Conceptualising headteachers' leadership of technology in schools across the United Kingdom during early coronavirus disease 2019

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Abstract

The coronavirus disease 2019 pandemic brought seismic changes to schooling which few could have anticipated. Across the four countries of the UK, (England, Scotland, Wales and Northern Ireland) urgent changes to the locus and focus of education were required. This paper conceptualises how headteachers led their schools in the use of digital technology as they adjusted to teaching and learning in the early stages of a UK wide school 'lockdown'. The study uses data from extensive interviews with the headteachers of 12 schools across all phases of learning in schools in all four countries in the UK. The analysis uses elements of Cashman's et al.'s (2014) 'leadership by convening' lenses to conduct a threefold analysis of the transcripts: the direction of communications (internal/external); the timeframes (synchronous/asynchronous); and headteachers' perceptions of how their digital technology helped them navigate challenges. These challenges are classified as: (a) technical – The solution required technology or technical expertise; (b) adaptive – The solution required a change in behaviour by at least one party in the communication process (internal or external); (c) organisational – solutions to these challenges contained both a technological and a behavioural component. A new model of leadership with technology is suggested.

Introduction

The early days of the coronavirus disease 2019 (COVID-19) pandemic brought seismic changes to schooling in the four countries of the United Kingdom (UK), namely England, Scotland, Wales and Northern Ireland. In a matter of weeks, changes to the locus and focus of education were mandated across the UK, which were further complicated by the differing responses by governments, with those in Scotland, Wales and Northern Ireland making full use of their devolved powers (Beauchamp et al., 2021). Amongst the many challenges for those leading and managing schools in these extraordinary circumstances, headteachers faced step changes in the use of education technology,

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which offered them not only quick fixes for pressing problems and complexities for implementation on the ground, but also impetus to try novel solutions with both new and existing technologies at their disposal.

This paper focuses on how headteachers led their schools in the use of digital technology as they adjusted to the early stages of the first lockdown period in the UK. The study is based on data from extensive interviews with the headteachers of 12 schools across all phases of learning in all four countries in the UK. It is important to note at the outset, however, that this is not a comparative study of national educational landscapes, but an attempt to identify common features of responses across the UK schooling landscape of practice (Wenger-Trayner et al., 2015). Indeed, it was apparent from very early in the analysis that there were common and consistent themes that transcended sector, or country, and this is how results are presented and discussed below.

Research context: Schools in the UK

Education in the UK is devolved to the four national governments. This devolution added an extra challenge for school leaders struggling to adjust to delivering teaching and learning in the early stages of the pandemic in 2020. Schools that might only be a few miles apart, but close to national borders, found themselves forced to implement sometimes contradictory national policies, some of which they heard about first from social media or news outlets, rather than through official channels (Beauchamp et al., 2021). Below government level, schools in England, Wales, Scotland and Northern Ireland all operate with different funding arrangements (particularly diverse in England), inspection bodies, local support structures and governance issues – including strong historical Christian denominational interests in Northern Ireland.

In general, the situation is equally varied in the provision of digital technology in the classroom and, indeed, throughout the curriculum. Recent curriculum reviews in Wales (Donaldson, 2015) Scotland (OECD, 2021) and Northern Ireland (Borooah and Knox, 2017) have led to schools taking a different approach to digital learning to those in England (DFE, 2014; Royal Society, 2017). Across the UK a mixture of toolsets is provided and managed centrally and there are others that schools source for themselves.

Despite the differing organisational structures and policy landscapes, all headteachers in this study shared the same challenge of a sustained period of school closure between March and June 2020. This was a leadership challenge for which none of them had been prepared. The early stages of the pandemic (March – June 2020) required headteachers to balance political, pedagogical and relational requirements with limited human and infrastructural resources (Hulme et al., 2021).

Leadership as convening

Models of educational leadership found in schools can be broadly characterised as leadership from the 'top-down' or the 'bottom up'. In 'top down' leadership approaches, change emanates from an individual or small group of senior leaders with varying amounts of consultation from stakeholders or team members before sharing their strategy for wider implementation (Cashman et al., 2014). This approach echoes older, 'heroic' leadership styles that often rely on positionality and charismatic leadership to create buy-in from staff. This study, however, identified a 'bottom-up' model of leadership, within which problems were detected by a broad range of stakeholders and team members (Woods et al., 2004), who also suggested solutions. These were taken up by a responsive leadership structure and implemented with a sense of shared ownership. This approach is characterised by collegiality, collaborative professionalism (Hargreaves and O'Connor, 2019) and collaborative leadership (Woods and Roberts, 2019). Potentially it becomes leading by convening, where there is a 'focus on sharing leadership and leveraging the connections that each stakeholder brings' (Cashman et al., 2014: 142).

