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Published online: 20 Apr 2023.

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RESEARCH ARTICLE

Educational purity and technological danger: understanding scepticism towards the use of telepresence robots in school

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ABSTRACT

This article contributes to the sociology of education and technology by providing a cultural analysis of scepticism towards new technologies in school, using reactions to the telepresence robot 'AV1' as its case. AV1 is designed to connect 'homebound' students with their 'school-based' teachers and classmates. Despite its idealistic purpose, the robot has been met with significant scepticism by Norwegian school workers. To understand why, the article proposes the novel concepts of 'educational purity' and 'technological danger' to highlight the shared beliefs that underlie school workers' concerns. We find that school workers see AV1 as threatening key ideals of schools being pedagogically oriented, physically copresent and bounded institutions – all concerns that reflect widespread ideas about how technologies tend to (not) function within educational contexts. In highlighting these symbolic tensions between new technologies and schools, the article sets a course for future studies into the cultural sociology of education and technology.

Introduction

In 2016, a series of evocative commercials filled Norwegian TV screens in promotion of a technology called 'AV1' (Figure 1). One commercial opened by showing a small, white, robotic bust placed on an empty school desk. A school bell rings, the robot's eyes light up and a bunch of 10-year-olds walk into the classroom. The voice-over of a young boy explains, 'Eirik isn't always at school because he's away on training to improve his walking'. We are shown a child in physical therapy, followed by a series of shots in which the robotic bust is included in play – in the school yard, at the beach, at a birthday party, on a canoe trip. The voice-over continues, 'It's pretty cool that we can bring the robot everywhere and that Eirik doesn't miss anything because he's able to follow us through his mobile phone'.

AV1 is a telepresence robot[1] for children who are homebound because of illness or disability. Produced by the Norwegian start-up company *No Isolation,* AV1 functions like a personified web camera and is meant to connect so-called 'homebound students' with their

Figure 1. AV1. Photo: Estera K.-Johnsrud/No Isolation. [The authors declare that they have obtained the rights to use this image from the copyright holders Estera K.-Johnsrud and No Isolation].

teachers and classmates in school. The robotic device itself is typically placed in the classroom, whereas the homebound child follows the robot *via* an app on their phone or tablet, which enables them to see, hear and talk to those in class, while also being able to direct their 'gaze' by rotating the robot's head.[2] As the robot comes with 4G cellular network technology, it can also be used outside of classrooms, whether for school trips, assemblies or birthday parties. As of April 2022, there are roughly 2000 active robots in Norway, Sweden, Denmark, Germany, the UK and several other European countries.

Having studied the robot over the past four years, we can attest to its potential as a tool for social and educational inclusion (Johannessen, Rasmussen, and Haldar 2023). The users we have talked to are generally positive towards the technology and stress the benefits of having a remote connection to the school. However, our studies also uncover an unexpected challenge for those wanting to use the robot: the fact that school workers often show significant scepticism, reluctance and even outright resistance to its use in their school or classroom. This has greatly upset the homebound users we talked to, with many finding it stunning that anyone could be sceptical towards a technology meant for helping socially isolated students.

With this article, we seek to understand what telepresence robots look like from school workers' perspective, focusing in particular on their *pre-experiential sensemaking*: that is, on how they make sense of the robot prior to having actually used it. Drawing on textual material and 55 interviews with 48 school workers across 29 schools in Norway, we find that school workers' scepticism is informed by widespread beliefs about how technologies often (fail to) function in schools, leading many to believe that adoption of the robot will threaten key ideals of schools being pedagogically oriented, physically co-present and bounded institutions. We see our analysis as contributing to 'the sociology of education and technology', which aims to understand 'the social, political, economic, cultural and historical contexts within which educational technology use (and non-use) is located' (Selwyn 2010, 66). Specifically, our study makes two key contributions to this emerging field of study. First, it explores reactions to a novel and relatively understudied device.

Second, we show how the reactions to AV1 reflect widespread ideas about what we, inspired by Mary Douglas (1966), call *educational purity* and *technological danger*, meaning that our case study of AV1 is a productive prism for highlighting tensions between new communication technologies and schools more generally.

Education, technology and symbolism

The subfield of 'the sociology of education and technology' began with early calls in the 1980s (Young 1984) and has truly coalesced over the past 20 years, especially through the efforts of Neil Selwyn and his colleagues (Selwyn 2003, 2010, 2011a, 2011b, 2012, 2013, 2014a, 2014b, 2021; Selwyn and Facer 2014; Selwyn et al. 2016, 2017). As Selwyn observed already in 2006

> '[I]nformation and communications technologies' (ICTs) such as the Internet, mobile telephone and computer have become such prominent and problematic elements of contemporary education that anyone interested in the sociology of education can ill afford to overlook their presence and influence in educational settings. (Selwyn 2006, 419)

As proposed by Selwyn, a sociology of education and technology should serve as a critical corrective to the predominant approaches to studies of technologies in education, which, representing the 'learning sciences', 'pedagogical sciences' and 'design sciences', have mainly limited themselves to studying 'the potential of technology to "enable," "assist," "enhance" or even "transform" learning' (Selwyn et al. 2016, 149). In their place, Selwyn urges sociologists to 'look beyond learning' and ask broader questions about the social life of technologies in education. Specifically, Selwyn sees a particular need for context-rich analyses that situate technologies in their wider socio-cultural milieu, with an eye towards 'the often uneven, contested and contradictory realities of technology use within educational settings' (Selwyn 2010, 67).

This article employs such a sociological approach to understand school workers' *scepticism* towards new technology – an area where a sociological perspective is acutely needed. There is a substantial academic literature discussing technology (non)acceptance and (non) adoption among teachers and other school workers, in which problematic relationships to technology is a central theme (cf. Henderson and Corry 2021). Predominantly, however, this problematic relationship is framed in psychological terms, as evident in the use of concepts such as techno-anxiety (cf. Revilla Muñoz et al. 2017), technostress (cf. Joo, Lim, and Kim 2016) and technophobia (cf. Efe and Efe 2016). While many such studies do explore the social roots of these purportedly psychological problems, their reliance on concepts such as anxiety, stress and phobia tend to individualize and pathologize the phenomena in question. Specifically, these framings suggest that the problem lies with school workers' irrational and exaggerated responses to technology (rather than with the technology itself) and that their 'anxiety' and 'technophobia' is something in need of a cure or treatment (rather than a potentially 'healthy' and desirable response).

