A debrief discussion in which audience members have the opportunity to ask real forensic scientists questions and also ask the artists about the piece.	Discussion in a room	Built in video call.

Number of performances and audience demographics

Prior to the pandemic, we did five performances of the co-located version of the piece and it was experienced by approximately 70 audience members. These were all people who lived or were studying in Dundee, Scotland, where the performances were held. During the pandemic, we did twenty-five performances of the online version of the piece and it was experienced by approximately 225 audience members. Our research collaborator Kadja Manninen analysed the demographics of 173 audience members of the online show and found that 69% of audience members identified as female. The majority (59%) were aged between 26 and 45. 80% of audience members came from the UK, 5% from the US and 3% from Australia. In total, people from 20 different countries experienced the piece, including people from Nigeria, Saudi Arabia, numerous European countries and New Zealand. Audience members came from a range of professional backgrounds, including arts, media and entertainment, education, law and computer science. These demographics will be analysed in more detail in a future paper.

Literature review

In this chapter we seek to briefly place *The Evidence Chamber* in the context of playable theatre, cyberformance, immersive theatre, theatre about law, games about law and human-computer interaction.

Playable theatre

Two of Fast Familiar's three lead artists (Rachel Briscoe and Dan Barnard) come from a theatre background and sometimes Fast Familiar talk about the work they create as "playable theatre" (Barnard, 2020), a term coined by Tassos Stephens from British theatre company Coney. Playable theatre is a hybrid form combining elements of theatre and elements of games. A range of playable theatre pieces have been created in the UK, including Coney's Remote in which audience members vote at various decision points for the protagonist by holding up cards, and Seth Kriebel's *A House Repeated* which echoes some interactive fiction and involves the audience choosing where a protagonist should go next in a house. Other examples include Coney's *Small Town, Anywhere* in which audience members

take on the role of different villagers responding to a strange new situation; Metis Arts' World Factory in which audience members become the executive board of a Chinese clothes factory and make decisions which play out in unforeseen ways; and Fast Familiar's Disaster Party in which audience members become guests at a party, taking on characters and following instructions given to them on headphones. Playable theatre is not a uniquely British phenomenon. Austrian director Philipp Ehmann from the performance collective play Vienna directed a piece called Press Staat for Revolution at Schauspielhaus Graz in which audience members are citizens trying to redesign the future of the fictitious state of Libertalia, while attempting to resist the efforts to derail this democratic process from other audience members who have been given secret roles as terrorists and members of the secret police.

Fast Familiar's recent work such as *The Evidence Chamber* and *The Justice Syndicate* draws inspiration from these other playable theatre projects and makes use of an active audience who become players or participants and influence the outcome of events. These projects differ though in some significant ways. As Barnard and de Meyer argue (Barnard & de Meyer, 2020a), the absence of live performers in Fast Familiar's work diminishes the embarrassment that audience members feel, and widens their "horizon of participation" (White, 2013, p.57). and increases their agentive behaviour.

Cyberformance

When *The Evidence Chamber* transitioned from its original pre-pandemic form as a digitally-enabled interactive performance for a co-located audience, to an online performance, it morphed into a cyberformance. Cyberformance is defined by Christina Papagiannouli as "the genre of digital performance that uses the internet as a performance space" (Papagiannouli, 2016, p.X). Cyberformance is often framed (especially by big artistic institutions) as a new phenomenon but, as Jamieson points out (Jamieson, 2012, cited in Papagiannouli, 2016), it dates back to at least 1994 when fine artists Nina Sobell and Emily Hartzell launched 'ParkBench', transforming their studio into a 'time-based public Web installation' (Papagiannouli, 2016, p.2) by creating a weekly, online, live, video-based

performance series called *ArTisTheater*. Despite Cyberformance's rich history, the rapidly evolving technological capacity to stream video and enable video-calling mean that new horizons keep emerging for artists to exploit, as we sought to with The Evidence Chamber.

Immersion

While we would argue that *The Evidence Chamber* produces an experience of immersion in audience members, we hesitate in describing it as "immersive theatre" because it does not feature "an all-encompassing sensual style of production aesthetic" (Machon, 2013, p.66). It also does not fit one of Machon's other definitions of immersive theatre – "that practice which actually allows you to be in 'the playing area' with the performers, physically interacting with them" (Machon, 2013, p.67) for the simple reason that there are no live performers. It does, however, feature the "direct participation of the audience member in the work" (Machon, 2013, p.67).

