Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Social Science & Medicine 311 (2022) 115368

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Theorising the shift to video consulting in the UK during the COVID-19 pandemic: Analysis of a mixed methods study using practice theory

Gemma Hughes [a,*], Lucy Moore [a], Gregory Maniatopoulos [b], Joseph Wherton [a], Gary W. Wood [c], Trisha Greenhalgh [a], Sara Shaw [a]

[a] Nuffield Department of Primary Care Health Sciences, University of Oxford, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG, UK
[b] Faculty of Business and Law, Northumbria University, Newcastle Upon Tyne, UK
[c] Independent Research Consultant, Birmingham, UK

ARTICLE INFO

Keywords:
Practice theory
Social change
Video consultations
Sociomateriality
Qualitative research

ABSTRACT

We studied video consulting in the National Health Service during 2020–2021 through video interviews, an online survey and online discussions with people who had provided and participated in such consultations.

Video consulting had previously been used for selected groups in limited settings in the UK. The pandemic created a seismic shift in the context for remote consulting, in which video transformed from a niche technology typically introduced by individual clinicians committed to innovation and quality improvement to offering what many felt was the only safe way to deliver certain types of healthcare. A new practice emerged: a co-constitution of technology and healthcare made possible by new configurations of equipment, connectivity and physical spaces. Despite heterogeneous service settings and previous experiences of video consulting, we found certain kinds of common changes had made video consulting possible. We used practice theory to analyse these changes, interpreting the commonalities found in our data as changes in purpose, material arrangements and a relaxing of rules about security, confidentiality and location of consultations.

The practice of video consulting was equivocal. Accounts of, and preferences for, video consulting varied as did the extent to which it was sustained after initial take-up. People made sense of video consulting in different ways, ranging from interpreting video as offering a new modality of healthcare for the future to a sub-optimal, temporary alternative to in-person care. Despite these variations, video consulting became a recognisable social phenomenon, albeit neither universally adopted nor consistently sustained. The nature of this social change offers new perspectives on processes of implementation and spread and scale-up. Our findings have important implications for the future of video consulting. We emphasise the necessity for viable material arrangements and a continued shared interpretation of the meaning of video consulting for the practice to continue.

1. Introduction

When the UK went into lockdown in March 2020 emergency measures were instigated to prevent transmission of COVID-19 and protect the NHS. Rapid reorganisation of clinical spaces, redeployment of staff and suspension of some services followed. Many clinicians, managers and support staff worked from home. Most health services, including community, secondary and primary care, switched to 'total triage', and much healthcare was provided remotely. Video technology was widely adopted in the NHS for staff communications and, the focus of this paper, patient care. We studied how video consulting changed from being a relatively niche activity confined to selected patient groups in a small number of clinical services to a mode of consulting available (albeit not universally embedded) across the NHS. In this paper, video consulting refers to healthcare consultations carried out over a distance between individual patients and clinicians using video technology instead of meeting in-person.

Video consulting is not new. Used for decades in areas such as rural Australia (Ignatowicz et al., 2019), video consulting reflects trends towards attempting to increase access and convenience for patients whilst reducing cost, expansion of new models of community care, and availability of mobile devices (Dorsey and Topol, 2016). In the UK, video consulting has been part of health policy aspirations to reduce face-to-face consultations through the uptake of digital innovation (NHS

* Corresponding author.
E-mail address: gemma.hughes@phc.ox.ac.uk (G. Hughes).

https://doi.org/10.1016/j.socscimed.2022.115368
Received 25 May 2022; Received in revised form 6 September 2022; Accepted 9 September 2022
Available online 14 September 2022

England, 2019). Despite a positive policy context, and evidence of the effectiveness and acceptability of video technology and its potential in avoiding lengthy, costly and unwanted travel (Ignatowicz et al., 2019; Shaw et al., 2018), video consulting had not previously spread and scaled-up in the UK. Pre-pandemic, video consulting had been undertaken only on a small scale in localised pockets in the NHS, typically led by clinicians committed to innovation and quality improvement. The interactional challenges of video consulting (e.g. opening consultations, dealing with interruptions to conversational flow and examinations) are frequently managed through collaboration between patients, their supporters and clinicians (Shaw et al., 2020; Seuren et al., 2020a, 2020b). The lack of wider adoption in the UK was previously attributed therefore not to video technology itself but to the complex dynamics of organisational, system and adopter changes, including reimbursement processes, information and communication systems, and the logistics of running clinics (Greenhalgh et al., 2018; Shaw et al., 2018).

The pandemic radically changed the system context. When in-person care risked transmission of COVID-19, video consulting offered a safe alternative and was rapidly adopted in the UK, although with differences in the pace and processes of change (Shaw et al., 2021). Variation in uptake was associated with prior policies and engagement (for example in Scotland the rapid roll-out of video followed previous investment in infrastructure) (Wherton et al., 2021) and the lack of relative advantage in some clinical settings (Greenhalgh et al., 2022). Service changes during the pandemic, including the use of video consulting, have had profound effects on how people experience and negotiate access to services in the UK, for example in mental health care (Liberati et al., 2021, 2022). Video consulting raises specific practical and ethical dilemmas about how to offer remote care without exacerbating inequalities associated with digital exclusion (Greenhalgh et al., 2021). Questions remain about how the wide uptake of video consulting happened, particularly where there were few prior traces of support and limited infrastructure.

We asked what changed for patients, clinicians and organisations compared to the slow spread and small-scale adoption of video consulting in the NHS pre-pandemic? Shifting away from the focus of much research to date on how the technology of video consulting was introduced into healthcare (see Shaw et al., 2021 and Greenhalgh et al., 2021 for an overview), we draw on practice theory to analyse how video consulting was enacted during COVID-19. Practice theory covers a broad area of scholarship, but commonly considers that the important features of social life are made up of organised human activities: practices. Practices are material (involving more than language), collective (involve multiple people) and intentional (enacted for specific purposes and meaning). We use Schatzki's theory of social change to study the sociomateriality of video consulting. For Schatzki, social change is both spatial and temporal, detectable as a series of interconnected events and processes that involve differences in the activities people engage in, their intentions towards their activities and the meaning that those activities signify (Schatzki, 2019). This approach moves beyond accounts that privilege individuals, (inter)actions, language, the life world, institutions, structures or systems in defining the social (change). A practice theory orientation suggests that these phenomena can only be understood through the analysis of practices (Schatzki, 2001). As such, practice theory is highly relevant to studying the organised changes people made as they conducted video consultations during the pandemic. Drawing on a practice theory perspective, we sought to analyse what people did, how their actions were materially constrained or enabled, the meanings they attributed to their actions, and how those actions were situated and contextualised.