With this article, we seek, instead, to understand school workers' scepticism towards new technology in *sociological* terms. In so doing, we follow the lead of a small collection of qualitative and context-sensitive studies of school workers' problematic relationship to technology (cf. Howard 2013; Peck et al. 2015; Selwyn et al. 2017), which demonstrate that

school workers' concerns are often significantly more rational than labels such as 'anxiety' or 'phobia' would suggest.

We also extend these context-sensitive studies in two main ways. Firstly, whereas existing research has predominantly explored either *educational technologies* (that are owned by schools and meant for educational purposes) or *personal media devices* (that are owned by students and used for a range of social and entertainment purposes), our article explores a device that traverses these categories.[3] AV1 is designed to be used in school, but not primarily for educational purposes; instead, it is meant to offer social connection and reduce loneliness among homebound students. Furthermore, the device is typically introduced to schools in a bottom-up fashion, by the homebound student or their guardians, rather than being implemented as a top-down solution with all the formal legitimacy and power mechanisms that entails. Thus, AV1 serves as a good technology 'to think with' by shedding new light on more established technologies in schools.

Secondly, we propose a *cultural sociological* approach for understanding school workers' scepticism towards new technology. While cultural sociology comprises an array of competing approaches (Simko and Olick 2021), the present article draws inspiration mainly from semiotic conceptions of culture as meaningful webs of significance or symbols (Geertz 1973). Conceived as such, culture refers to school workers' shared beliefs about schools, technologies and the relationships between the two, all of which will serve as an 'interpretive grid' through which any new technology must be mediated 'emotionally, cognitively and morally' (Alexander 2003, 31) – with significant consequences for whether and how school actors will seek to adopt, reject, modify or engage in other actions of consequence for the technology in question.

More specifically, our cultural sociological approach draws inspiration from Mary Douglas' work on *dirt,* as found in her seminal book *Purity and Danger* (1966). Douglas famously defined 'dirt' as 'matter out of place' (1966, 42), a definition that points both to 'a set of ordered relations' and 'a contravention of that order' (1966, 42). Applied to our case, we take this 'set of ordered relations' to comprise shared beliefs about what schools *should* be like, which we, building on Douglas, refer to as school workers' ideals of 'educational purity'. Conversely, our notion of 'technological danger' captures how technologies can be considered 'contraventions' of these ideals, serving as the proverbial 'matter out of place' within school workers' symbolic order.

Concerning these latter ideas about 'technological danger', we emphasize that our empirical focus is on school workers' *pre-experiential sensemaking* – that is, on how school workers make sense of AV1 *before* having had any direct experience with it (see also Johannessen 2023). This is a theoretically strategic focus for highlighting the 'interpretive grid' through which school workers interpret AV1, as lack of direct use experience means that school workers must draw on their cultural resources to make sense of the robot. These resources include second-hand information about the robot itself (from websites, commercials, word-of-mouth, etc.), but also experiences with *supposedly similar technologies* (e.g. distance education) as well as more *general stereotypes* about technologies in education. It is this amalgam – this jumble of second-hand information and more-or-less precise analogies with, and stereotypes about, AV1 – that they relate to their beliefs about school and schooling, and which warrants their sceptical stances towards the robot.

Given the varying precision of such amalgams, it might be tempting to dismiss school workers' ideas about AV1 as mere 'misconceptions' that can be easily corrected by direct exposure to the technology. However, such a dismissal would rest on the ill-conceived

assumption that the school workers are actually willing to adopt and use the robot. Indeed, the fact that they are often reluctant to do so is the very issue driving this article. Thus, rather than dismissing pre-experiential ideas as 'misconceptions', we adopt the Thomas theorem understanding of culture and action in which people's interpretations – whether 'inaccurate' or not – are seen as laying an important foundation for how they act (Merton 1948). Accordingly, when school workers come to the pre-experiential conclusion that they distrust a technology, they may see good grounds for never allowing any direct user experience with the technology in question. In other words, we focus on people's pre-experiential sensemaking, and the cultural resources this relies on, because this is a highly salient approach to understanding scepticism towards, and non-adoption of, new technologies in school. We apply this perspective in the results section, but first we describe the study's data and methods.

Materials and methods

Our data is drawn from a larger and mainly interview-based study of AV1, comprising 159 semistructured interviews with users, producers, school workers and other stakeholders of the robot in Norway, conducted between the fall of 2018 and the spring of 2021 (Johannessen, Rasmussen, and Haldar 2023). The large majority of these interviews were conducted prior to the lockdowns of the COVID-19 pandemic (we return to the significance of this point in the Discussion section).

In this article, we focus most closely on the 55 interviews done with 48 teachers, principals and other educational employees across 29 schools in Norway. Of the 48 interviewees, 31 were female and 17 male; 4 were between 20 and 29 years old, 9 between 30 and 39, 17 between 40 and 49, 9 between 50 and 59 and 6 were aged 60 years or older (3 were not asked/did not provide their age). Nineteen worked in primary school (ages 6–12), 5 in secondary school (ages 13–15), 11 in upper secondary school (ages 16–18) and 13 in other education-related institutions (e.g. hospital schools). Most interviewees were recruited through snowball sampling *via* users, and thus, had a basic acquaintance with the robot. As we return to in the Discussion section, there were significant differences in opinion about AV1; this study focuses most closely on the expression of scepticism towards the robot, ranging from mild hesitance to vocal resistance.

Of the 55 interviews, 18 were conducted face-to-face and 37 were conducted by phone. While telephone interviews inevitably entail the loss of certain data, the method gave the interviewees great flexibility in when and where to conduct the interview, thus, significantly increasing our pool of informants and allowing for a geographically more diverse sample (see Johannessen, Rasmussen, and Haldar 2023 for a more in-depth discussion; see also Oltmann 2016).

All interviews were carried out using a semistructured interview guide. This article builds mostly on accounts of what the interviewees thought about the robot prior to using it. For those who had not (yet) used the robot, we rely on their accounts of how they believed it would be to adopt AV1 in their school; for those who had started using it, we rely mostly on retrospective accounts of what they thought about the robot prior to its adoption.