This proved important to headteachers as the challenge facing them was that they did not have any training or specific preparation to deal with a pandemic that required schools to close physically, but remain active educationally. They were forced to use whatever tools they had at their disposal to articulate what they believed to be the core functions of the school and to continue to uphold and project what they believed to be its ethos. We have reported elsewhere on the more generic strategies headteachers across the UK developed in a time a crisis (Beauchamp et al., 2021), highlighting the importance of resilience in emotional leadership for the whole school community, and the importance of headteachers' values and attitudes in motivating them in that exceptional period. This paper focuses on their leadership of the deployment of digital toolsets available to individual schools which had at least some digital hardware or software resources, such as internet-connected laptops, mobile phones, virtual learning environments, messaging services and so on. However, none of it was initially purchased with the particular challenges of COVID-19 in mind. Therefore, decisions about what technologies to use, and how to use them, were driven by how the headteachers perceived these tools could be used effectively to support pupils and staff, often at a distance. In so doing, headteachers addressed challenges and made decisions in three elements of interaction outlined by Cashman et al. (2014):

1. *Technical areas*. Addressing challenges by accessing the right information or advice from experts;
2. *Adaptive areas*. Addressing challenges by human negotiation to accommodate different situations
3. *Operational areas*. Making decisions using a mixture of technical and adaptive approaches.

Research questions

This led to the development of the following research question:

- How did headteachers lead their schools in their use of technologies as they adjusted to early stages of lockdown?

Method

This paper addresses the lived experiences and perspectives of a sample of headteachers as they deployed education technology to enhance learning and care in the early stages of the UK COVID-19 pandemic. The design was therefore qualitative and, of necessity, remote. The qualitative design reflects a relational, processual and adaptive approach to 'leadership-as-practice' (Raelin, 2016). Mandatory social distancing and a series of lockdowns to reduce contagion, precluded direct observation of leadership in action over a protracted period (Raelin, 2020). While immersive co-location in the field has long been the hallmark of qualitative enquiry, during the pandemic alternative modes of data gathering were required (Howlett, 2021). This was especially prescient as timeliness was an important consideration. In addition, rapid qualitative enquiry of this kind has the potential to provide nuanced descriptions of leadership activity, sense making and choices, enabling a 'focus not just on "what" but on "how"' (Teti et al., 2020: 1).

We were mindful that self-reported data of this kind needs to be treated with some caution, but the honest, consistent, and often heartfelt, responses of the headteachers suggests they were reporting the reality of the situation they were facing at that moment in time.

Sample

Semi-structured interviews were undertaken with 12 headteachers, selected through non-probabilistic convenience sampling from schools with differing size and demographics who were known to each university. The sample included headteachers from each of the four countries of the UK – in total, primary (4), post-primary/secondary (4) and special schools/alternative provision (4), including a Pupil Referral Unit for young people with social, emotional and behavioural difficulties. The headteachers had diverse experiences, which ensured a range of different viewpoints. Further information is provided in Table 1.

A member of the research team from each country undertook the interviews in their own country as they were familiar with the ever-changing policy context and any national 'jargon'. Participants were offered two modes of engagement – telephone or video call. Remote interviews were selected as the most appropriate primary method of data collection because the technique is non-intrusive, accessible and convenient (Gray et al., 2020). Telephone/online data gathering offered flexibility over scheduling at a time of fluidity in participants' work schedules. The shift to remote methods enabled geographically-dispersed participation, removing the time and travel costs of in-person techniques. Real-time recorded interviews overcame the limitations of possible alternative methods such asynchronous email interviewing where participants are not co-present

(Hawkins, 2018). An emerging body of research suggests that remote interview methods compare favourably with on-site interviews in terms of rapport and engagement (Lobe et al., 2020). Indeed, some participants may prefer the sense of heightened privacy and anonymity offered by a telephone interview (Dodds and Hess, 2021).

Data gathering, undertaken between May and June 2020, considered the needs of school leaders responding to a social and education crisis. Following Brinkman and Kvale (2018: 28), we acknowledge, 'An interview inquiry is a moral enterprise'. Therefore, at a time of personal and professional challenge, participation could not be too intrusive or burdensome. The research team generated a topic guide consisting of 16 questions addressing knowledge, experience and opinions. The draft guide was tested for clarity, relevance and completion time with a serving school leader, who was not included in the sample. Themes to be explored were shared in advance and interviews were limited to an hour to avoid fatigue and undue time pressure on busy professionals. The semi-structured guide provided consistency across the team, while retaining flexibility for the generation of rich responses. Ethical approval was gained from [name of university removed for anonymity in review] university ethics committee and informed consent was gained from each headteacher in writing in advance and reaffirmed verbally at the start of each interview.

Analysis of data

Interviews were transcribed and analysed using an inductive, iterative process with both descriptive and interpretative codes (Miles et al., 2014). Codes were generated (Braun et al., 2019) in the first instance by a single researcher looking at all transcripts to develop a provisional coding frame. Codes were generated from all ideas present in the transcripts, which referred to digital technologies being used support the functions of the school as all those associated with the institution (Headteachers, senior leadership teams, teaching / auxiliary staff, students, parents and external professionals) adapted for delivering its core (teaching/learning, student/family/staff welfare) functions in a lockdown situation. All technologies enabled or implied a form of communication and were hence considered elements of interaction (Cashman et al. (2014). To acknowledge Nowell et al.'s (2017) call for rigorous and methodical qualitative analysis, these codes were validated and augmented by a second member of the team. Subsequent iterations were shared, and developed, with a third member of the team, to achieve consensus. The final themes were developed, including the use of diagramming to make sense of connections (Nowell et al., 2017), before being applied to all transcripts.