Gordon Calleja (2011) makes some useful distinctions between different types of immersion in games studies, which Machon (2013) adapts in her study of immersive theatre. Calleja describes "immersion as absorption" (Calleja, 2011, p.26) as following the Oxford English Dictionary (2003)'s definition of that word as "absorption in some condition, action, interest" (Calleja, 2011, p.26). As an example of "immersion as absorption" he mentions playing Tetris, which is highly absorbing but does not involve representational mimesis. "Immersion as transportation" (Machon, 2013, p.63) does, however, use representational mimesis. Machon (2013) develops Calleja's (2011) discussion of immersion to distinguish between "immersion as absorption", "immersion as transportation" and "total immersion" which combines absorption and transportation. The experience of *The Evidence Chamber* seems to generate "immersion as absorption" as it frequently engages the participants fully "in terms of concentration, imagination, absorption and interest; a total engagement in an activity that engrosses…the participant within its very form" (Machon, 2013, p.63). It lacks, however, the scenographic and visceral qualities or the elements of spatiality

required for "immersion as transportation." These distinctions and how they relate to the work of Fast Familiar are discussed in more detail elsewhere (Barnard & de Meyer 2020a).

Theatre and the law

The Evidence Chamber is part of a long history of narrative and theatrical representations of the law, dating back at least as far as Aristophanes. As Alan Read notes, 'the relations between theatre and law were always omnipresent'(Read, 2015, p.75). A courtroom provides many of the key ingredients of drama: high stakes, conflict, people of differing status and (usually) a beginning, middle and end. *The Evidence Chamber*, like our previous piece *The Justice Syndicate,* is an evolution of that tradition – focussing, specifically, on the jury deliberation phase of a trial.

The Evidence Chamber and *The Justice Syndicate* are not the first theatrical performance to task its audience with deciding on a verdict. Ferdinand von Schirach's play Terror opened at the Deutsches Theater Berlin in 2015. In Terror, a large audience watches a court case unfold, from their seats, in a traditional theatrical way – but at the end, they vote about the verdict on small electronic devices. There are other theatrical productions that have placed members of the public in the role of jurors. The most famous of these is perhaps Milo Rau's *Pussy Riot's Moscow Trials*. The trial, a one-off performance or 're-enacted show trial', ran over three days in Moscow's Sakharov Centre. These six Moscow residents were genuinely free to come to their own decision, based on the evidence they heard. These pieces and their similarities and differences with Fast Familiar's work are discussed in more detail elsewhere (Barnard & de Meyer 2020b).

Games and the law

Craig Newberry-Jones argues that video games differ 'from other modern cultural texts by providing the user with an active experience, instead of mere passive observation'(Newberry-Jones, 2015, p.78). We would argue that this is also true of playable theatre like *The Eviden-*

ce Chamber. Newberry-Jones goes on to argue that 'video games encourage the player to critically interrogate [themes of justice] in a more profound way than other modern texts due to their phenomenological characteristics.' (Newberry-Jones, 2015, p.78) Newberry-Jones argues that:

> *Whereas the format and codes of communication found in cinema and television are largely based around the role of the audience as passive observer or officious bystander, the role of the user in video games is that of active experimenter or experiencer. Video games place decisions and narratives in the hands of the user and allow the player to immerse himself more substantially in the subject matter of the text, engaging more substantially with themes and motifs, choices and decisions.*
> (Newberry-Jones, 2015, p.84)

Newberry-Jones points out that the experience of playing a video game alternates between a passive and active engagement. *The Evidence Chamber* similarly alternates between active and passive engagement, with audience members switching between watching testimonies and voting on and discussing the case. Newberry-Jones claims that 'while there has always been a phenomenological public engagement with law, legality and justice, there has been a shift in recent decades from active public engagement to passive observation, but video games are reviving a more active engagement' (Newberry-Jones, 2015, p.89). He claims that the decision-making process that video games permit allows 'the individual player to experiment with his own conceptions of justice (Newberry-Jones, 2015, p.93).' and this particular type of phenomenological engagement 'allows players to experience justice and carry forward beliefs into their own consciousness'(Newberry-Jones, 2015, p.99). We would argue that *The Evidence Chamber* operates in a similar way.