In addition to interviews, our sample also includes two critical op-eds that were published in Norwegian newspapers and magazines in the first years after the robot's launch (Dagbladet

2017; Utdanningsnytt 2019), which were identified following a broad-scale search of national and international press coverage about the robot and its producers. As the op-eds were written by teachers who had yet to use the robot, and as they convey similar reasons for scepticism as our interviewees, we treat them similarly as our interview data – that is, as reflecting salient shared beliefs about the relationship between education and technology.

The study was reported to the Norwegian Centre for Research Data (NSD) and approved in September 2018. All interviewees have given their written consent to participate in the study. To ensure confidentiality, their names and other identifying information has been made anonymous. All interviews were transcribed verbatim. The included quotes have been translated from Norwegian, making minor grammatical and aesthetical adjustments.

In analysing data, we focused on accounts that expressed varying degrees of scepticism, hesitance, reluctance or resistance towards AV1. Our focus has primarily been on the content of school workers' concerns rather than the characteristics of those expressing these concerns, in part because it was quite common even for 'positive' teachers to have some reservations against the robot. In coding and categorising data, then, we sought to identify school workers' most salient reasons for distrusting AV1, focusing in particular on their ideas about 'educational purity' and 'technological danger'. The results of this process are presented in the following section.

Results

We will now reconstruct the webs of significance that inform school workers' scepticism towards AV1. Our analysis is structured according to three key notions of 'educational purity' that school workers consider threatened by AV1, namely the ideals of schools being pedagogically oriented, physically copresent and bounded institutions. As we will show, school workers reach these conclusions about 'technological danger' not by assessing AV1 as an 'individual' technology, but by relating it to more general ideas about how technologies tend to (not) function within the context of schools. In sum, then, our analysis highlights a series of shared beliefs about schools, technologies and the strained relationship between the two.

A pedagogical institution

To begin, AV1 was widely believed to threaten the ideal that schools are, above all, institutions for teaching and formalised learning. The general idea was that if a technological device is to be considered suitable for school, it must work towards pedagogical goals. AV1 was believed to violate this principle in several ways, depending on how the robot was classified. One overarching concern was that AV1 is developed primarily as a *social tool* for school, something many interviewees believed went against the core mandate of schools as institutions. As one teacher explained:

> I think it's strange if a sick person should have social [use] as the only [rationale for using the robot] […] I mean, school is a place for learning. And if the person in question is too tired to participate in learning development, I think we might as well say that 'the third lecture on Friday is reserved for social activities, so you can join us then' and stuff. I mean, I think it's a muddling of what school [should be], if there's one [student] for whom it's just a place to be

socially present, while the others have it decidedly as a place for learning […] For me, it *has* to be a pedagogical tool, otherwise I have problems saying it's important for the school. Not that it's not important for that person [the homebound student], which is a totally different issue. (Interviewee #31)

The teacher here establishes a firm boundary between 'learning' and 'being social', thus, echoing what Dinsmore (2019) refers to as 'the cultural logic of separation': 'a constructed boundary between educational and social time and space in school' (2019, 666). While interviewees differed in how *strongly* they distinguished between these logics, the lack of fit between social tools and teaching situations was a common concern in our sample, especially as the robot is marketed as something to be used in and alongside classroom instruction (as evident, for instance, in the slogan of AV1 being 'The child's eyes, ears and voice in the classroom' (No Isolation 2022)).

Besides its social aim, many interviewees also paused on the fact that AV1 is a *digital technology* for use in classrooms. This led many school workers to relate the robot to their experiences with, and stereotypes about, similar educational technologies, with a common view being that these technologies can be unwieldy and cumbersome to integrate into pedagogical practice. Some focused particularly on the robot's camera features and related these to negative experiences with camera-mediated instruction. Others concentrated on AV1 being a 'robot' and how this might be a demanding tool to master; as one teacher told about her colleagues' reactions: 'Some people heard the word "robot" and were like "Help! How am I supposed to learn *this*?"' (interviewee #26). Underlying these concerns was the belief that the technology might be unmanageable and that tending to the technology's 'needs' might overrule pedagogical concerns. In extension, many also suspected that the robot could prove to be a particularly demanding student, and that this could have a negative effect on the learning outcomes of the *other* students in class. Thus, in light of these widely held beliefs about 'unwieldy' technology, the robot was seen as challenging the teacher's ability to prioritise pedagogical concerns and relate to the class as a group of equals.

On a more explicitly ideologically charged level, a third objection related the robot to a larger narrative about how 'outsiders', such as politicians and market actors, undermine the pedagogical logic of schools more generally. This was particularly emphasized by some of the older interviewees in our sample, who saw the robot as the latest expression of a series of non-pedagogical perversions of schooling. One central reference point for this complaint was the ongoing and large-scale digitalization of Norwegian schools. This was intertextually linked to AV1 in a critical op-ed in the Norwegian magazine 'Utdanningsnytt' [Educational news]:

Digitalization is racing through the public sector, there are no limits to what the technology can do. Sceptics are immediately branded old-fashioned and hesitate to participate in the debate.

One of the new gizmos that is being heavily promoted in school is a digital robot that is to function as a 'peephole' into the classroom for students who cannot attend regular classes at their school due to physical or mental health challenges.

The robot is, thus, seen as an expression of a more general and overly optimistic digitalization of schools. According to our interviewees, this trend was driven by several actors, each with their own non-pedagogical agenda. One frequent reference was politicians and school leaders who might see AV1 as a way of being 'modern' and 'future-oriented':

> If you work a lot with technology in school, you'll see overzealous principals and politicians whose faith in certain tools tends to extend far beyond what the tools in fact offer. […] As evidenced in the case of throwing iPads in the face of all first graders[4], and the like. […] I've seen dread-and-horror examples of how badly prepared such political decisions have often been. Where students are sitting individually at their desks, facing the blackboard, each with their own computer, while the teacher is writing on the blackboard. So that, at the end of the day, these are all pedagogical questions. And not a political or an 'our-municipality-is-at-the-technological-frontier' type [of question]. (Interviewee #31)

This teacher's account highlights several reasons for alarm, including an inflated belief in technological quick fixes and non-pedagogical concerns for municipal identity and prestige. These were all seen as challenging school workers' autonomy, as the supposed 'local' experts on schooling – teachers and other educational workers – are perceived to be over-ruled by a series of non-pedagogically motivated 'non-experts'.