Results

Three themes emerged: human use of technology, technical issues, and combinations of these two. As such, they closely matched Cashman et al.'s (2014) three elements of

Table 1. Headteacher characteristics and school context.

HT code	Gender	Years of experience as Head	Years of tenure at current school	School sector	No. of pupils	Age range (years)	Locality	Pupils eligible for free school meals (%)	Pupils with english as an additional language (%)	Most recent school support rating (national inspectorate)	Country
SE1	Male	1	18	Secondary	1450	11–18	Small town	34%	5%	Outstanding (Ofsted)	England
SE2	Female	5	5	Secondary	1050	11–18	Urban	55%	32%	Good (Ofsted)	England
SS	Male	15	6	Secondary	854	12–18	Urban	<10%	<10%	Good (HMI)	Scotland
SNI	Female	8	4	Secondary	788	11–18	Urban	5%	<5%	Very Good (ETI)	Northern Ireland
PW	Female	10	3	Primary	479	5–11	Urban	23%	55%	Good (Estyn)	Wales
PS	Female	10	10	Primary	458	3–11	Small town	<10%	<10%	Very good (HMI)	Scotland
PNI	Female	10	16	Primary	346	5–11	Urban	48%	<5%	Good (ETI)	Northern Ireland
SPNI	Male	2	2	Special	282	5–18	Urban	70%	<5%	Very Good (ETI)	Northern Ireland
SPW	Male	18	11	Special	259	4–16	Small town	Unavailable	Unavailable	Good (Estyn)	Wales
PE	Female	4	4	Primary	231	3–11	Small town	14%	<1%	Good (Ofsted)	England
PRUE	Female	22	22	Pupil Referral Unit	40	11–16	Urban	50%	Unavailable	Outstanding (Ofsted)	England
SPS	Female	2	2	Special	28	10–21	Rural	Unavailable	Unavailable	Very good (Care Inspectorate)	Scotland

SNI: secondary headteacher (S) in Northern Ireland (NI); SPNI: Special School in Northern Ireland.

interaction (adaptive, technical and operational) and these labels were adopted. These were used as lenses to scrutinise the nature of the challenge faced by the school leadership (as described by headteachers) and the solutions they deployed to overcome such challenges.

Adaptive changes were made to overcome challenges that require negotiation and interpersonal adaptation to accommodate different situations. New communication practices managed the needs and expectations of others, such as weekly emails which focused on staff well-being or establishing regular telephone check-ins with the families of at-risk children.

Technical changes required adoption of a new, specialist, means of digital communication previously not used by the participants. Previously widely used ubiquitous digital communication channels, such as Zoom or WhatsApp, were not included in solutions coded as 'Technical'. Specialist tools that were either new to the school or whose adoption was accelerated to meet the challenges of the pandemic were included, such as Google Classroom, Class Dojo or curated online learning resource hubs.

Operational changes comprised both technical and adaptive elements. This required participants to change their behaviour to communicate effectively, rather than providing tools to facilitate existing communication behaviours, for example, developing videos and resources to promote online safe socialising or encouraging teachers to feel comfortable uploading their resources to a regional resource hub.

All three elements of interaction were further classified according to whether they were synchronous/asynchronous and were internal/external to the school.

Synchronous/asynchronous. Synchronous time technology refers to when the parties in the communication were focused on it at the same time and there was a presumption of a two-way exchange between the participants (such as a Zoom call); asynchronous occurred when the parties were not present at the same time and there was no presumption of a two-way exchange (such as a messaging system to parents or a web portal containing curated learning resources).

Internal/external. Internal indicates when the communication necessary was internally focused on the staff within the school (such as a WhatsApp group or weekly email for staff): External focus involved staff and other actors such as parents or pupils (such as teaching using Google classroom or phone calls with other agencies).

These choices produced 12 thematic categories, summarised in Table 2 and discussed in turn.

Table 2. Twelve thematic categories.

	Synchronous		Asynchronous	
	Internal	External	Internal	External
Adaptive	AIS	AES	AIA	AIE
Technical	TIS	TES	TIA	TIE
Operational	OIS	OES	OIA	OIE

Adaptive

Adaptive synchronous internal. Conversations, both formal and informal, were commonplace before the lockdown. There would have been daily opportunities for such face-to-face meetings within the school. They served a range of functions, such as maintaining professional focus among the staff or providing mutual support in difficult times. Headteachers turned to a range of solutions from the telephone to Zoom to sustain professional focus and support for teams and individuals, as exemplified by a secondary headteacher (S) in Northern Ireland (NI) [SNI] and a headteacher in a Special School (SP) in Northern Ireland (NI) [SPNI] – see Table 1 for all headteacher codes:

> We have set a minimum of once a fortnight they must have some sort of meeting, it doesn't have to be a Zoom, it can be a telephone, whatever people are most comfortable with. (SNI)

> We have had staff workshops on resilience… through the mechanism of Zoom and the feedback has been very, very, very positive. (SPNI)

As a leader with functions nested in wider education systems, one participant needed to find ways to maintain personal contact with other actors in their vertical and horizontal networks. The meetings appeared to be focused on ongoing support and reassurance. Headteacher SE1 gave some examples:

> My [Local Education Authority] advisor has phoned every week and we've done Facetime every week. She's looked to any concerns that we've had, she's followed things up for us.