Glitch and smoothness

There is a movement within the field of fine art and performance research that celebra-

tes glitches in net art and cyberformance, arguing that they are a productive disruption. As Christopher Murphy writes, the glitch:

> *questions assumptions of perfection and beauty within a digital context in which - theoretically - everything one can create is a perfect, binary realisation. Within this perfect world, the glitch represents a rupture within the contexts of idealised representation, challenging the premise that the digital world is one free from imperfection.*
> (Murphy, 2009 p.1)

While we acknowledge the valuable role that glitches can play in certain contexts, we work to avoid them in our practice. This is not to create the illusion of technological perfection but rather to enable the technology in our work to, as far as possible, disappear. This is because the interaction between audience members is at the heart of our work and we view the technology we use as a means to facilitate this so our aim with the technology is to make it as unobtrusive as possible. This is why we tend to describe our work as "audience-centric performance." A glitch would disrupt the interaction between audience members, which is why we work to avoid them. This paper documents our process of endeavouring to do that when converting *The Evidence Chamber* from a co-located performance to an online one.

Adapting *The Evidence Chamber* from a co-located piece to an online one

Challenges we faced

Adapting *The Evidence Chamber* from an experience that took place in a single room with a co-located audience to an experience that could take place online with a geographically dispersed audience posed three key challenges:

- Enabling discussion. In the co-located version of the piece, there were a series of stages in the piece where the participants were prompted to discuss their current feelings about the case with their fellow "jurors." In a physical room, this was easy to achieve as participants simply spoke with each other until a notification on the iPads prompted them to move on. When we moved the piece online, we were faced with the challenge of how to ensure that the participants could speak with each other.
- Adapting to different devices and browsers. In the co-located version, we provided the devices on which people could experience the piece. These were all the same model of iPad so we could be sure that the software worked in exactly the same way on each device. We could also ensure that they were all running the same version of OS. In the dispersed version, we knew that people would be joining on a wide range of different types of laptop and computer and with different browser versions, resulting in a huge range of variability which we had not previously had to deal with.
- Adapting to different broadband strengths and speeds. In the co-located version of the piece, we would bring our own router to each venue, allowing us to ensure there was a consistent local area network that all devices would be connected to.
- Human-Computer interaction. Adapting from a situation where participants could easily ask each other or the technician for support in navigating the interface (in the