In the remainder of this paper, we outline our sociomaterial methodology, which employs practice theory to examine the particularities of practices, intentions and material arrangements allied to video consulting. We then explain our research settings and methods before presenting findings showing that a great variety of health services tried video consulting during the pandemic, with common kinds of changes apparent across diverse settings. We argue that these changes (to the purpose and meaning, the material arrangements and the organisational rules around video consulting) constituted a social change i.e. significant differences over time and space to organised activities and the meaning and intention of those activities and discuss implications for the future.

2. Video consulting as a sociomaterial practice

Considering video consulting as a sociomaterial practice involves analysing the organised and situated activities of people as they do video consulting. Theories of social practice generally consider that social life comprises human activities (actions and judgements) as both shaped by, and shaping, their social, organizational, political and cultural contexts (Shaw et al., 2017). For example, practices are understood to be situated in, produced by and produce organising activities and organisations (Orlikowski, 1992). Practices are sociomaterial in that they have social purpose and meaning and are intimately interwoven with materials (in this case video consulting technologies). The sociomaterial nature of video consulting is apparent in the inseparability of material arrangements and organised human actions that constitute the practice. Video consulting necessarily involves two or more people and material arrangements of webcams, microphones, software and internet connection. The organised activities of communicating via video technology are related to, and co-constitutive of, the material arrangements that constitute the practice of video consulting. Video consulting can therefore be considered as a practice 'bundle': a social phenomenon of human activity that is intrinsically material (Schatzki, 2019). During the pandemic, people working in the NHS rapidly changed their working practices as they engaged in video consulting through ad hoc and hastily assembled bundles of practices: coordinated activities and material arrangements.

Conceptualising video consulting as a practice allows us to consider the entirety of activities that are involved in a consultation. Practices have a chain of intent in what Schatzki (2012) terms a teleoaffective hierarchy with 'lesser' activities (such as scheduling a consultation, securing an internet connection, logging onto software, manipulating the camera angle and so on) connecting to 'higher' purposes (e.g. protecting patients from risk of infection). Reasons for, and interpretations of, video consultation and the related material technologies-in-use are flexible (Orlikowski, 1992). The reinterpretation of technologies previously used to provide telemedicine as a form of 'digital PPE' in hospital settings illustrates this concept of 'interpretive flexibility' (Oborn et al., 2021; Orlikowski et al., 1995). Even within the same context and setting, video technology can be considered as *equivoque:* interpreted and interpretable in multiple ways, making both 'limited sense and many different kinds of sense' (Weick, 1990).

Pre-pandemic, video consulting was introduced with varying degrees of success into the organisational routines of some health services (Greenhalgh et al., 2018). Adoption was shaped by institutional conditions and health systems infrastructure through, for example, organisational norms or 'scripts' (Greenhalgh et al., 2019). During the COVID-19 crisis, people working in the NHS were cut adrift from established organisational routines and norms. Familiar structures of work fell away as clinics were cancelled and buildings closed. Healthcare professionals providing remote care were physically separated from their patients, and those working at home from their colleagues. What remained were fragments of work practices enabled by digital communications. This gave us the unique opportunity to study technology-mediated practices of healthcare in contexts stripped of the usual norms and resources.

Practice theory can be used to analyse activities beyond a local setting to consider broader social changes in the organisation of healthcare (Maniatopoulos et al., 2015). A social change necessitates a significant difference in the organisation of bundles (the combination of human activities and material arrangements) and a change in how those

activities are understood and governed (changes to the meaning and rules that shape what people do and say). Such a change may not be uniform, as is apparent in the inconsistent spread of video consulting across different settings (Shaw et al., 2021). Rather, a common understanding emerges of how the practice could and should take place; new norms and meanings are negotiated, shaped by situated material arrangements.

During the pandemic, much healthcare was possible only through the medium of video technology so analytical distinctions between pre-existing relationships, routines, practices and systems and video technology became less relevant. To reprise Orlikowski and Scott (2021), the dichotomy between healthcare and technology suggests that there is – in non-pandemic times - a distinction to be made between healthcare that involves video technologies and healthcare that does not. When the COVID-19 pandemic struck, this distinction disappeared for those healthcare services provided only through the medium of video consultations. As we show below, whilst video technology was not new, the work people did to use video technology and the meaning it held, was constitutive of new, emerging practices.

3. Research setting and methods

We studied the rapid spread and scale-up of video consulting with a UK-wide online survey of people working in the NHS in September 2020, interviews with survey respondents, patient interviews and online discussion groups with patients and people supporting patients with video consulting. Ethics approval was given by [anonymised]. We analysed 809 survey responses then recruited a purposive sample of respondents who had agreed to follow-up interviews, seeking maximum variety in terms of location (urban/rural), UK nation, service setting (primary, secondary, community care), role (clinician, manager, support staff), clinical speciality and uptake of video consulting. A summary of the characteristics of survey respondents is provided in Table 1. We interviewed forty respondents between September and November 2020. From these, a sample of 20 (ensuring variety of setting and uptake of video consulting) were interviewed again between April and May 2021. We interviewed 10 patients and ran two online discussion groups. In-person research methods were not possible, one interview was carried by phone due prior knowledge of poor internet connection and the remainder were conducted over video, with two interviews converting to telephone due to poor video connection.

Qualitative video interviews provided immersion in, and observation of, the naturalistic setting of the practice of video consulting. Many interviewees participated in video interviews using the same equipment and from the same location as for their video consultations. Observations of these practices formed part of our dataset, with two researchers (Author 1 and Author 2), taking contemporaneous fieldnotes of their experiences of conducting video interviews. Quantitative analysis of survey data produced a set of descriptive statistics that were used to organize free text comments (grouping by variables including country, organisational setting, and platforms used). The survey showed that video consulting had increased in response to the pandemic with moderate spread across the NHS, varied by clinical speciality and setting, with varying availability of equipment, software and skills. These findings informed topic guides for interviews and discussion groups.