Adding fuel to this fire was the view that the robot was driven by a *commercial* company. As emphasised in a critical op-ed in the Norwegian daily 'Dagbladet':

> This is about unchecked market forces. The entrepreneur behind the robot is motivated by the fact that each year, up to 6000 students have significant sickness absence. It is claimed that the motive is to help.

The robot's producers are here accused of having vicarious motives, seeking financial gain rather than the inclusion of marginalized children. The robot is, thus, seen as symptomatic for the marketization of schools, a central theme in discussions of the commercial drivers behind educational technologies (cf. Selwyn 2013). Some interviewees linked this interpretation to the ad campaign mentioned in the introduction, and especially the fact that these advertisements were aired *before* the robot was officially launched. One principal explained her reaction to seeing these ads for the first time:

> I thought this was a massive ad campaign that this firm had launched without anyone knowing how it's used. There hasn't been any research or anything, you know, and they just shipped them out large-scale. And of course, people got real interested, and then it was going to be implemented in school, just like that – that was my thinking. (Interviewee #30)

As evident, the principal questioned how the producers could market their product so heavily before having any 'evidence' of its effects. This perceived lack of quality assurance led some to believe that the robot was just another commercial product, making the producers' vision seem less like idealism and more like a marketing ploy.[5]

In sum, then, the robot was seen as challenging the primacy of pedagogy in several ways, ranging from practical to more ideological concerns.

A physically co-present institution

Beyond pedagogy, AV1 was also seen as threatening the idea that schools should be places for physically co-present sociality among students. Rather than emphasizing a tension between social and educational needs, the school workers here acknowledged the importance of sociality while questioning the quality of mediated interaction. We see this expressed in the aforementioned op-ed in Utdanningsnytt, where the authors, after having stated that the robot offers few educational benefits, went on to argue as follows:

What we are left with is social participation. But how social is it for a student to be at home or in an institution, cut off from normal interaction, and witnessing, through a small screen, all the things the student in fact cannot be a part of? Should the school, through its choice of tools, rub it in that the student is in a situation where she or he falls short physically because of their health situation?

The op-ed authors, thus, question the value of robot-mediated interaction, stressing how the robot only allows the student to 'witness' (as opposed to 'participate') in interactions, something that might even entail negative psychosocial consequences for its user. In so doing, the authors are echoing widespread beliefs about the second-rate nature of technology-mediated interaction (cf. Baym 2015). Similar references were expressed throughout the interviews. For instance, one teacher conveyed a concern that the robot would entail 'a distance even if you're included' (interviewee #14). Several interviewees also emphasised how this type of distanced participation might even *increase* the loneliness of its homebound users. As one teacher revealed about the discussions she had with her colleagues when they first heard about the robot:

> [People] thought, "Will this just make it so that the [homebound] student sees even more of what they're missing?" – and that looking at what the others are doing would make it harder and more hurtful for the student. I mean, one thing is that you know what you're missing. But here you also get to see what you're missing. And sort of be part of something you're missing. (Interviewee #18)

Following this line of thought, remote co-presence is a fundamentally inadequate form of participation for homebound students. This view is captured by the paradoxical phrase that you can 'be part of something you're missing', an expression conveying the belief that telepresence robots are unable to provide the authentic connection of physical copresence. Indeed, this liminal participation, in which the remote user is neither fully here nor there, might ultimately end up hurting homebound students by making them realize that they are missing out on the 'real' deal. Remote copresence is, thus, seen as an insufficient form of togetherness for the students in question, which should never come at the expense of physically copresent options (e.g. home visits).

That said, we should note that opinions about tele-present interaction differed amongst our interviewees. For instance, some claimed *not* to be worried about homebound students interacting remotely, as physical co-presence was never an alternative for these students to begin with. Others expressed a middle ground position in which the homebound students' experiences were seen as likely to vary with personal factors, such as their degree of introversion and 'sensitivity', thus, articulating a different discourse about the relationship between technology and 'proper' participation.

Regardless of their general stance, however, most of our interviewees tended to agree that remote participation was particularly high-risk in cases of so-called 'school refusal'. More than a distinct group of students, 'school refusal', as used by our interviewees, is better understood as a fuzzy-set category comprising students who, for various anxiety-related reasons, have difficulty attending school. Many school workers expressed significant scepticism towards the use of telepresence robots by this category of students, as they believed the best treatment for school refusal is to be exposed to the physical school environment. One reason for this emphasis, according to a principal we interviewed, is that being physically copresent in school is crucial for becoming a well-functioning citizen:

> You know, school … One thing is what you learn academically, during lectures. But that's, at best, only half the point of going to school. The other half is [learning] social interaction with others […] To develop interaction skills, as we call it, is incredibly difficult. I mean, it requires so much practice, so much feedback. And this cannot be accomplished from home. And what we see time and again is … Those in society who didn't manage to become good citizens – you know, those who's sitting in their basements full of resentment, those who commit acts of terrorism, or who end up on the dole – when you look back, there's always a combination of them not mastering basic academic skills, and also that they didn't get to grips with the social [aspects]. Like, they were bullied and excluded, or they didn't manage to get a friend or function with others. So evidently, school is crucial to sort of get the best out of people. (Interviewee #12)

In this account, the idea of 'school' is treated as synonymous with *physically co-present schooling* and opposed to being at 'home'. Physically co-present schooling is, in turn, linked to ideas of interactional competency and becoming a 'good citizen' (i.e. someone who functions successfully within the conventional parameters of society). Conversely, in lieu of co-presence and the development of such social skills, students risk various forms of marginalization, expressed through the principal's references to ideas about 'internet trolls', 'welfare recipients' and 'terrorists'. Seen within this symbolic nexus, the dangers of telepresence become particularly clear.