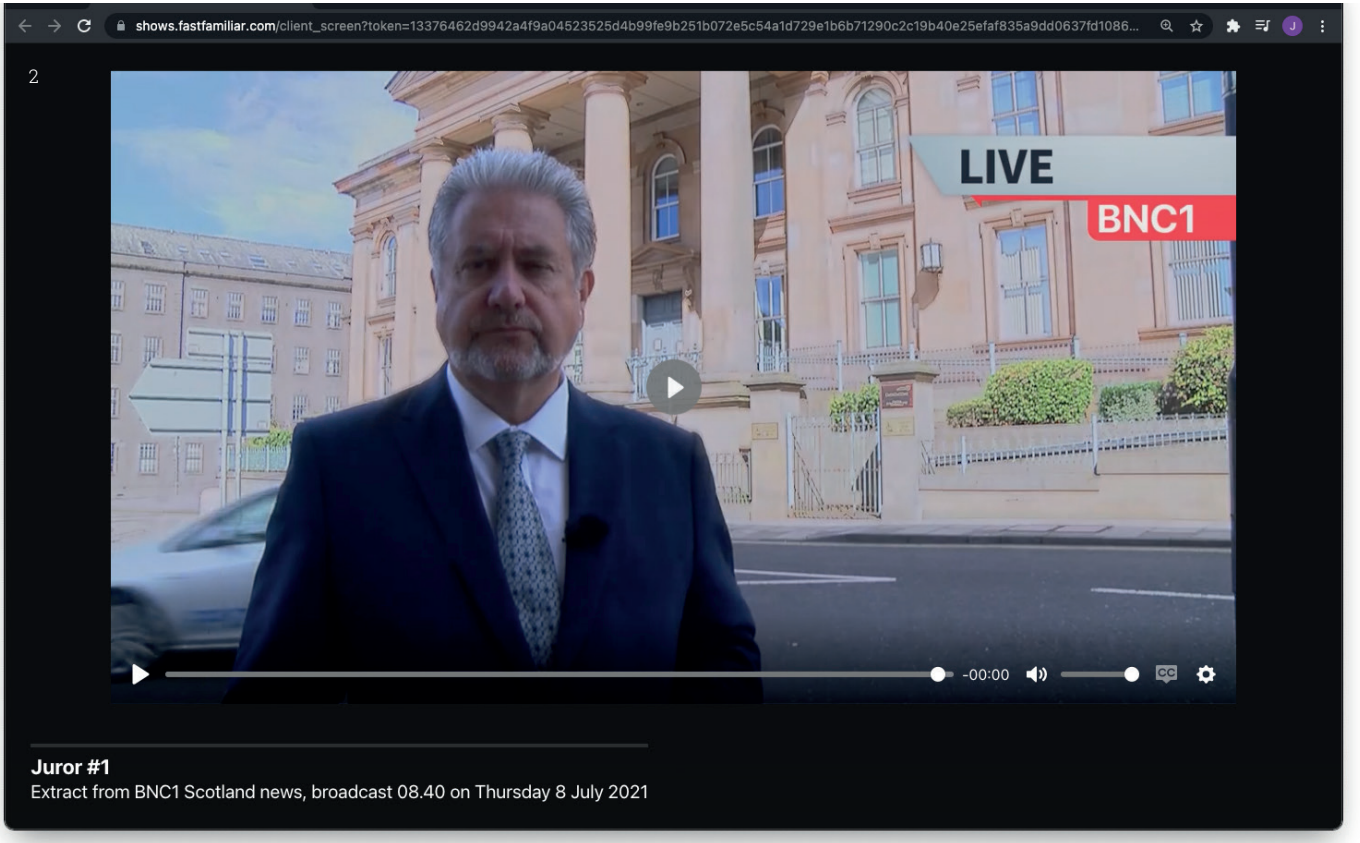
co-located version) to a situation where audience members where dispersed, could not always speak to each other and could less easily communicate with the technician (in the online version) required a greater level of attention to human-computer interaction in the design of the Syndicate Online platform, in comparison to the Syndicate Os platform.

In the next part of this article, we will discuss how we addressed these three challenges and the process that we went on to reach these solutions.

Solutions: enabling discussion

We knew that we wanted the whole experience to run within a single platform so that participants could discuss freely in the discussion sections and also receive all the other elements of the experience (the videos, documents, votes etc.). We therefore decided to build a web-based video chat into the main platform. Ideally, we wanted this video chat to appear for the discussion sections and disappear for other sections. As this was the biggest new element to the experience, it was the one with which Joe began the process.

He first began by seeking advice from other developers and people who work in telecoms to see whether it would be possible to embed an existing API (Application Programming Interface). He first attempted to embed Jitsi but encountered a problem as Jitsi struggled with compressing individual videos so loading twelve videos at the same time would have put a lot of strain on web browsers and presented a challenge for people with less fast internet speeds or low-powered devices. He then investigated two others: Twilio and Tokbox (which was then bought up by Vonage). Having undertaken stress tests for latency and image quality, he chose Vonage, which seemed to have a slightly better image quality and somewhat more competitive pricing. Using this seemed more efficient than trying to build our own video calling software from scratch, so we decided to use this and set about exploring how to embed it into our platform, which we began to call Syndicate Online to contrast it to Syndicate OS, the software system that runs *The Evidence Chamber* (and