Analysis was inductive; using modified grounded theory two researchers (Authors1 and A2) independently coded the interview, discussion group and free text survey responses, discussing regularly to reach consensus on codes. To synthesize the large and heterogeneous dataset and following a process of narrative analysis (Elliott, 2005), Authors1 and 2 developed narrative summaries of the codes which offered interpretations of technology use in relation to different organisational and social settings. Narrative summaries were used in discussion with the wider team to consider whether take-up of video consultation was high (widely-used and embedded in organisational processes) or low (used by only a minority of people and with ongoing technical problems) and how variation might be explained by different organisational contexts. However, attempts to categorise take-up and differentiate contexts in this way were of limited success. We found, for example, that video consulting had been rapidly adopted in settings where there were no organisational antecedents and low readiness for adoption, and not in others where there was significant organisational support. This led us to refocus on analysing commonalities across the dataset which involved Authors1 and 2 creating themes across the data related to teleoaffective structures, material arrangements and re-shuffling of rules.

4. Findings

Video consulting was used in a great diversity of NHS service settings during the pandemic (including urgent and routine care, primary, community and secondary care) with different patient groups (e.g. older adults, children and young people, people with chronic conditions) and for different types of consultations (including triage, assessments and

Table 1
Summary of characteristics of survey respondents.

	Category of respondents	England	Northern Ireland	Scotland	Wales	Total Numbers (% of total responses)
Staff role	Clinicians	332	34	221	52	639 (79%)
	Managers	52	4	41	9	106 (13%)
	Support staff	31	3	28	2	64 (8%)
Type of organisation	NHS Trusts/Boards	239	32	269	35	575 (71.1%)
	General Practices	147	8	17	27	199 (24.6%)
	Other organisation	29	1	4	1	35 (4.3%)
Location[a]	Very rural	13	1	18	3	35 (4.3%)
	Rural	56	0	63	10	129 (16.0%)
	Mixed rural and urban	166	22	127	26	341 (42.4%)
	Urban	86	3	37	16	142 (17.6%)
	Major urban	90	15	45	8	158 (19.6%)
Clinical speciality[b]	Primary care	145	8	28	25	206
	Children/Young People	30	4	38	2	74
	Mental health	13	2	51	2	68
	Musculoskeletal	31	2	19	5	57
	Neurology	21	2	15	1	39
	Diabetes	5	8	4	0	17
	Combined other	87	8	66	17	178
All respondents		415 (51.3%)	41 (5.1%)	290 (35.8%)	63 (7.8%)	809 (100%)

[a] 4 missing responses to this question.
[b] 639 clinicians responded to this question.

treatments). Video consulting had first been set up in direct response to the pandemic according to the majority of survey respondents (76.5%, n = 619). A fifth (20% n = 162) reported that video consulting had been available in their organisations prior to the pandemic and only with a small minority (3.5%, n = 28) reported that video consulting was not in place in their organisation at the time of the survey. Previous experience of video consulting varied: some had used video before but most were new to this mode of consultation. There were varying levels of preparedness and speed of response by organisations and different approaches taken by regional and national bodies towards resourcing and endorsing video consulting. We heard positive experiences of video consulting during the pandemic and correspondingly positive expectations about how it might be sustained. We also heard unsatisfactory experiences and pessimism about future use. Despite this variation, we found that the work that people did to set up video consulting was motivated by similar reasons, involved common processes of securing and arranging equipment and software, and shaped new interpretations of rules about video consulting. Take the example of a consultant anaesthetist who set up a video high-risk obstetric clinic, summarised in the following vignette (drawn from an interview conducted in September 2020).

> The outpatient centre that had previously housed the clinic was repurposed for COVID-19 patients. With no clinic space available and a patient group of pregnant women who could only wait for so long for assessment before delivering their babies, outpatient appointments were initially conducted by phone. The anaesthetist decided to set up a video clinic himself after talking to a colleague who had introduced video consultations in a different service pre-pandemic. He swapped a monitor for one with a camera from another room, found a headset, then as he described in an interview: ' … I … went to IT and said, 'I'm doing a video clinic on Friday. I've got all the equipment; I've got the software; the women are booked. Are you happy with that?' And they went, 'Er, yes, we'll do a test call tomorrow to make sure it's OK and then you can do it … ' There were advantages of video over telephone. Crucially for the anaesthetist, he could visually assess his patients' airways. The patient, following instructions from the clinician, could open their mouth and direct their mobile phone camera to offer a view of their uvula. They could also show their neck movement, bite their top lip and so on.
>
> As well as visual assessment, video consultations involved discussing plans for delivering babies including choice of pain relief. The clinician found it easier to build rapport with patients when he could see them, and they him, and it was easy for partners to join the call – important for this patient group. Patients were able to call from home and the clinician would put them at ease, for example reassuring them that it was okay to have their other children present during the video consultation. Consultations were captured on the electronic care record so that other anaesthetists in the service were able to access information and respond accordingly when these high-risk patients arrived to give birth. Those patients deemed to be especially complex were invited in to be seen in person.

In this example, the video clinic was rapidly established for a specific purpose: to provide time-critical care. The anaesthetist made a new arrangement of equipment and took a new approach to negotiating the set-up of technology with the IT team. The resulting video clinic comprised a *bundle* in social practice theory terms: an arrangement of activities by the clinician and patients interdependent on their devices, internet connections and electronic records. This bundle connected to other bundles, including the communication between clinicians as they planned how to manage deliveries, and the bundle of activities involved in bringing patients in for in-person consultation when needed, which involved a different set of activities and material arrangements.

Despite the variations noted above in terms of experiences of video technology and the organisational settings and clinical services in which it was used (or not), we identified three common types of changes to the practice of video consulting across our dataset. Firstly, to the *meaning* and *purpose* of video consulting (i.e. changes in teleoaffective structures), secondly to the *material arrangements* (including new locations, arrangements of equipment, materiality of consultations) and thirdly to the *norms* and *rules* of video consulting (from formal procedures to informal norms and expectations of clinicians and patients). This commonality in the types of changes experienced indicates that a social change was underway: from introducing video into existing healthcare practices to practicing healthcare through video.

4.1. Changes in the purpose of video consulting

Video consulting took on new meanings and purposes as clinicians actively sought out their IT teams for help with technology

> ' … we used to be characterised as the ICT department trying to foist technology on to clinicians … ' Interview with ICT manager, NHS hospital trust.