We, thus, see how school workers – in various ways and with various degrees of worry – expressed scepticism towards the 'compromised' form of participation that AV1 was believed to offer. Their accounts build on a widespread idea of schools being physically co-present institutions, in which physical copresence is linked to formative concerns of developing social skills and becoming a well-functioning citizen. A central reason why AV1 was considered 'out of place' (Douglas 1966), then, is because it was seen as endangering these fundamental concerns.

A bounded institution

The third and final principle threatened by AV1 was the idea of schools as bounded social systems. School workers here put less emphasis on the primacy of pedagogy or physically co-present togetherness, and more emphasis on the value of schools being 'sheltered' environments in which actors can engage in *locally* defined interactions, whose scope and consequences can be predicted with relative certainty by the involved parties. Our interviewees particularly stressed how 'boundedness' was threatened by the robot's broadcasting functionality. Taking inspiration from Goffman (1982), the robot was believed to create what we dub *porous situations*, in which the presence of communication technology creates uncertainty about the scope of a co-present interaction, thus, raising questions such as 'who participates?' and 'on what premises?'[6]

'Porousness' was seen as problematic for several reasons, many of which pertain to the consequences this might have for the students in school. School workers here related the robot to their ideas about how technologies intersect with the social dynamics of childhood, with a central reference point being the (mis)use of social media by pre-teen and teenage students.[7] Many interviewees stressed the risks of AV1 being integrated into a broader ecosystem of apps and platforms that encourage sharing of video and images, thus, leading homebound students to use AV1 to secretly photograph or record their classmates. As phrased in the op-ed in Dagbladet, the robot could serve as 'a peephole into a space where

students are to try and fail, be educated and formed', thus, posing a threat to the safety of students' learning environment. This was considered both a general concern and a particular hazard when linked to ideas about 'vulnerable' students, such as those who experience bullying or live under protection from a parent or relative. Although not stated directly, these risks were also perceived to be higher at schools with a greater degree of 'social' problems, as evidenced in interviews with those who worked at 'well-ordered' schools (as one teacher told us, she had little problem accepting AV1 because 'we find that we have a lot of … disciplined students, you know – little vandalism, few dropouts, little need to engage in mischief' [interviewee #24]).

In addition to students' learning environment, the robot's 'porousness' was also considered a threat to *teachers'* working environment. Besides the abovementioned risks of being recorded by a homebound student, many referenced a fear that the homebound student's *parents* might use the robot to scrutinize their actions in the classroom. This threat was deemed particularly high when linked to ideas about 'critical parents', a (stereo)type considered especially likely to seize on the opportunity to monitor teachers (and create trouble if they see something they are opposed to). Such a possibility was considered a further threat to teachers' autonomy, as it would allow for auditing by yet another 'outsider' without sufficient insight into the everyday workings of school.

Lastly, the possibility of recording and sharing content was also linked to ideas about *legal risk*, especially by the principals we talked to, as these are the ones who are held legally accountable for what goes on in school. For instance, some principals highlighted how AV1 might enable outside actors to learn about problematic situations in schools. As one principal explained:

> As principal, you're legally responsible for everything that happens in a school […] If a situation arises, then it's sort of my responsibility, 'What did you, as principal, do to prevent this from happening?' […] I mean, let's assume as a worst case that someone, via this robot, sees one student knock down another student. And there are pictures taken or … rumours start spreading. Parents hear about it. 'What did you do to prevent this?', 'How did it come to this?', 'We've heard that someone saw a live feed of students being knocked down at your school'. (Interviewee #28)

As the principal here filters AV1 through his beliefs about the everyday politics of schooling, he conjures images of how the robot might complicate his work in terms of public exposure and accountability.[8] In addition, several principals highlighted how broadcasting carries legal risk on its own by raising a series of privacy concerns. This was considered a particularly salient issue at the time of our data collection, as this was when the EU's General Data Protection Regulation (GDPR) came into effect. Several interviewees highlighted how the GDPR had made them more risk-averse, as they could not say exactly what was legal or illegal when it came to streaming technologies like AV1 yet knew that violations of the GDPR's rules might lead to significant fines and a damaged reputation. Thus, when linked to the ambiguous and alarming symbol of 'GDPR', the robot was perceived as a risk of *unknown* scope. Accordingly, many principals found it tempting to simply refuse its use in schools, thereby avoiding the problems associated with its porous situations.[9]

Discussion

This article set out to understand scepticism towards new technologies in school, using reactions towards the communication device 'AV1' as its case. Building on our concepts of

'educational purity' and 'technological danger', our analysis has revealed school workers' scepticism to be entangled with a series of shared beliefs about schools, technologies and the strained relationships between the two. Specifically, we find that AV1 is believed to threaten widespread ideals of schools being pedagogically oriented, physically co-present and bounded institutions, a series of concerns that reflect broader ideas about schools and schooling and how technologies tend to (not) function within this context.

In closing, we will now discuss some conceptual and normative aspects of our findings, respectively. Concerning the former, we begin with some reflections on the relationship between our case and the concepts of 'educational purity' and 'technological danger'. Our study has explored reactions to a particular *technology* (AV1) by specific *actors* in a specific *context* (school workers in a Norwegian, publicly funded school system). Accordingly, studies into reactions to other technologies by other actors in other contexts should expect to find somewhat different ideas about both educational purity and technological danger. That said, there are reasons for believing that our analysis sheds light on widespread ideas that can help us understand scepticism towards technologies in education more generally. For instance, concerns for pedagogical primacy were expressed already by Young (1984) and have later become a recurring theme in studies where school workers criticize digital technologies for overriding pedagogical concerns (Cuban 1986; Philip and Garcia 2015; Winner 2009). The importance of physically co-present sociality has been a recurring concern in debates about distance education (cf. Brennan 2020), and is also a dominant notion in Western discourse about interaction, sociality and togetherness, where mediated interaction is typically considered second-rate compared to the 'gold standard' of face-to-face interaction (Baym 2015; Cerulo 1997). Concerns for schools as bounded social systems is also a recurring topic in studies of education and technology, as evidenced, for instance, in discussions of how mobile phones break down physical barriers (Selwyn 2003) and challenge established power structures in schools (Peck et al. 2015; Selwyn et al. 2017). We therefore see our analysis as highlighting common beliefs about schools, technologies and the strained relationship between the two.