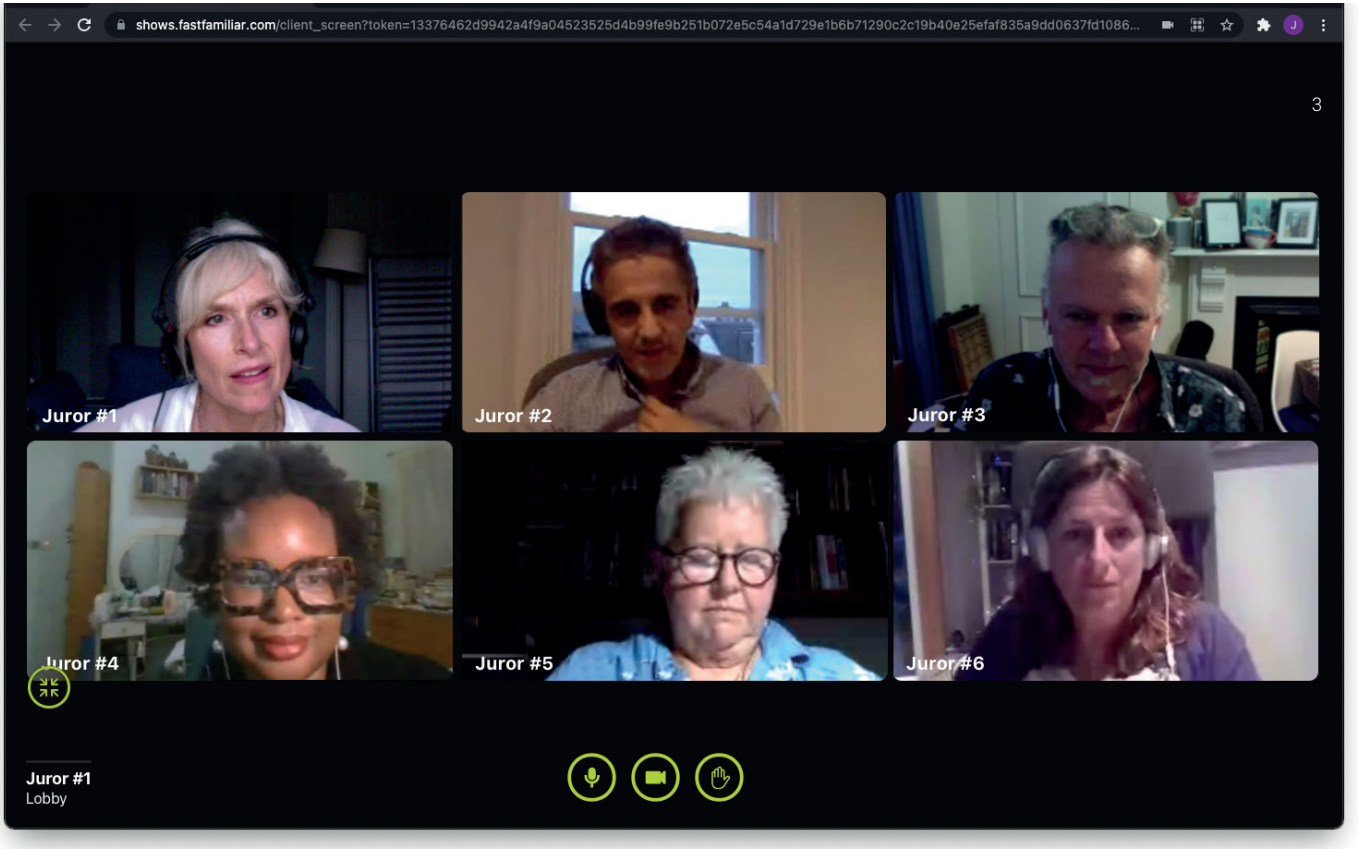
some of our other pieces) on iPads.

The video call interface via *Syndicate Online*

We knew that we did not want the cameras and microphones to be on all the time throughout the performances as the background noise and visuals would be distracting when audience members were reading documents or watching videos (particularly videos as this risked very distracting echoing sound) so the next phase was to build the ability to hide and reveal the videos and mute and unmute microphones.

Following this, the next phase was to move on to looking at how to stylise the video calling. This involved testing various versions to find something that felt natural, would fit into

the visual style of the rest of the piece and that would ideally feel boring as we felt that if we made something too "glitzy" it would distract people from thinking about the case and the discussion they were having. We first explored a spotlight version that would make the person speaking bigger (similar to Facetime groups) but we remembered that in the co-located performances people would often speak quite quickly, one after the other and we decided that moving between these different spotlights would be distracting. We then explored where to display the videos and decided to present them in order of juror number, with the lowest numbers in a row at the top of the screen (starting with Juror 1 at the top left) and the higher numbers in subsequent rows (so that Juror 12 was at the bottom right). Participants were assigned a Juror num-



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ber based simply on the order that they arrived. Keeping this consistent throughout the piece seemed like a useful way to help people remember and recognise strangers, rather than having them moving to different positions on the screen. We also created two different view options, one with the videos all large in a grid view (as described above) and another which allowed participants to minimise the other jurors to the bottom of the screen to consult the documents that related to the case. During the majority of the discussion sections of the piece, participants used the grid view.