> We've got some additional schools coming into the hub [local school cluster] … We've met a couple of times on Zoom just to discuss things through. I'm kind of the deputy for the hub, so if the hub lead becomes ill that responsibility falls to me.

Adaptive synchronous external. Responses in this category focused on supporting parents, continuing specific teaching provisions and child welfare. Parents needed several different kinds of support, now facilitated by technology. One school ran a mental health shared education project. Several participants talked about supporting parents through calls to help keep children focused on learning activities, exemplified by SPS who stated that

> So, with one boy, for instance, who is still home because his father is in the shielding group, he will not engage in any of the tasks that the teacher would set. But he has, about every second day, WhatsApp video calls with all sorts of staff. Even with the secretary in the office, or with myself, or with the speech and language therapist, and it's more these chats, you know? Or, he would play whilst the video is on, and you could chat with him whilst he plays; so it's very, very individualised.

Contact with parents was mainly via the phone or app available on mobile (WhatsApp or Facetime), which did not rely

on a dedicated internet connection or laptop to be in contact. Communication focused on immediate concerns, either parental or the student's learning. This communication was used to support parents, including a child who had become increasingly violent and abusive as a result of being unable to go to school, and a child whose ASD meant they were not able to access the learning technologies and resources which were provided for them.

A second group of responses focused on child welfare, where teachers would contact (again via mobile or mobile app) parents and students for regular check-ins, such as SNI, who stated that

> We have also done welfare calls, every pastoral teacher has been in contact with their pupils, again we have left that flexible there is some of them have done Zoom meetings which have worked or not worked because they felt some children really didn't get their say on it and some other ones have done a group telephone chat and things like that.

One participant (PW) felt that the switch to mobile apps for regular check-ins was very positive as it gave another channel of communication with which parents were familiar and comfortable. It also enabled them to diversify and capacity-build in their leadership team by expanding the number of people who contacted the families in question.

Finally, where students had defined provision, such as small group learning or one-to-one sessions, collaborative communication tools were used to create an interactional space that was as similar as possible to that available in the school. Specialist sessions included small group teaching for children with Special Educational Needs and counselling using Google Hangouts. Where persistent lack of engagement was a concern, one participant (SE2) organised their team of Academic Mentors to provide close supervision to students identified as at risk stating

> The Academic Mentoring Teams we have … help with catch up. …, but the take up is just not good enough at all. The completion rates are really poor, so each of the children have been split into even smaller groups and the five Academic Mentors are also involved in calling them and making sure they're working and saying well done when they do.

Adaptive asynchronous internal. The asynchronous communication among staff focused on email. This was regarded as useful for important, but not urgent, information. It provided an opportunity to get support without creating an urgent demand on attention. For instance, PW stated that

> So, for example, two or three weeks in I realised I hadn't actually communicated with the whole staff team and communication was 'Well we don't expect you to be answering emails at eight o'clock at night, we don't expect you to answer emails quickly. If there is an issue, we will WhatsApp you'. So, I was very clear about what the expectations were.

In addition, sharing also supported staff, such as SS who stated that

Asynchronous communication via websites and email have also been used to support staff morale and wellbeing. With leadership sharing quizzes, information and non-urgent invitations to 'Please pop-by.'

Adaptive asynchronous external. Headteachers reported that the lack of interaction in asynchronous communication was sometimes difficult for parents and students. Asynchronous communication, such as email, website uploads or social media posts resulted in a lack of physical interaction and the need to work independently for extended periods. PRUE stated that

> Some of these parents may not have had a physical contact with their child's school for any of these weeks. They might have received texts, they might have received emails, but they might not have had that actual interaction.

PW also noted the negative impact on children:

> Some of the children do their online learning from their schools and they seem to quite enjoy it, but they have no stamina for it. You know, 20 min and they were done, even using IT. And that really shocked me, you know, I thought they'd be ripe for something, but they really weren't.

Asynchronous communication tools were used to keep in touch between schools and pupils in a less urgent and more institutional way than synchronous communication. It provided a means of demonstrating, performatively, that there was still a link between the student and the school. Examples included:

> It was Mental Health Week just before we broke up. So, lots of resources, Children's Mental Health Ambassadors, they put things out onto Twitter. Obviously, we put them out on their behalf, so we've done a lot of things like that. Pictures of staff saying hello, all that kind of information just to help the children feel connected and the families to feel connected with. (SE2)

The flow of pictures and records coming from students and their families and the posting of resources by the school for a pupil-driven initiative both demonstrate connectivity and that the sender values the priorities of the intended audience as exemplified by SNI, who reported that

> I also write to pupils, every other week I send an e-mail to pupils to say 'how are you doing and here is where we are in school' and we are just about to upload a video today of a we miss you video, it is about empty classrooms and then it reverts to a picture of them when they are in class and basically 'can't wait until you are all back with us', we are working on that today. (SNI)