Another important caveat concerns the heterogeneity of ideas in our sample. Our analysis must not be read as suggesting that all school workers interpreted AV1 similarly, drawing on the exact same ideas about educational purity and technological danger. On the contrary, our interviewees differed widely in which ideals they emphasised the most and in the extent to which they emphasised them. This is of course to be expected, as school workers are a heterogenous cultural group, comprising contrasting and even contradictory beliefs that can support myriad reactions to new technologies.[10] What we have sought to achieve with our analysis, therefore, is not to show that all school workers interpreted AV1 in exactly the same terms, but rather to present the sum total of concerns that made our interviewees sceptical towards the robot.

Related to homogeneity, we must also point out that not all school workers were equally worried about 'technological danger'. In fact, several school workers spoke more in terms of technological opportunities and benefits, referencing ideas about vulnerable students, the importance of inclusion and the exciting prospects of new technologies to emphasise how AV1 could be a much-needed tool for homebound students. Such interpretations reveal different ideas about both schools and technology, emphasizing a more symbiotic relationship between the two, and should be subject to further investigation. Our reasons for downplaying these ideas in this article, however, is that our aim is to understand school workers'

scepticism towards new technologies. We consider this an important analytical focus, as analyses of ambivalence, scepticism and resistance can help shed light on the 'contested and contradictory realities of technology use within educational settings' (Selwyn 2010, 67).

In sum, then, we do not claim to cover all 'webs of significance' that characterise school workers' reactions to new technologies, nor that all school workers interpret technologies in the same way. Instead, our study identifies a series of shared beliefs that explain why *some* school workers express scepticism towards technologies *like* AV1. In other words, our analysis sheds light on *salient* ideas about educational purity and technological danger, thus, providing a foundation for other studies to build on so that we can better understand reactions to new technologies in school.

Moving on to the normative issues, we would like to focus more closely on the empirical findings of this article and take up Selwyn's critical-constructive advice that sociologists should seek 'to identify, highlight and *overcome* the many contradictions and conflicts that surround the use of technology in educational settings' 2017, 71; our italics). To that end, we close with some constructive reflections on school workers' beliefs.

First, we emphasize the rationality of school workers' scepticism. Our interviewees are clearly acting based on reasons they consider *good*. As analysts, we too find merit in their arguments. There is no arguing, for instance, that technologies can interfere with pedagogical goals (cf. Winner 2009), that much educational technology is driven by commercial forces (cf. Williamson 2022), or that communication technologies contribute to 'context collapse' (Brandtzaeg and Lüders 2018) and might, thus, create significant uncertainty among its users. Normatively speaking, then, scepticism might be a healthy impulse when faced with new technologies, as this can serve to protect important values in school, including pedagogy and wellbeing.

Second, however, we also see two potentially problematic aspects with school workers' scepticism. For one, in light of our empirical focus on pre-experiential sensemaking, we must remember that the school workers are drawing on general beliefs about schools and technology to make sense of a new artefact. In other words, they are not assessing AV1 itself, but an amalgam of second-hand information, experiences with supposedly similar technologies and more general beliefs about how technologies tend to (not) function in educational settings. As with stereotypical reasoning more generally (cf. Birkelund et al. 2020), the school workers' reasoning risks overlooking the 'individual' characteristics of the technology in question; that is, how various aspects of the robot (e.g. its drivers, users and uses) might differ from the more well-known technologies they compare it to.

The dangers of such stereotypical reasoning tie in with another problematic point: that AV1 is a relatively rare example of a digital tool that seeks to 'empower otherwise subordinated groups' (Selwyn et al. 2016, 158). The robot is designed for homebound students who, in being unable to attend school physically, are 'removed from a social context that constitutes four to six hours of their daily lives' (Newhart, Warschauer, and Sender 2016, 9). The educational and social costs of this can be high, as these students are likely to 'fall behind in instruction, feel isolated from their peers and experience loneliness and depression' (Newhart, Warschauer, and Sender 2016, 9). As we document elsewhere (Johannessen, Rasmussen, and Haldar 2023), the robot can lessen this predicament by offering an immersive link to these students' schools, thus, counteracting their feelings of loneliness, missing out and being forgotten, while also offering them the possibility to partake in classroom instruction and interaction.

Seen in this light, AV1 represents a pressing normative dilemma between homebound students' need for inclusion and school workers' concerns for pedagogy, co-present sociality and boundedness. While it is beyond our scope and expertise to solve this dilemma, we believe some guidance can be found in what Smits (2006) refers to as a 'pragmatic monster ethics'. 'Monsters' here refer to technologies that threaten an established symbolic order, whereas a 'pragmatic monster ethics' pertains to how we, as a society, should approach such threats. Concerning the latter, Smits advocates for a strategy of 'monster assimilation' in which we 'develop, renew and differentiate our cultural categories as well as our technologies, so as to have them fit into a new order' (Smits 2006, 503). In other words, the goal is a mutual adaption of both technologies and cultural assumptions, so that we reassess 'not only the monster but also the cultural categories by which it is judged' (Smits 2006, 501). Applied to AV1, this would translate into a suggestion for both school workers and the robot's producers to reconsider their assumptions about the technology in order to reach a more stable compromise about its design and use.

In closing, we note the possibility that the COVID-19 pandemic has helped reduce tensions between schools and AV1, as the pandemic resulted in an unprecedented adoption of digital tools in teaching. This might have decreased the scepticism of many school workers, as actual use experience might have put many critical assumptions to rest. At the same time, we urge caution against making technologically deterministic readings of school workers' pandemic experiences, as their new-won experiences have likely led to the decline of some stereotypes and the proliferation of others. For instance, we have seen an increased disregard for 'hybrid teaching' (cf. Shah 2021) that might fuel future scepticism towards AV1.

In light of such potentially contradictory developments, we encourage further studies into the cultural conflicts surrounding technologies in education. By identifying tensions and contradictions, such studies can 'foster and support issues of empowerment, equality, social justice and participatory democracy' (Selwyn 2010, 68), thus, working towards more inclusive and just use of technologies in educational contexts.