After various internal tests, we then proceeded to test the piece on members of the public. The group that we tested it with included a number of people who did not use video calling for work and did not often watch videos onli-

ne, which created a challenging stress test for the experience. From this experience we found that if people did not wear headphones and did not mute themselves, an echo would be created. This is more pronounced with Vonage than it is with software like Zoom, which applies complex and proprietary filters to minimise this. In response to this, we ensured that the email instructions sent to participants before the experience begins featured clear instructions that they should wear headphones.

Following these tests, we also decided to add a new character to the piece, a Court Clerk called Stan (played by Dan Barnard) who would greet players when they arrived and do various bits of onboarding, including ensuring that everyone was wearing headphones. If people did not have headphones or if their headphones were not working, he told them to ensure that they were always muted when not speaking. Stan was also able to notice if players were having issues turning their webcams on and recommended that they call Joe for tech support.

In the test performance, some people were struggling with internet speeds, so we added a broadband speed test link to the pre-show email also.

During the test performance, we also discovered that people would accidentally speak over each other because it is harder to read non-verbal cues about when to speak online than it is when players are co-located. To respond to this, we made two changes. The first was to create the role of a Jury Foreman, which is a member of the jury (of any gender) who facilitates discussion in real life juries. This meant that one of the players could facilitate the discussion and ask people to speak. We also built in a hand raise button (similar to the one in Microsoft Teams), which allowed people to signal to the Foreman that they wished to speak. These adaptations made the discussion process much smoother for players, allowing them to focus on the experience and immerse themselves in it.

Solutions: adapting to different devices

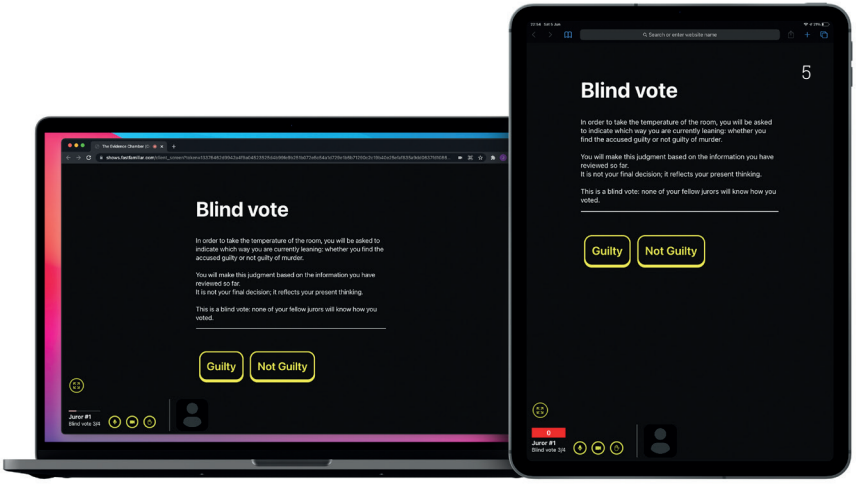
In the co-located version of *The Evidence Chamber,* it is very important that the videos on all devices are in sync as the sound comes from a single source and if the mouth you see on the

video is not in sync with the audio or you can see that other people's iPads are displaying a different image to yours, this can be distracting and disorientating. Syndicate OS therefore has a very precise video syncing system, which syncs the videos to within +45 to -125 milliseconds, the threshold for audio-visual delay recommended by the ITU-R BT.1359 standard. For Syndicate Online, however, this level of precision was not necessary as participants could not see or hear each other's videos . Using the precise Syndicate OS version requires more processing power and so would have posed a challenge to various people's browsers and devices, so Joe stripped this back, creating a version that allowed a 1-2 second lag between different audience members, requiring considerably less processing power.