Technical

Technical synchronous internal. In this category, headteachers gave a positive account of the adoption of new collaborative

technologies by staff. These included (a) an uptake in an online counselling service (PW); (b) the embedding of Google Classroom in everyday practice including the use of Google Hangouts for meetings (SE2); and (c) a self-driven learning of new skills by staff in response to how they perceive their own needs. Headteachers were then able to provide support if required:

> I know for instance some of them are upskilling themselves on how to upload videos and do pre-recorded videos and things like that, … if they need something they can come back to us. (SNI)

Technical synchronous external. The challenges of using synchronous communication (for example, Google Classroom) focused around maintaining provision for learners at home. Schools were rapidly adjusting provision of lessons via a live link as part of a broader range of classes as explained by SE2:

> … we've also put a timetable out of live lessons. So, there are some lessons which are tutorials, …. There's some which are just like a lecture series, … . And then there's a third type … for example for the more creative subjects there might be a workshop. So, the dance teacher will do a dance workshop that you could join in with, or there's a music workshop that you can join in with, or there's been a cooking one that you can join in with.

Participants highlighted three unmet accessibility issues: (a) the social and cognitive requirements to support greater independent study online (SPS); (b) the physical infrastructure to enable pupils to get online (SE2), and; (c) the challenge of engaging parents remotely:

> We interviewed or we spoke to everybody on the phone and … we asked them have you got a device that can get you onto Google Classroom which isn't a mobile phone and that was a really important question because a lot of children are trying to access it through that, or a gaming device, and do you have a Wi-Fi connection etcetera?" (SE2)

One school was much further along the path of networked learning prior to the pandemic. Nevertheless, lockdown learning for this school was still a process of accelerated, but continuing, change for both teachers and pupils:

> Every child in forms one to three had an iPad. Staff were using those communications anyway before we went off, but again I know not every school had that luxury, we had it and we were well prepared, there were maybe six Departments here who were using the iPad anyway they had gone paperless. (SNI)

Technical asynchronous external. Some headteachers talked extensively about asynchronous communication with students and their families. Many schools had some form of messaging platform or protocol in place prior to the start of the lockdown (such as Class Dojo). There was,

however, a transition in the kinds of materials that schools provided to their students. PE provided a detailed account that typified features of asynchronous communication with students as the lockdown progressed and teaching evolved. At first, they used asynchronous channels (such as their website or online messaging service) to share existing resources.

> It was hard to kind of judge where to go on that Monday but we originally kind of put a lot of things … we sent the children home with a book and a pack of work and we put lots of things on our website. (PE)

The second stage of their response was to incorporate the resources of trusted third parties:

> When the [name of organisation] provided the online virtual school, we incorporated that into the timetables really so then we were able to direct parents much more specifically to what we wanted them to be doing with the children. (PE)

The final stage was to begin developing their own content to share with students still at home, explaining

> "… that's our next step now is when we have the children back in we're looking at some way of videoing those lessons so the children at home also have access to it. But we haven't quite finalised that yet." (PE)

The school targeted the parents, rather than the students, as the key people to contact and with whom to share work. They focused on setting up nested communication channels for the school and the class:

> So, there's kind of smaller communities inside the bigger community. We can upload things to that, we can send things home through that system and the parents can download it via the phone, or the tablet, whatever they use it on and it goes the other way as well. (PE)

Other schools also reported similar features. One early adopter of asynchronous communication technology found their skills and practices were increasingly valued within their networks:

> "… we have been using this now about three years, we have been using the seesaw app which is a massive communication app, there is an awful lot of modelling of lessons." (SPNI)

There was a sense that lockdown accelerated the process of increased use of digital tools for learning and that experimentation within the staff was encouraged. As well as the process of expanding and adapting existing infrastructure, some schools continued to mitigate the situation with offline solutions for some children, such as SE2 who explained that

> we already had Google Classroom which we're already on Gmail so we had Google Classroom which we had set up in the

background for homework. But we always gave paper copies as well because we know that not everybody has got a device.

Technical asynchronous internal. Many issues in the category related to providing opportunities for self-directed learning for staff, particularly technical learning, such as

> Yeah, they've done some [Online CPD] but we haven't… we've left that open to their professional discretion. We've obviously shared all the platforms and all the learning tools that have become available, and they've made the decision what they will and will not access. (SPNI)

One headteacher (PNI) used a mailing list to share information among staff both in preparation for closure and during the lockdown. PNI also reported teacher collaboration following CPD to share findings more widely among colleagues stating

> I think the staff themselves have been the most useful resource because they are out there putting out feelers all the time and then feeding back to each other, that level of collaboration you just couldn't beat it. (PNI)

Email thus became a channel for sharing information and opportunities from management to the teaching and non-teaching colleagues.

Operational

Operational synchronous external. Activities discussed in this category relate to the future structure of interaction, not only during, but post-lockdown. The shift to online communication presented new opportunities, but also highlighted some structural weaknesses which needed addressing. These challenges were operational as they included actions both adaptive (in that they require changes in human collaboration and working patterns) and technical (in that they require a new relationship to the technology which facilitated learning).