The motivation for clinicians and other NHS staff to work with video technology coalesced around the aim of patient care, and extended to sustaining clinical services, clinicians' professional identities, and ultimately contributing to the continuation of healthcare. This aligned with the UK government's exhortations to 'protect the NHS'. Patients participated in video consultations in order to sustain treatment plans, for example to continue post-surgery treatment and to access urgent assessments (e.g. for an unwell child). During the pandemic patients felt they had little choice but to take part in video consultations to access assessment, treatment and advice but also reported advantages including not having to travel and reduced exposure to COVID-19.

The need to provide time-critical care, linked to managing clinical and operational risks, motivated clinicians. One community-based occupational therapist described how she employed video to screen people for in-person home visits. For example, she used WhatsApp video-calling to observe someone swallowing after having been alerted by their carer about concerns about eating. Viewing the person on video allowed the therapist to decide if giving advice to the carer was sufficient. Video consultations were used to provide remote care and to ascertain the need for, and to arrange, in-person contact.

Sustaining ongoing patient care and treatment was an important motivation for some clinicians to conduct video consultations. For example, a sexual health consultant explained how video consulting allowed the changing demand for their service to be managed during the pandemic. While in-person acute care continued, prophylactic (preventative) care was still required for those who continued to take sexual health risks during the pandemic. Video consulting worked well to sustain this service, offering harm minimisation approaches whilst protecting staff and patients from COVID-19.

A trauma therapist explained how their service, disrupted by closure initially, resumed with remote therapy to offer the therapeutic interventions previously offered face-to-face. A visual connection via video substituted reasonably well for the eye contact that was important in establishing therapeutic connections during in-person sessions. Therapists adapted their usual techniques through sharing screens, for example to share educational material or view stimuli linked to trauma. For this clinic, the occasional '*glitches*' of video consultations (image freezing or a lag in audio) led to some appointments being cut short but video consulting remained preferable to the physical barriers of in-person consultations, offering a more '*spontaneous connection*' for therapy than the alternative of consulting in a designated COVID-19 zone and keeping 2 m apart whilst wearing full PPE (interview with trauma therapist).

Some clinicians, including those who had advocated for video consulting prior to the pandemic, felt video consulting enabled greater choice for patients and could be more efficient, thus allowing clinicians to fulfil their professional roles and offering opportunities for further

professional development. Some doctors (including oncology and respiratory consultants) approached video consulting as a practice that they could incorporate into their professional roles, ensuring it was used optimally to provide a good quality of service. One GP with an informatics role saw the widespread use of video consulting as representing broader progress for technology and medicine that would lead to greater benefits of efficiency and precision. Conversely, for others, video consulting introduced new concerns about their ability to fulfil their professional role. Take the example of one GP who said he was:

> ' … worried about doing a good job by video'.

This mode of consulting clashed with what he wanted from his work:

> 'I don't feel like I want to be working in a call centre for my whole career' (interview with GP partner).

This GP valued, in his words, '*really good quality consulting*' and was concerned about how technology might disrupt the psychological and philosophical nature of a consultation. Telephone triage, for example, meant undertaking transactions rather than engaging in relational care. Video consultations, for this clinician, were interpreted as undermining good clinical care.

Use of video was also motivated by concerns about the future of services, both in the short term (e.g. to secure funding) and the longer term (e.g. building resilience in the face of future crises). Patient education and intervention groups (including diabetes and cardiac rehabilitation) were concerned not just to ensure good patient care but also had an eye on achieving their activity and outcome targets to ensure future funding through public health grants. As one group leader told us:

> ' … I think it's great using the online platform, and as a service we're delighted to have it because it means we can still operate and we can still offer our service. We're a temporary funded service at the minute … so for us to be able to still operate is, you know, it's vital for the patients of course, that's your first priority. But as well for us as a service to continue when we are a temporary service is … it's a big, huge bonus for us as well to still have outcomes to report on … ' (interview with diabetes prevention programme manager).

Video allowed some services to continue that would otherwise have ceased. Success in sustaining services through lockdown led people to think the possibility of doing things differently in future:

> 'This is a cultural revolution. It's a shift for us as healthcare professionals thinking, 'Is this possible for us to do virtually?' If somebody had told me a year ago that I would be doing … clinical consultations from home, I would have said, 'Yeah, I'd really like to do that but I don't think I'm going to be allowed to'. Whereas COVID has now sort of put a very different dynamic in place … I want to be confident that my service is resilient … I'm not going to say pandemic proof, but at least somewhat pandemic resilient, that we need to have a … modality where I can meet them in their home without infection risk' (interview with Consultant Physician).

In this extract, the crisis of the pandemic is understood as having created an opening amongst usual routines within which new practices, like video consulting, could be trialled, a kind of liminal space (Orlikowski and Scott, 2021). Where video was found to be beneficial, other reasons for continuing with the practice were noticed. For example, one specialist service was still using video consultations a year after the first lockdown as a solution to a lack of clinical space and to reduce patient travel.

In some circumstances, video was understood to be the safest way for clinicians and patients to see each other and so was tried out in services unlikely to have been considered appropriate for this mode of consulting pre-pandemic (see examples above of sexual health, learning disabilities and obstetrics services). Patients and professionals were strongly motivated to access and provide healthcare, and to sustain professional roles and clinical services. The new meaning and purpose ascribed to video consulting during the pandemic were linked together in a teleoaffective structure of related tasks, activities and ends. Once tried out, video represented a relative advantage over phone consultations where visuals were important, and over in-person consultations due to the risk of COVID-19 transmission. The result was a widespread trial of video consulting which in some cases offered a new solution to fulfil other service requirements.

4.2. Changes in the material arrangements for the practice of video consulting

In this section, our analytical focus is on the materiality of video consulting: how participants secured equipment and software, rearranged existing materials and spaces and how practices were shaped by these material arrangements.