Notes

1. 'Telepresence robot' is the accepted term for such devices, despite the fact that they lack some features conventionally associated with robots (e.g. the capacity for autonomous action and intelligent behaviour).
2. In contrast to many telepresence robots, AV1 cannot move around on its own; instead, it is designed as a 27 cm tall bust that can be carried around easily by teachers or classmates.
3. Personal phones and computers under the banner of 'bring your own device' similarly blur the distinction between educational and personal media technologies. The two categories themselves can also be said to be blurry; for instance, while educational technology is *meant* for educational purposes, it is well-documented that this too can serve a range of non-educational means (cf. Aagaard 2017).
4. The teacher is here referencing the wide-scale adoption of iPads in Norwegian schools, a phenomenon driven less by national strategies and more by local initiatives from schools and municipalities (Brochmann 2020).
5. Some informants highlighted how this over-optimistic and commercial agenda was supported by a third actor, the parents of the homebound student. While the informants expressed understanding of parents being willing to do 'everything' for their child, they also emphasized the need to balance concerns for the one homebound child with the needs of the many students in class (another expression of universalistic ideals).

6. This concern is discussed more fully in Johannessen (2023), which focuses more closely on teachers and how they speculate on the consequences of having a robot in their classroom.
7. It should be noted that the robot's producers have made it impossible to screenshot or record the video stream. However, a common objection was that students could easily work their way around such restrictions.
8. The principal's concerns can seem quaint in light of how most students are already in possession of smartphones. However, his account can be read as expressing a worry that the power balance would be shifted even *further* away from the principal by *yet another* camera technology being introduced in his school.
9. Besides perceived risk, some principals highlighted how legal issues could lead to significant amounts of paperwork, which made them further reluctant to adopt the robot. Disdain for 'paperwork' can be read against the widespread discourse that time has become an increasingly scarce resource in schools. "Will it waste time?" therefore stood out as a pressing question for many of the school workers we interviewed.
10. This emphasis on heterogeneity must not be taken to suggest that there are no similarities in school workers' belief systems. After all, these are people who occupy a shared environment, engage in role-specific interactions, face similar expectations, and share their experiences with each other in conversations and rituals. As a result, they tend to develop similar ways of understanding the world, albeit with distinct and often conflicting variations (cf. Friedland and Mohr 2004).

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References

Aagaard, J. 2017. "Breaking down Barriers: The Ambivalent Nature of Technologies in the Classroom." *New Media & Society* 19 (7): 1127–1143. doi:10.1177/1461444816631505.
Alexander, J. C. 2003. *The Meanings of Social Life*. Oxford: Oxford University Press.
Baym, N. K. 2015. *Personal Connections in the Digital Age*. 2nd ed. Cambridge, UK: Polity.
Birkelund, G. E., L. E. F. Johannessen, E. B. Rasmussen, and J. Rogstad. 2020. "Experience, Stereotypes and Discrimination. Employers' Reflections on Their Hiring Behavior." *European Societies* 22 (4): 503–524. doi:10.1080/14616696.2020.1775273.

Brandtzaeg, P. B., and M. Lüders. 2018. "Time Collapse in Social Media: Extending the Context Collapse." *Social Media + Society* 4 (1): 205630511876334. doi:10.1177/2056305118763349.

Brennan, K. 2020. "I miss my classroom: 4 things that distance learning cannot replace". *SchoolRubric*. Accessed 26 May 2022. https://www.schoolrubric.com/es/i-miss-my-classroom-4-things-that-distance-learning-cannot-replace/

Brochmann, G. 2020. "*De digitale prøvekaninene: Historien om hvorfor barnet mitt plutselig kom hjem med en iPad i skolesekken.*" 1. utgave. Oslo: Cappelen Damm. Accessed 27 May 2022. https://www.nb.no/search?q=oaiid:"oai:nb.bibsys.no:999920085783302202"&mediatype=bøker

Cerulo, K. A. 1997. "Reframing Sociological Concepts for a Brave New (Virtual?) World." *Sociological Inquiry* 67 (1): 48–58. doi:10.1111/j.1475-682X.1997.tb00428.x.

Cuban, L. 1986. *Teachers and Machines: The Classroom of Technology Since 1920*. New York: Teachers College Press.

Dagbladet. 2017. "Skal vi tillate videoovervåking i norske skoler?" Accessed 21 June 2021. https://www.dagbladet.no/kultur/skal-vi-tillate-videoovervaking-i-norske-skoler/66922647

Dinsmore, B. 2019. "Contested Affordances: Teachers and Students Negotiating the Classroom Integration of Mobile Technology." *Information, Communication & Society* 22 (5): 664–677. doi:10.1080/1369118X.2019.1568518.

Douglas, M. 1966. *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*. London: Routledge.

Efe, H. A., and R. Efe. 2016. "Swiss and Turkish Pre-Service Science Teachers' Anxiety Levels for Educational Technology." *Journal of Education and Training Studies* 4 (7): 195–205. doi:10.11114/jets.v4i7.1492.

Friedland, R., and J. Mohr. 2004. *The Cultural Turn in American Sociology. Matters of Culture: Cultural Sociology in Practice*, 1–68. Cambridge: University Press Cambridge.

Geertz, C. 1973. *The Interpretation of Cultures. Selected Essays.* New York: Basic Books.

Goffman, E. 1982. *Interaction Ritual: Essays on Face-to-Face Behavior*. New York: Pantheon Books.

Henderson, J., and M. Corry. 2021. "Teacher Anxiety and Technology Change: A Review of the Literature." *Technology, Pedagogy and Education* 30 (4): 573–587. doi:10.1080/1475939X.2021.1931426.

Howard, S. K. 2013. "Risk-Aversion: Understanding Teachers' Resistance to Technology Integration." *Technology, Pedagogy and Education* 22 (3): 357–372. doi:10.1080/1475939X.2013.802995.

Johannessen L. E. F. 2023. "Anticipated Affordances: Understanding Early Reactions to New Technologies." *New Media & Society* 0(0): 1–18. doi:10.1177/14614448231161512.

Johannessen, L. E. F., E. B. Rasmussen, and M. Haldar. 2023. "Student at a Distance: Exploring the Potential and Prerequisites of Using Telepresence Robots in Schools." *Oxford Review of Education* 49 (2): 153–170. doi:10.1080/03054985.2022.2034610.