One headteacher (SPNI) highlighted the issue of online child safety. They reported that at the beginning of the lockdown there was a lack of guidance which was perceived as putting the burden of responsibility unfairly and disproportionately on to the head teacher

> Because what happens is it is all put back onto the Principal. It is under the Principal's discretion what, if he thinks this should be used, but without saying 'listen this is able to be used, let people at it', that isn't coming. (SPNI)

In the end decisions were taken in favour of limited use of the technology at school level as

> given the need of our children and their parents our safeguarding team basically agreed to disagree in one sense, but have now agreed that we are not using it for classes or from a pastoral point of view. (SPNI)

Some schools used the data-gathering capabilities of learning platforms such as Google Classroom to develop new monitoring and oversight practices for student working.

SE2 talked about using a measure of activity on Classroom as a proxy for engagement with schoolwork, where three hours minimal online Google Classroom was required and

> We pull that data … as the week goes on and if you're not doing anything or you've not submitted then in those phone calls you're told to crack on. (SE2)

Other headteachers reported that the use of technology was actually a positive thing, which brought a new dimension to their work. For example, PW highlighted the opportunity to communicate visually and not only verbally with students in their homes was very powerful as

> Whether it's a WhatsApp call, whether it's Facetime, whether it's Zoom, whether it's Teams, those resources for me have made a big difference because, okay, you can talk to somebody on the phone, you can email, you can text, but actually I think there's something about seeing people and I think that for us as a team has been really powerful.

It was anticipated that post-lockdown working would retain elements of remote working adopted by schools both for teaching and learning, but also for leaders' administrative tasks, such as

> I won't be going to [Name of town] and driving there for an hour for a 45-min meeting and driving home again anymore; I'll do it on this. And I won't be struggling to park in the middle of [Name of town] in the pouring rain to get to a bloody meeting with two-hour parking when I can do it this way. (SPW)

For this participant, the ability to make operational decisions with external stakeholders in real time had made a huge impact on the students and on the staff.

Prior to the lockdown, some headteachers were reluctant to change existing practices, but the changes forced them to work out how virtual meetings and working could meet the challenges they had to deal with. As SPW explained, 'It's funny that it's something you always talked about and until you've actually done it … and now you've done it it's okay provided you've got a platform where you can see everyone'.

Operational synchronous internal. Although not a prominent theme, this area was important as it focused on the needs of the teachers, rather than just the pupils and parents. It acknowledged the potential impact of teachers' family and caring commitments on their potential to work from home in real time. For instance, PRUE noted

> … daft as it sounds if you've only got one computer in your house and you've got three children trying to work on that computer, to take the computer out … for half an hour's meeting it wouldn't be really practical. (PRUE)

Operational asynchronous internal. In these activities, headteachers talked about restructuring their organisation to

make better use of existing online resources to support operational matters, which took on a new significance in lockdown. For example:

> I'm a bit of a planner so we've got…we use a Trello Board with job cards on it now because we used to have a job board in my office. So, we've got this sort of virtual job board that we have online just to make sure that we've planned for September (SE2)

SPNI talked about the inability of their institution to effectively use the resources published by their supervisory education authority or commercial providers. Instead, they developed their own processes within the school for developing and sharing content among colleagues, where

> Our online resources are basically created by ourselves in the sense that we are creating our lessons, … [and] … we are sharing those within departments, and we are building up a bank of lessons based on particular classes and particular needs.

Operational asynchronous external. *****Examples of these activities tended to cover the adaptations institutions made to reflect the reality of student home situations. Some headteachers were aware of the challenge of learning and working in a household with only one internet-enabled computer. For example,

> We do know though that some families are accessing one device between a parent who might be working, and the children who are trying to learn as well and that's really difficult. (PE)

School leaders had to adjust their policies and practices to assist families in having access to technology. This resulted in novel priorities, such as SE2 who noted 'everyone else was stocking loo roll and I was stocking Chromebooks!'.

Other issues ranged from recognising that some teachers were neither familiar, nor comfortable, with new ways of making online or recorded content, by trying to get staff to share their hard work beyond the school with other teachers in a network. PN1 gave an example where

> It was important that we took the two staff development days which were headed up by our ICT guy to look at what can we do with this, what actually does this tool allow us to do. We built in a lot of staff development about using it, putting videos, making videos putting videos up (*sic*), using pens to annotate things that might seem very basic actually now but again within any staff you are going to have a range of expertise …

Schools also had to make institutional adjustments to the curriculum as well. These ranged from adjustment to the resources available, greater emphasis on life skills to support routines in lockdown, to building resilience into the marking and assessment procedures, such as

> We just got together and we said, 'Right, what do we want to send the children home with? How will that look, and what's the online platform we're going to all consistently say this is what we're offering the children?' (PS)

Discussion

Many of the challenges which headteachers described related to communication in some form. Normal dialogues could not now happen as lockdown had removed the location for interaction. Digital technologies, therefore, filled the gap. However, communication which had hitherto been implicit and taken for granted was now made explicit. Communication also took novel forms for the schools, exploiting the feature of technology they had.