4.2.1. Material resources for video consulting

The minimum material requirements for video consulting are a pair of devices (e.g. computer/laptop/tablet/smartphone) – one at each 'end' of the call - equipped with audio-visual facilities (webcam, speakers, and microphone) and appropriate software connected via the internet, which is accessed from mobile phone or cable (broadband) networks. Twenty different platforms were identified by survey respondents including commercially available software such as Zoom and MS Teams and health-specific systems including NHS Near Me, Attend Anywhere, Accurx and Pixep. NHS staff had variable access to these material arrangements, and with global supply chains subject to the shocks of the pandemic, headsets and microphones were in particularly short supply. Staff using video consulting pre-pandemic were able to use their same equipment to increase the number of appointments they offered. Others adapted equipment, for example, one Trust had issued community-based staff with iPads for recording patient notes. The inbuilt webcams, software and mobile connectivity of these devices made them suitable for video consulting. Other people used their own devices and home broadband, including patients who typically learned to navigate new software and processes. Concerns about patients' ability to secure, and sustain, the material arrangements necessary for video consulting were expressed by professionals. Patients (whilst able to participate in video consulting themselves) were concerned that others, less familiar with the technology or with fewer resources, would not be able to benefit.

The adaptability and creativity of clinicians and patients in securing equipment extended to a range of mundane material arrangements. One stroke rehabilitation clinician explained the process of trial and error she, and her patients, had used:

> ' … I found … the first initial session is always tricky ….I try [the] phone … that hasn't got that on your camera and that doesn't have … a microphone … let's try the laptop … but after the initial setup it's so easy … they know what they're doing, they're sitting by the table, they have the kitchen towel in front of them, they have their …, you know, beans … or a toilet roll … I've been very creative here because obviously, I wasn't prepared … in the lockdown … I wasn't able to go to the office and get equipment. So, I'm actually working with everything … at home … there's no fancy … equipment. 'What do you have in your cupboard? Take me to your cupboard. Oh yeah, take that, pick that,' that's what we do ….OK. See if you can lift your hand, see if you can feel any pain … ' (interview with Occupational Therapist)

Participating in video consultations involved a process of bricolage, using phones, tablets and laptops and everyday objects to make consulting possible' (Greenhalgh et al., 2013 p93).

The crisis of the pandemic exposed inequalities in progress on digital strategies within the NHS, and created opportunities to secure more resources (Gkeredakis et al., 2021). Trusts that had trained staff and issued equipment were better placed to respond than those at the planning and strategy stage, as exemplified by one hospital-based

clinician:

> ' … prior to COVID-19, we had this strategy that had been developed in the physiotherapy department and then extrapolated across into therapies, which was kind of thinking about the use of … you know, the digital health paradigm and Digital First and … the inclusion within the Long Term Plan, and it had been recently placed - those words, Digital First, had been placed into the Trust strategy and we were looking at ways that we would plan strategically … but we hadn't really … we hadn't really done a great degree other than setting out some priorities' (interview with physiotherapist).

The crisis also presented opportunities, for example additional money was made available from national government:

> ' … at one stage they said, 'Never mind the business case, just … here's [the] money,' and that was actually very useful because the normal processes you have to write six business cases and it takes you six months to get them out … that agility from releasing money was very welcome and enabled us to … transact … whatever technology we needed to buy … ' (Interview with IT project manager).

It was crucial that funders (in this case national governments) released resources rapidly to organisations needing equipment. Software suppliers also had a key role in making video platforms available, and with sufficient capacity: when asked why certain software was most used in the early and rapid stages of adoption of video consulting, our survey respondents pointed to the ready availability and ease of use of platforms such as Accurx, which were made freely available by the supplier and were already integrated into (some) clinical systems. Official NHS endorsement contributed towards the readiness of clinicians to adopt those platforms.

4.2.2. Consulting from home

Video consulting was carried out in new locations, bringing new material arrangements into play in the clinic and the home. Many people worked at home for the first time, including clinicians who were shielding, avoiding unnecessary travel or displaced by changes to their usual workplace. The majority (76%) of respondents to our survey had been given permission to work from home, although some felt that there was limited support and lack of equipment. Significant changes resulted to the experience of healthcare. There were changes to workflow: for some software platforms consultations began when a patient clicked on a link rather than entering a waiting room (Greenhalgh and Wherton, 2022). Boundaries between personal and professional life were blurred. Some people enjoyed this convenience, others experienced an unexpected and, at times, uncomfortable intimacy by taking part in consultations whilst at home. Some organisations issued guidance intended to standardise video consultations: clinicians were advised to anonymise their background (e.g. blurring or use a corporate backdrop), to wear their uniform, and to ensure pets and children did not distract them (from survey responses). Patients were advised to find quiet, private spaces where they would not be overhead, not easy during lockdown for families living, working and schooling at home. One patient, having explained in an interview how convenient she had found a video consultation, then questioned herself: 'What if I'd had that video call when I was in my previous relationship which was abusive?'.

4.2.3. Connectivity

A key characteristic of video communication is the tendency of the connection to 'freeze' and/or the call to 'drop out'. Such interruptions were a central feature of the experience of video connection, both in our data and during data collection: a continual reminder of how video consultation is constituted by material arrangements. Although many video consultations and interviews were completed successfully, the quality of the call would frequently dip even if it did not fail entirely. Responses to this material feature of video consulting varied; some people were optimistic that the technology would become more reliable in future, others abandoned the practice.

A video interview with one patient provided an illustration of this common problem. When asked how she felt when first offered a video consultation, she responded: '*I was just worried about my Wi-Fi connection*'. This was, she told us, her '*main worry*' and she went on to describe managing a break in connection as a '*faff*':

> Respondent: Because you have to go through all the little steps again … enter the date of birth and then you have to wait for them to realise that you are on and invited to go back in … it's happened every time … having a slow broadband didn't help that. And also, you're in the middle of a sentence and you get cut off and it's like oh …
>
> Interviewer: Oh, lost you.
>
> [*Distortion and rustling*]
>
> Respondent: Can you hear me now?
>
> Interviewer: I can hear you now, yeh, yeh. I lost that last bit, sorry.
>
> Respondent: Yeh. I can hear you but then some … you know when it cuts off, you freeze.
>
> Interviewer: Freeze … I've got a message saying your bandwidth is low. What I'm going to do is just stop maybe … '(interview with patient).

Persisting with the reconnection process, repeating words previously spoken, and resorting to telephone as a back-up were common to video interviews and video consultations. The fluctuating nature of connectivity led to poor quality experiences, workarounds (e.g. clinicians resorting to other platforms for future consultations which could connect via embedded links), and abandonment of video during the consultation.