Joo, Y. J., K. Y. Lim, and N. H. Kim. 2016. "The Effects of Secondary Teachers' Technostress on the Intention to Use Technology in South Korea." *Computers & Education* 95: 114–122. doi:10.1016/j.compedu.2015.12.004.

Merton, R. K. 1948. "The Self-Fulfilling Prophecy." *The Antioch Review* 8 (2): 193–210. doi:10.2307/4609267.

Newhart, V. A., M. Warschauer, and L. Sender. 2016. "Virtual Inclusion via Telepresence Robots in the Classroom: An Exploratory Case Study." *The International Journal of Technologies in Learning* 23 (4): 9–25. doi:10.18848/2327-0144/CGP/v23i04/9-25.

No Isolation. 2022. "AV1 - The child's eyes, ears and voice in the classroom." Accessed 6 March 2020. https://www.noisolation.com/av1

Oltmann, S. 2016. "Qualitative Interviews: A Methodological Discussion of the Interviewer and Respondent Contexts." *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 17(2). doi:10.17169/fqs-17.2.2551.

Peck, C., K. K. Hewitt, C. A. Mullen, C. Lashley, J. Eldridge, and T.-R. M. O. Douglas. 2015. "Digital Youth in Brick and Mortar Schools: Examining the Complex Interplay of Students, Technology, Education, and Change." *Teachers College Record: The Voice of Scholarship in Education* 117 (5): 1–40. doi:10.1177/016146811511700505.

Philip, T. M., and A. Garcia. 2015. "Schooling Mobile Phones: Assumptions About Proximal Benefits, the Challenges of Shifting Meanings, and the Politics of Teaching." *Educational Policy* 29 (4): 676–707. doi:10.1177/0895904813518105.

Revilla Muñoz, O., F. Alpiste Penalba, J. Fernández Sánchez, and O. C. Santos. 2017. "Reducing Techno-Anxiety in High School Teachers by Improving Their ICT Problem-Solving Skills." *Behaviour & Information Technology* 36 (3): 255–268. doi:10.1080/0144929X.2016.1221462.

Selwyn, N. 2003. "Schooling the Mobile Generation: The Future for Schools in the Mobile-Networked Society." *British Journal of Sociology of Education* 24 (2): 131–144. doi:10.1080/01425690301905.

Selwyn, N. 2006. "High-Tech Soc-of-Ed? Signs of a 'Smart' Sociology of Education Technology." *British Journal of Sociology of Education* 27 (3): 417–426. doi:10.1080/01425690600756509.

Selwyn, N. 2010. "Looking beyond Learning: Notes towards the Critical Study of Educational Technology." *Journal of Computer Assisted Learning* 26 (1): 65–73. doi:10.1111/j.1365-2729.2009.00338.x.

Selwyn, N. 2011a. "Digitally Distanced Learning: A Study of International Distance Learners' (Non) Use of Technology." *Distance Education* 32 (1): 85–99. doi:10.1080/01587919.2011.565500.

Selwyn, N. 2011b. "Editorial: In Praise of Pessimism—The Need for Negativity in Educational Technology." *British Journal of Educational Technology* 42 (5): 713–718. doi:10.1111/j.1467-8535.2011.01215.x.

Selwyn, N. 2012. "Making Sense of Young People, Education and Digital Technology: The Role of Sociological Theory." *Oxford Review of Education* 38 (1): 81–96. doi:10.1080/03054985.2011.577949.

Selwyn, N. 2013. *Distrusting Educational Technology: Critical Questions for Changing Times*. New York: Routledge.

Selwyn, N. 2014a. "Education and 'the Digital." *British Journal of Sociology of Education* 35 (1): 155–164. doi:10.1080/01425692.2013.856668.

Selwyn, N. 2014b. "Making the Most of the 'Micro': Revisiting the Social Shaping of Micro-Computing in UK Schools." *Oxford Review of Education* 40 (2): 170–188. doi:10.1080/03054985.2014.889601.

Selwyn, N. 2021. *Education and Technology: Key Issues and Debates*. 3rd ed. London ; New York: Bloomsbury Academic.

Selwyn, N., and K. Facer. 2014. "The Sociology of Education and Digital Technology: Past, Present and Future." *Oxford Review of Education* 40 (4): 482–496. doi:10.1080/03054985.2014.933005.

Selwyn, N., S. Nemorin, S. Bulfin, and N. F. Johnson. 2016. "Toward a Digital Sociology of School." In *Digital Sociologies*, edited by J. Daniels, K. Gregory, and T. McMillan Cottom, 147–162. Bristol: Policy Press.

Selwyn, N., S. Nemorin, S. Bulfin, and N. F. Johnson. 2017. "Left to Their Own Devices: The Everyday Realities of One-to-One Classrooms." *Oxford Review of Education* 43 (3): 289–310. doi:10.1080/03054985.2017.1305047.

Shah, N. 2021. 'I Feel Half as Successful': Teachers Push to Ban Hybrid Instruction, But Districts Want to Keep It. Accessed 26 May 2022. https://www.politico.com/news/agenda/2021/12/29/teachers-districts-hybrid-education-526214

Simko, C., and J. K. Olick. 2021. "What We Talk about When We Talk about Culture: A Multi-Facet Approach." *American Journal of Cultural Sociology* 9 (4): 431–459. doi:10.1057/s41290-019-00094-7.

Smits, M. 2006. "Taming Monsters: The Cultural Domestication of New Technology." *Technology in Society* 28 (4): 489–504. doi:10.1016/j.techsoc.2006.09.008.

Utdanningsnytt. 2019. Er en robot virkelig elevens beste? Accessed 21 June 2021. https://www.utdanningsnytt.no/teknologi/er-en-robot-virkelig-elevens-beste/141573

Williamson, B. 2022. "Big EdTech." *Learning, Media and Technology* 47 (2): 157–162. doi:10.1080/17439884.2022.2063888.

Winner, L. 2009. "Information Technology and Educational Amnesia." *Policy Futures in Education* 7 (6): 587–591. doi:10.2304/pfie.2009.7.6.587.

Young, M. F. D. 1984. "Information Technology and the Sociology of Education: Some Preliminary Thoughts." *British Journal of Sociology of Education* 5 (2): 205–210. doi:10.1080/0142569840050208.