Technical

Technical solutions foregrounded internal and external characteristics, rather than synchronous or asynchronous. When addressing technical/internal challenges, headteachers focused on ensuring staff had sufficient skills to deliver resources and lessons online. Headteachers were able to use distributed leadership to enable staff to share resources and specialist skills to support each other as the need arose (PNI). Staff were able to support each other in meeting existing skills deficits. They provided leadership by offering the space and opportunities so that staff could use their professional discretion as to how best to meet needs (SPNI). This supportive approach was facilitated by digital technology as it allowed direct communication between staff without involving senior managers. Headteachers perceived it was sufficient to know that this support and independent work was taking place, without having to be directly involved.

In contrast, technical/external challenges focused on establishing if, and to what extent, deficits existed for learners in their homes. These deficits might be in the form of skills, requiring the intensive support of online lessons (SPS). Or might be in the form of hardware, requiring an audit of home internet set up (SE2). Headteachers were aware that remote learning in the homes of some students would be difficult to manage. They needed to show flexibility in the responses they deployed. Lack of space and computers at home meant that using web-based applications would not be practical. School teams tried to do what they could to bridge the gap in provision at home, either with additional hardware or a blend of paper resources and digital technology.

Few schools were as far advanced as SNI whose already paperless year groups transitioned to remote learning without much disruption. Nevertheless most, if not all, schools had some of the key tools useful for online learning at their disposal well before the lockdown began. As such, lockdown accelerated a process that had already begun. Schools began using their existing expertise in software such as Seesaw and Purple Mash (PW) or Google Classroom (SE2) to a much greater degree, and much

faster than they would have before, as the situation gave additional dynamism to otherwise slower evolutionary steps.

Adaptive

Adaptive solutions focused mainly on the challenge of maintaining connections in difficult circumstances. Here the synchronous or asynchronous nature of digital communication was foregrounded and took on greater importance: Whether the interlocutors were internal or external to the organisation had less relevance.

A common feature was the need to maintain contact between the institution and an individual. Synchronous communication was supported by multiple digital tools – which even if not particularly new, were certainly used in new ways by the schools. These could be relatively novel at that time, such as Zoom, or relatively ubiquitous and familiar such as a mobile phone (e.g., SPS). Leadership in this case was very much 'bottom up'. As long as the school institution was represented by someone, it did not necessarily matter very much who it was. The goal was to maintain communication and the key to doing so was finding the best channel for the individual you wanted to talk to.

The foregrounding of the communication itself, and the backgrounding of the identity of the person representing the institution (in either internal or external conversations), gave the communication a performative character. Activities coded as Adaptive/Asynchronous were broadly focused on reaffirming links between the school and stakeholders. For instance, shared pictures of staff saying hello (SE2), quizzes and invitations for staff team members (SS), or videos showing student work (SNI). These represent an expression of shared ownership (Woods et al., 2004). Each is a performative way of expressing a sense of ongoing connection.

Operational

In finding solutions to operational factors, headteachers encountered broader social parameters which constrained the extent to which they could adapt to meet the challenges of the COVID-19 lockdown. These parameters were legal, socio-economic, cultural and cognitive. Headteachers reported being used to taking policy directives (including the use of technologies) and applying them in a way that made sense to their context, but were now operating without clear guidance from those to whom they normally looked for leadership. They were having to make decisions for themselves and live with the consequences with a freedom of action not previously possible. Previously centralised, top-down, leadership structures were now shifting to more horizontal and bottom-up ones, relying on headteachers' shared professionalism (Hargreaves and O'Connor, 2014).

Previously, schools had well-developed structures of reward and consequence, plus the adaptability of teachers in a classroom to ensure children engaged with teaching and learning activities. The new lack of physical presence was a challenge that headteachers addressed in very different ways. For instance, SE2 required students to be present on Google Classroom for three hours per day. Quality of work was monitored and technology was further deployed to support children by mentoring if required. PW focused on conversation and connection, using a range of channels to maintain human contact and engagement. Some headteachers saw liberation in the challenge of COVID-19 and their responses to it. The technology had been available before the pandemic, but it had not been used consistently or extensively. Digital technology now provided the opportunity to permanently change some practices for the better.

Leadership of technology

What became apparent was that headteachers had to adapt their leadership style to incorporate the use of technology to a much greater extent, in a much quicker timescale, and to use a wider range of technologies, but they did not do this on their own. Their responses, although often requiring highly complex management of people and resources, can be simplified into the following basic questions:

- **What** is the leadership challenge I am trying to overcome?
- **What** is the nature of the challenge – technical, adaptive or organisational?
- **Who** is involved (external or internal)?
- **When** do we need to engage – synchronous/ asynchronous?
- **How** can I use technology to help?
- **Who** can help?
- **What** support is needed for that person(s)?