The next phase was to try to make these videos play on all browsers. There were problems with Safari so we went with Chrome and Firefox: as they are both free to download, we felt Ok about limiting the piece to these two browsers.

Another element that needed to be reworked to function on different browsers was the document viewer. This had worked well on iPads in Syndicate OS but needed to be rewritten to be compatible with different browsers. Transitioning from iPads to browsers also meant that we could make the buttons smaller (as mouse and trackpad are more precise than tapping with a finger). To improve accessibility, we decided to change to using user-defined font sizes, meaning that players could read text at the size that was most comfortable for them.

During the public test performance described above, some players had issues playing video: Joe built a range of debugging tools which allowed him to see any issues and their probable cause during the show. He also built in the ability for him to message players who were encountering issues directly within the software platform and either tell them how to resolve it or ask them to call him on tech support. This messaging function also allowed him to message all players so that if one player was briefly delayed during a video (due to very slow internet speeds, for example), he could message everyone reassuring them that we would "move on shortly."



Solutions: adapting to different internet speeds

A further adaptation related to how the videos that players watch would be delivered to them. Joe first explored using a 1080p H.264 encoded video with the native web browser video player, as we use it in the co-located version of the piece. This worked well on fast internet speeds but when he tested it on an artificially throttled internet connection (to replicate conditions in some parts of the UK and other countries) this resulted in big delays when waiting for it to pre-load, buffer and start playback, which would have meant that players with a fast internet connection would have finished watching the videos and would be sitting around waiting for others and wondering if something had broken. He then looked into using adaptive bitrate streaming, rendering multiple versions of each video each accounting for different formats and bitrates similar to techniques used by YouTube, so that the system would adapt to the player's internet speeds and improve or decline in image definition if the player's internet speed changed. To do this Joe used MPEG-DASH encoding.

Solutions: human-computer interaction

The Syndicate Online platform that Joe McAlister created for the online performances of *The Evidence Chamber* employs techniques derived from human-computer interaction (HCI) studies to create a user interface accessible to a wide range of participants with vastly varying needs and requirements. These personal requirements were often different from those presented during physical shows, particularly relating to technical comprehension and confidence, as participants were required to have a reasonable level of control over their own technology. The management of individual technology is a substantial element that McAlister manages in the physical counterpart. Due to this challenge, we needed to create a digital interface for Syndicate Online that focused on increasing the ease of use to achieve an experience similar to the more managed co-located shows, particularly among non-e-literates.

With Syndicate Online, we focused on ways to invoke familiarity within a user interface (UI) by using design similarities within existing software to guide users through interaction without the need for implicit instruction. Unlike the co-located counterpart, participants cannot always ask each other for help when navigating the UI, so they must learn without intervention. The relation between familiarity and ease of use, particularly among older participants, is well-established: Turner and Van de Walle focus on the effect of introducing metaphor and analogy within a UI to help "bridge the gap" between the technology and the "naïve user" (Turner & Walle, 2006, p.150). They cite the first computer graphical user interface (GUI) found within the Xerox Star and how they used lifelike illustrations of folders within a virtual table-top to guide users confidently into unfamiliar territory. Furthermore, Turner and Van de Walle note how Tognazzini, an influential designer at Apple Inc., described the following "object-based" approach as one of the best ways you can communicate the underlying structure of an interactive system:

It can be realized by using a set of objects (such as elements of the user interface) which can activate a metaphorical or analogical con-

nection to the real world. Having made this connection, the user of the system can anticipate its behavior. (Tognazzini, 1991, p.76)

We directly invoke similar "object" metaphors in multiple stages found within Syndicate Online, including the "document" stages. During this stage, the system presents participants with small photo-realistic previews of available documents presented in a grid, which participants can view with a single press. By styling these icons similar to thumbnails found in a typical computer operating system UI, we can exploit these prior connections to help inform the user of the subsequent actions. Using this approach rather than presenting them in a grid similar to a photo gallery allows us to acknowledge each document's importance and how they are individual, like files on a computer, rather than belonging to a set of photos. Gibson, a cognitive psychologist, created the term 'affordance' (Gibson, 1979, p.1) to describe the relation between a subject and an object. Affordance includes the principle of "designed affordances" from the designer's point of view or "perceived affordances" from the user's point of view. The "object" approach, as described by Tognazzini, is considered to be an example of Skeuomorphic design (Norman, 1990, p.159). This design style takes design cues from real-world objects to inform the design of virtual equivalents. Skeuomorphism is rich in affordances: Oswald and Kolb note how these affordances apply to UI elements, suggesting:

The orientation of the groove of a slider for instance clearly indicates in which direction the slider can be dragged. (Kolb & Oswald, 2014, p.2)

Often referred to as micro-metaphors, Syndicate online uses and uniquely expands upon these techniques. We combine UI design elements with show content to create a cohesive experience that blurs the line between the UI design style and any in-game elements such as documents or graphics. We even use real-world textures such as inverted photocopied paper as the digital backdrop to Syndicate Online. We believe this allows the user to flow natural-

ly between narrative and digital interaction as they appear seamless in design and equally rich in affordances.

Conclusion

The Evidence Chamber is a piece of digitally enabled playable theatre that allows audience members to engage actively with ideas of justice, creating a phenomenological engagement that, as Newberry-Jones puts it "allows players to experience justice and carry forward beliefs into their own consciousness" (Newberry-Jones, 2015, p.99). The absence of live performers in the co-located version and their near absence in the online version allowed audience members to widen their horizon of participation and increase their agentive behaviour.

Translating *The Evidence Chamber* into an online experience during the COVID 19 pandemic presented a number of challenges. The process of adapting to these challenges was one that stretched us and taught us a great deal.

Creating an online version of the piece meant that instead of all the players being from a single geographical location (as was the case with the co-located version), players could join from disparate locations in different parts of the UK and different parts of the world. This led to a richness and nuance in the discussions which delighted us.

A key learning for us was that when transitioning to an online piece, it is very valuable to build tools that allow for more granular control of the experience. For example, the ability of the technician to mute audience members who had background noise or were creating an echo during discussion phases of the piece (and then unmute them when they wished to talk) allowed audience members to have a smoother and more immersive experience, allowing their attention to be focused on the content of the piece and their interaction with each other, rather than on the technology.

Another valuable lesson that we learned was that, while 12 co-located audience members in a physical room do not need anyone to chair their discussion, 12 online audience members using a video call do, because of issues caused by time lag and the challenge of reading body

language in that context. This is why we added the role of jury foreman and we would recommend that others creating online interactive theatre performances also invite a member of the audience to chair discussions if they do not wish to do so themselves.

We found that for a smooth and easy human-computer interaction, it is beneficial to create a user interface that closely models platforms with which audience members are familiar as this allows the experience to feel more intuitive. However, this also poses a risk that audience members might assume that this platform can do everything that the platform they are most used to can do or that, for example, because they do not need to wear headphones when using Zoom (because Zoom filters out echo and background noise) then they do not need to wear headphones for this. We do, however, believe that building our own software platform rather than using an existing one was worthwhile and would be for other artists. While many theatre artists did make work using Zoom and other platforms during the pandemic, this means adapting to the requirements of that platform (which is essentially designed for business meetings and webinars). For us, the ability to make the video call only available during discussion sections, to be able to observe audience members without being observed (as a stage manager would in a theatre) and to have the whole piece within a single platform and web browser meant that creating our own platform, Syndicate Online, was absolutely worthwhile.

Perhaps the chief benefit of the transition to an online piece for us personally was the ability to continue to offer engaging experiences that invite people to wrestle with big ideas during the pandemic. It allowed people to have an intense and meaningful interaction with people they did not already know, which became something of a rare experience for many during the pandemic.

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Images

1. *The Evidence Chamber* welcome interface;
2. A video segment within *The Evidence Chamber;*
3. The video call interface via Syndicate Online;
4. Co-located version using iPads;
5. *The Evidence Chamber* working simultaneously on a laptop and tablet device.

Tables

1. Outline structure of *The Evidence Chamber* indicating how different stages differ between the co-located and online versions.

Fast Familiar's piece The Justice Syndicate has received 4 star reviews from The Stage and the Irish Times. Smoking Gun was one of The Financial Times' "Top Ten Dramas to Enjoy at Home" and one of The Guardian's "hottest front-room seats".

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