Given these challenges it is not surprising that some clinicians abandoned video consulting after an initial trial. Yet many persisted with the practice, and were optimistic about future use of video, post-pandemic. These different interpretations of similar experiences can be explained by Weick's analysis of technology as equivoque, i.e. something that can be interpreted in several plausible ways, is uncertain and not fully known. Of particular relevance is Weick's description of the interactive complexity that is related to stochastic, continuous and abstract features of technologies (Weick, 1990). Uncertainties and unexpected failures of technology, such as the 'freezing' of the video or the 'dropping out' of the internet are examples of stochastic events (randomly occurring and not determined by a specific or reversible cause). Video consulting requires continuous (reliable, ongoing) processes, but these processes are abstract (unknown or invisible to the technology users). During consultations, clinicians (and patients) could become 'failure managers', having to recover from incomprehensible breaks in connection and 'variance absorbers', coping with unexpected changes in audio/visuals. The random nature of failures of video, and the invisibility of the problem, negates any possibility of learning about and thereby addressing the failure of the connection, leading to repairs done through interactional work (Seuren et al., 2020a, 2020b) and a need to tolerate ongoing uncertainty.

The varying responses to this material feature of video consulting can be attributed to different mental models: the ways in which people make sense of, and negotiate expectations about the future (Weick, 1990). Different mental models of how healthcare could be delivered shaped participants' predictions, indicating the open-ended, and unpredictable nature of the future of video consulting. A rural GP practice explained how she had tried video consultations using WhatsApp at the start of the pandemic because this platform was familiar to her patients. Poor broadband, over which she had little control, made these consultations difficult so she resorted to telephone conversations, supplemented by photos when visuals were needed. The clinician knew a more secure platform would be necessary for video consulting to continue, but her

clinical system was not compatible with the commonly used primary care video software. The upgrade required, combined with a preference for face-to-face care, led to this clinician pessimistically forecasting her own retirement from clinical practice should video consulting persist. On the other hand, clinicians with a keen interest in IT predicted video consulting would improve over time to incorporate images from rapid diagnostics and integrate with patient records. Some patients saw advantages in video continuing for certain people in certain situations, other patients and clinicians viewed video consultations as providing a temporary solution only. Video consulting, as equivoque, lent itself to each of these interpretations.

In sum, we found that the bundle of video consulting emerged from pre-existing and new material arrangements and practices. The materiality of the practice accounted for diverse experiences and interpretations of the potential for future use of video consulting.

4.3. Changes in the interpretation of the rules about video consulting

Social change involves differences in organization of practices, including 'reshuffling of rules' (Schatzki, 2019). In the context of our study the idea of 'reshuffling', rather than breaking or changing rules, conveys the changing interpretations of, and adjustments to, the information governance rules about using video for healthcare consultations. This reshuffling process was apparent prior to the pandemic, for example from the account of a consultant physician who had been working on video consultations in a specialist service in a rural setting since 2019. This quality improvement initiative had involved a lengthy process of securing information governance approval. Repeated data protection impact assessments were required before appropriate levels of risk mitigation were agreed. A process of negotiation about how the risk to patient data security was understood resulted, rather than a material change to the practice or technology. During the pandemic, these lengthy processes of approval were not fit for purpose, leading to further reshuffling of rules.

Rules were re-ordered and re-stated during the pandemic. Some clinicians and service managers set up video consultations before receiving formal organisational approval. The extraordinary circumstances of the pandemic made this 'bending' of the rules appear reasonable, with organisational approval issued in retrospect. Staff justified their use of video platforms as prioritising patient care over information governance, re-evaluating the importance of pre-pandemic protocols against the need to see patients. Rules were re-stated, for example, when working from home survey respondents said they were reminded by their organisation of the importance of confidentiality, safety and privacy and of their professional responsibility to manage patient data securely.

Decisions about which platforms to use, and changing interpretations of the security of those platforms, provide a further example of rules being re-shuffled during the crisis. The initial selection process of video platforms was described by one interviewee as:

> 'A bit of a free for all' … We literally overnight needed to find a solution … we needed to find ways of seeing the patients … there was Pexip being used, there was Zoom, there was Zupa, the meeting platform, WhatsApp, Facetime, any way, shape or form we could contact patients was being used. And there was really for the first month, there was real uncertainty because people were worried about the governance, about the GDPR, about all sorts of risks associated with this; asking about saving images and all sorts. But no-one had any answers and essentially, we were given the word from the Trust that had come down from the region saying, 'Look, all is forgiven so to speak. For the time being, till we get a proper governance structure in place just anything goes' (interview with IT manager).

The use of 'non-health' platforms such as WhatsApp or Zoom was interpreted as acceptable in the early stages of the crisis, with guidance and choices tightening up over time. Zoom provides a telling case for how rules around information governance were re-interpreted and reshuffled in light of changing understanding of privacy and security. Concerns about data privacy resulted in one Trust '*shutting down*' and '*deactivating*' Zoom (as described in an interview with a psychological therapist). After security checks, the Trust reactivated Zoom, but also made a health service specific application available. However, clinicians who had established a working arrangement with patients continued to use Zoom because of the ease and familiarity of use, rather than switch to a new platform which would involve clinicians and patients adjusting to a new interface, and learning a different way of logging in.

Changes to the privacy and security rules and norms were re-shuffled as people adopted the practice of video consulting: approval processes were re-ordered and expedited, security requirements were relaxed, individual responsibilities for ensuring patient confidentiality were re-stated and new rules emerged. These changes to rules were produced by and through the emerging practice of video consulting.

5. Discussion

We set out to find what changed, in terms of sociomaterial arrangements and practices, for patients, clinicians and organisations during the pandemic compared to the slow spread and small-scale adoption of video consulting in the NHS pre-pandemic. We found the extraordinary conditions of the pandemic removed much of the possibility of in-person care and created what has been described by Orlikowski and Scott (2021) as a liminal space: an opening amongst usual routines and norms. Within this space, people acted by creating new material arrangements, making different sense of and therefore re-shuffling rules, for the purpose of delivering and accessing healthcare (and for the linked reasons of sustaining clinical services and maintaining professional identities). Across our data (survey, interview and focus groups) we found video consultations used across a full range of NHS services, quite unlike pre-pandemic practice and thus representing a significant change in the social norms (what people did and what meaning was attached to video consulting) despite the technology itself having changed little. Video consulting shifted from a niche, quality improvement practice which enthusiasts worked hard to set up, to a mainstream mode of healthcare (albeit not universally embedded).