This is summarised in Figure 1 below:

Although this is a linear process, the use of technology was not the driving force, but it was selected and deployed after considering a range of factors as outlined in Figure 1. Leadership is, of course, not so linear as this may imply. As outlined earlier in Table 2, these factors were often considered in combination, and headteachers took different routes through to the decisions about what technology to use and who would use it. Although not explicit in their response, headteachers were taking account of the affordances of the available technologies. In this context, we move beyond the original concept proposed by Gibson (1979) of the affordances of an object which we can use as a tool to accomplish a task meaningfully. The Gibsonian conception of affordances was one of ecological, biological, perception. Objects were perceived as useful by an individual at a pre-cognitive level, independent of the socio-cultural context. We suggest that the affordance of a tool is bounded by constraints, a value-neutral quality which defines the structure for action for that tool and that user at that time (Kennewell et al., 2008). This structure for action, within which the affordances of an object are understood, is dependent on the knowledge, skills and disposition of the user.
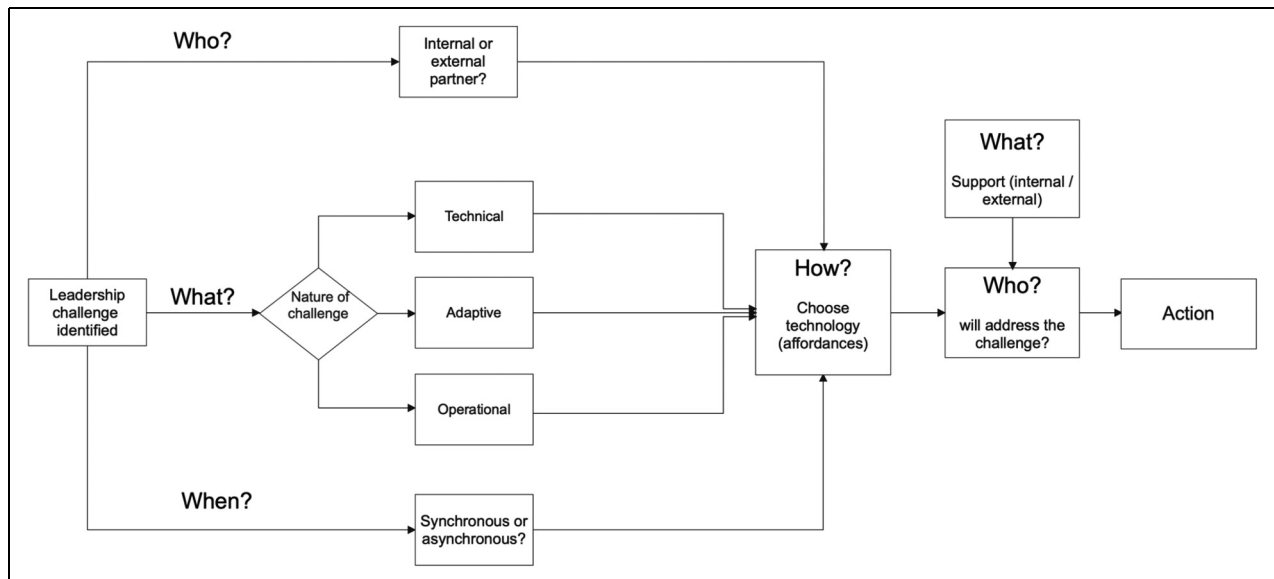
Figure 1. Model of leadership of technology of headteachers in this study.

For the headteachers the perception of affordances was neither a mechanical/biological process, removed from contextual experience, nor a process of decoding the authorial intent of the designer of the technology (Norman, 2013). Rather, their perceptions were of the presentation of meaning through action. Merleau-Ponty argues for a foreground – background structure to perception. In the background are the actors' (in this case headteachers') knowledge and experience. In the foreground is the actor's perception of the affordances of a particular artefact. It is not possible for that actor to perceive all the affordances of a task, but rather the affordances which are relevant to the task on which they are focusing (Bonderup-Dohn, 2009). We suggest that this is how headteachers made decisions about *how* to use technologies. Having made this decision, it was then logical to choose a member of staff best able to exploit the affordances, or indeed for the headteachers themselves, to address the challenge and take action, provided with support (internal or external) as necessary.

It is important to note, however, that the whole process in Figure 1 was often taken subconsciously, at speed, as events unfolded unpredictably. Figure 1 is necessarily a post hoc conceptualisation of headteachers' reflections on technological aspects of the leadership of their school through a period of uncertainty. Nevertheless, it does help to map headteachers' leadership in areas as diverse as teaching children remotely, keeping in touch with parents, members of staff and external agencies, and ensuring staff wellbeing, as they led their schools in their use of technologies adjusting to teaching and learning in lockdown.

Limitations

The study was limited by sample size, the relatively short distance of hindsight and by the unprecedented nature the pandemic itself. Nonetheless, the sample reached headteachers in all main school types in all parts of the United Kingdom, the instruments were robustly constructed and piloted by each member of an experienced research team. It may be viewed as a strength that these headteachers' views capture the immediacy of events in the heat of change and ambiguity with an authenticity that was clear to the research team, who each reported that headteachers seemed to relish the opportunity to narrate the realities of the rapidly developing technological challenges and fixes which had so suddenly become part of their leadership repertoire. A future study will return to the sample population to elicit views in a hopefully more stabilised landscape.

Conclusion

This paper has shone a light on a singularly challenging and unique moment of change in the digital history of schools. The views of headteachers from a range of schools across the UK bring to life both the situational ambiguities and realities of leadership in utilising technology to meet a range external and internal demands. We proffer a new heuristic conceptualisation of the approaches the headteachers in this sample deployed available toolsets, adapting to rapidly changing new demands, and organising the best available solutions across a range of internal and external, synchronous and asynchronous contexts.

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