Our findings demonstrate the importance of meaning and purpose for changes in practice. Simultaneous adoption of video consulting in multiple settings occurred outside of usual organisational routines and processes, and in services which had not previously considered video as a suitable mode of care. People engaged in sense-making processes as they set up video consultations without formalised implementation plans and, at times, by side-stepping organisational rules. Clinicians were no longer resistant to new technology, but instead made decisions that prioritised patient contact over rules about data security, concerned with 'doing the right thing' rather than 'doing the thing right' (Greenhalgh et al., 2014). Multiple configurations of material arrangements were possible, and necessary, as people brought a mixture of personal devices, commercial software and equipment supplied by the NHS into their practice of video consulting.

Our contribution to the literature on video consulting is therefore threefold; first, by showing how the practice bundle of video consulting emerged from pre-existing and new material arrangements we demonstrate how healthcare practices were *constituted* through video technology. The shift observed in the pandemic was from introducing video into existing healthcare practices to practicing healthcare through video. Video consulting became more than a means to improve aspects of patient experience or increase efficiency, it was a practice *of* healthcare. Second, we offer a new interpretation of the relative advantage of video consulting as being materially shaped and therefore volatile, with connectivity uncertain and changing, as we experienced when our own video interviews dropped out and as was reported to us by interviews and survey respondents. Technology was not merely a precondition or

appropriated into the practice of video consulting, but was constitutive of the practice. The stochastic nature of the technology accounted for diverse experiences and, our third contribution, the multiple ways in which people interpreted the practice of video consulting which gave rise to different expectations for its future use.

5.1. Strengths and limitations

Our study was conducted remotely during the pandemic. Survey data provided a snapshot of diverse experiences of video consulting but not a representative sample. We did not gather data directly from people unable to access video consulting; we heard about problems of inequity of access from advocates, professionals and other patients and carers. Empirical studies of practices usually require an immersion in, and close observation of, the situated activities that constitute that practice. Despite this limitation, a strength of our study was that we were able to generate knowledge of the practice of video consulting through researchers' ethnographically informed reflections and fieldnotes of the practice of video interviewing, which materially connected (through the same devices, connections and situations) the interviews we conducted with the practice of video consultations. Our online and mixed methods study design allowed us to gather primarily qualitative data about the practice of video consulting which centred on interpretations of pandemic-situated experiences from the four nations of the UK.

5.2. Implications

There are implications of conceptualising video consulting as a social practice, and its take-up as a social change (i.e. a significant difference in the organisation and interpretation of activities and material arrangements), for how we approach the implementation, scale-up and spread of innovations. Rather than conceiving of innovations as being implemented, or even providing a starting point for social practices of scale-up and spread, innovations can be understood as constitutive of new, emerging social practices. Practices are enacted for the sake of linked purposes or ends, rather than because of the nature of the innovation. What is clear from our empirical work is that people (clinicians and patients) will engage with the practice while it has meaning and purpose for them and as and when it retains sufficient advantage over other forms of healthcare, contingent on material arrangements, notably acceptable levels of connectivity. The contingency on material arrangements will lead to unequal access to healthcare in proportion to unequal access to those arrangements.

6. Conclusion

During the pandemic video consulting changed from a practice broadly understood to be instrumental to improving healthcare to one that constituted healthcare, for those services where safe, in-person alternatives were limited, or non-existent. The take-up of video consulting was linked to wider social changes and shifts caused by the responses to the pandemic, in particular an increased general use of video communications. Video consulting became a recognisable social phenomenon, albeit differently adopted with a broad range apparent across both material arrangements and interpretations of the practice. We conclude that the future of video consulting is inherently unpredictable, could lead to inequities of access and that sustained changes in material arrangements and shared meanings around the organisation of the practice are essential, if not sufficient, for this social change to be sustained.

Author contributions

Gemma Hughes: Investigation, Conceptualisation, Methodology, Writing – original draft. **Lucy Moore**: Investigation, Writing – review & editing, **Joseph Wherton**, Investigation, Writing – review & editing **Gary W. Wood**: Investigation, Formal analysis, Data curation, **Gregory Maniatopoulos**: Conceptualisation, Methodology, Writing – review & editing. **Trisha Greenhalgh**: Conceptualisation, Methodology, Writing – review & editing, **Sara Shaw**: Conceptualisation, Methodology, Writing – review & editing, Funding acquisition, Supervision

FUNDING

This research was funded by the Health Foundation, an independent charity committed to bringing about better healthcare for people in the UK (2133488).

Declaration of competing interest

There are no declarations of interest.

Data availability

Data will be made available on request.

Acknowledgements

We thank all the research participants for giving generously of their time during the crisis period of the pandemic and we thank Dr Joanne Morris for arranging the online focus groups and Dr Joanna Crocker for advice on analysis of survey data.

References

Dorsey, E.R., Topol, E.J., 2016. State of telehealth. N. Engl. J. Med. 375 (2), 154–161.
Elliott, Jane, 2005. Using Narrative in Social Research : Qualitative and Quantitative Approaches. SAGE, London ; Thousand Oaks.
Gkeredakis, M., Lifshitz-Assaf, H., Barrett, M., 2021. Crisis as opportunity, disruption and exposure: exploring emergent responses to crisis through digital technology. Inf. Organ. 31 (1).
Greenhalgh, T., Ladds, E., Hughes, G., Moore, L., Wherton, J., Shaw, S.E., Papoutsi, C., Wieringa, S., Rosen, R., Rushforth, A., Rybczynska-Bunt, S., 2022. Why do GPs rarely do video consultations? qualitative study in UK general practice. Br. J. Gen. Pract. 72 (718), e351–e360. https://doi.org/10.3399/BJGP.2021.0658.
Greenhalgh, T., Rosen, R., Shaw, S.E., Byng, R., Faulkner, S., Finlay, T., Grundy, E., Husain, L., Hughes, G., Leone, C., Moore, L., Papoutsi, C., Pope, C., Rybczynska-Bunt, S., Rushforth, A., Wherton, J., Wieringa, S., Wood, G.W., 2021. Planning and evaluating remote consultation services: a new conceptual framework incorporating complexity and practical ethics. Frontiers in Digital Health 3 (103).
Greenhalgh, T., Shaw, S., Wherton, J., Vijayaraghavan, S., Morris, J., Bhattacharya, S., Hanson, P., Campbell-Richards, D., Ramoutar, S., Collard, A., Hodkinson, I., 2018. Real-world implementation of video outpatient consultations at macro, meso, and micro levels: mixed-method study. J. Med. Internet Res. 20.
Greenhalgh, T., Stones, R., Swinglehurst, D., 2014. Rethinking 'resistance' to big IT. a sociological study of why and when healthcare staff do not use nationally mandated information and communication technologies' 2 (39).
Greenhalgh, T., Wherton, J., 2022. Telepsychiatry: learning from the pandemic. Br. J. Psychiatry 1–5.
Greenhalgh, T., Wherton, J., Shaw, S., Papoutsi, C., Vijayaraghavan, S., Stones, R., 2019. Infrastructure revisited: an ethnographic case study of how health information infrastructure shapes and constrains technological innovation. J. Med. Internet Res. 21 (12), e16093.
Greenhalgh, T., Wherton, J., Sugarhood, P., Hinder, S., Procter, R., Stones, R., 2013. What matters to older people with assisted living needs? A phenomenological analysis of the use and non-use of telehealth and telecare. Soc. Sci. Med. 93, 86–94. https://doi.org/10.1016/j.socscimed.2013.05.036.
Ignatowicz, A., Atherton, H., Bernstein, C.J., Bryce, C., Court, R., Sturt, J., Griffiths, F., 2019. Internet Videoconferencing for Patient–Clinician Consultations in Long-Term Conditions: A Review of Reviews and Applications in Line with Guidelines and Recommendations. London, England.
Liberati, E., Richards, N., Parker, J., Willars, J., Scott, D., Boydell, N., Pinfold, V., Martin, G., Dixon-Woods, M., Jones, P., 2021. Remote care for mental health: qualitative study with service users, carers and staff during the COVID-19 pandemic. BMJ Open 11 (4), e049210.
Liberati, E., Richards, N., Parker, J., Willars, J., Scott, D., Boydell, N., Pinfold, V., Martin, G., Jones, P.B., Dixon-Woods, M., 2022. Qualitative study of candidacy and access to secondary mental health services during the COVID-19 pandemic. Soc. Sci. Med. 296, 114711, 114711.
Maniatopoulos, G., Procter, R., Llewellyn, S., Harvey, G., Boyd, A., 2015. Moving beyond local practice: reconfiguring the adoption of a breast cancer diagnostic technology. Soc. Sci. Med. 131, 98–106.
Nhs England, 2019. The NHS Long Term Plan.

Oborn, E., Pilosof, N.P., Hinings, B., Zimlichman, E., 2021. Institutional logics and innovation in times of crisis: telemedicine as digital 'PPE. Inf. Organ. 31 (1), 100340.
Orlikowski, W.J., 1992. The duality of technology: rethinking the concept of technology in organizations. Organ. Sci. 3 (3), 398–427.
Orlikowski, W.J., Scott, S.V., 2021. Liminal innovation in practice: understanding the reconfiguration of digital work in crisis. Inf. Organ. 31 (1), 100336.
Orlikowski, W.J., Yates, J., Okamura, K., Fujimoto, M., 1995. Shaping electronic communication: the metastructuring of technology in the context of use. Organ. Sci. 6 (4), 423–444.
Schatzki, T.R., 2001. Introduction: practice theory. In: Schatzki, T.R., Knorr-Cetina, K., Von Savigny, E. (Eds.), The Practice Turn in Contemporary Theory, vol. 44. Routledge, London.
Schatzki, T.R., 2012. A primer on practices. In: Higgs, J., Barnett, R., Billett, S., Hutchings, M., Trede, F. (Eds.), Practice-Based Education : a Perspectives and Strategies Practice. Brill | Sense, Leiden; Boston.
Schatzki, T.R., 2019. Social Change in a Material World : How Activity and Material Processes Dynamize Practices. In: Routledge Studies in Social and Political Thought, vol. 142. Routledge, London.
Seuren, L., Greenhalgh, P., Shaw, S., Wherton, J., 2020a. Whose turn is it anyway? Latency and the organization of turn-taking in video-mediated interaction. J. Pragmat. 172.
Seuren, L.M., Wherton, J., Greenhalgh, T., Cameron, D., A'Court, C., Shaw, S.E., 2020b. Physical examinations via video for patients with heart failure: qualitative study using conversation analysis. J. Med. Internet Res. 22 (2).
Shaw, J., Shaw, S., Wherton, J., Hughes, G., Greenhalgh, T., 2017. Studying scale- up and spread as social practice: theoretical introduction and empirical case study. J. Med. Internet Res. 19 (7).
Shaw, S., Wherton, J., Vijayaraghavan, S., Morris, J., Bhattacharya, S., Hanson, P., Campbell-Richards, D., Ramoutar, S., Collard, A., Hodkinson, I., Greenhalgh, T., 2018. Advantages and limitations of virtual online consultations in a NHS acute trust: the VOCAL mixed-methods study NIHR. Health Serv. Deliv. Res. 21.
Shaw, S.E., Hughes, G., Wherton, J., Moore, L., Rosen, R., Papoutsi, C., Rushforth, A., Morris, J., Wood, G.W., Faulkner, S., Greenhalgh, T., 2021. Achieving spread, scale up and sustainability of video consulting services during the COVID-19 pandemic? Findings from a comparative case study of policy implementation in England, wales, Scotland and northern Ireland. Front Digit Health 3, 754319, 754319.
Shaw, S.E., Seuren, L.M., Wherton, J., Cameron, D., A'Court, C., Vijayaraghavan, S., Morris, J., Bhattacharya, S., Greenhalgh, T., 2020. 'Video Consultations between Patients and Clinicians in Diabetes, Cancer, and Heart Failure Services: Linguistic Ethnographic Study of Video-Mediated Interaction'. JMIR, 22. The NHS Long Term Plan, NHS England, 2019.
Weick, K.E., 1990. In: Goodman, P.S., Sproull, L.S. (Eds.), Technology as Equivoque: Sensemaking in New Technologies, Technology and Organizations. Jossey-Bass, San Francisco, CA.
Wherton, J., Greenhalgh, T., Shaw, S.E., 2021. Expanding video consultation services at pace and scale in Scotland during the COVID-19 pandemic: national mixed methods case study', J med internet. Res. 23 (10), e31374.