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Breaking Down Barriers: The Ambivalent Nature of Technologies in the Classroom

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Abstract

This article provides a critical study of the ambivalent nature of educational technology. Departing from the fact that the contemporary classroom is no longer a bounded and discrete space, the article uses ethnographic participant observation to provide thick descriptions of technologies-in-use at a Danish business college. These observations suggest that educational technologies play much more nuanced roles than hitherto imagined. Building on the notion of *spatial imaginaries*, the article explores two complementary patterns of spatial relations in the classroom: Educational technologies open a gateway to the world that can be used both to bring relevant information into the space of the classroom (“outside-in”) and to escape educational activities in favor of off-task activity (“inside-out”). By exploring these twin movements, this article not only hopes to provide a glimpse into the 21st century digitized classroom, but also to showcase the uneasy position of educational technology between burden and blessing.

Keywords

Attention, classroom, connectivity, distraction, education, spatial imaginaries, technology

Introduction: The paradox of educational technology

The last few decades have seen an increasing imbrication of bodies, space, and digital media. Communication theorists have long argued that new media trouble previous conceptions of time and space, and digital media amplify and extend these spatial fluctuations. As the editors of a recent anthology on the mediation of public space have argued, the traditional idea of space as a bounded ‘enclosure’ has become increasingly problematized by digital media distributing data flows that transverse these boundaries (Berry, Harbord & Moore, 2013). Space, in other words, is an imminent field of relations in constant flux. This condition also applies to our contemporary educational system in which sophisticated technologies have become ubiquitous and unremarkable parts of the

classrooms. The exact nature of this imbrication, however, is still up for debate. The research presented in this article is motivated by a concern with the way in which educational technologies are represented in academic literature. As Friesen (2011) has argued, educational technology is a peculiar field of study in which mutually exclusive discourses on technology manage to coexist. As of today, the field is characterized by an uneasy armistice between technological determinism and instrumentalism.

Technological determinism is the idea that “technology causes or determines the structure of the rest of society and culture” (Dusek, 2006: 84). Technology is here cast as an independent agent of development. In close connection with this ‘resistance is futile’ mentality, determinists often make grandiose, but unsubstantiated claims about technological developments (Sacacas, 2013). When it comes to educational technology, such claims often concern the connectivity it makes possible: Lock (2015), for instance, celebrates how the microcosm of the traditional face-to-face classroom has been eclipsed by the contemporary *global classroom*¹: “This new technology-enhanced learning environment provides opportunities for educators to design learning that empowers students to reach beyond local resources and people and to engage in learning *with* and *from* others from anywhere and anytime in the world” (p. 140). Educational technology facilitates learning outside the walls of the classroom (Veira, Leacock & Warrican, 2014), thereby making classroom walls come tumbling down (Weaver, 2005). By dissolving the boundaries that seclude the classroom from the outside world, educational technology ‘enhances’ learning. The contemporary classroom is open (as opposed to closed), global (as opposed to local), and connected (as opposed to isolated). The origin of this change is located in the benevolent force of technology, while students and teachers are its passive beneficiaries. Schematically, the line of causality goes accordingly: Technology → Humans. At the same time, however, technologies are present in the classroom, and on this situated microlevel, technological instrumentalism reigns.

Technological instrumentalism is the idea that human beings have full control over their actions, while technologies function merely as means to privately chosen ends: “A hammer can be used to construct a bookshelf or to bash in someone’s head” (Mitcham & Briggie, 2012: 43). According to this view, a hammer is a tool that can be used for either good or evil, depending upon the intentions of the person employing it. Extrapolating from this simple example, instrumentalists believe that all technologies are neutral tools under human control that can be used for either positive or negative purposes. This is a classical psychological account in which agency is thought to reside entirely within human beings, while technologies are seen as innocent bystanders, neutral intermediaries. “Humans perform *through* the technologies, as it were, to accomplish a deliberate and premeditated change in their social and physical surroundings” (Kiran & Verbeek, 2010: 414). Responsibility for misuse therefore belongs solely to the users of a technology. In the case of educational technology, unintended consequences such as distraction in the classroom are ascribed to internal psychological shortcomings such as deficient self-regulation (David et al., 2015), low abstract reasoning (Chen & Ji, 2015), or lack of academic engagement (Risko et al., 2013) on behalf of the students. Distraction originates *within* students and educational technologies are viewed as mechanisms through which this pre-existing psychological tension is alleviated. Here, the line of causality goes: Humans → Technology.

Succinctly put, the idea of technology as a ‘benevolent force’ currently exists side by side with

an understanding of concrete technologies as ‘neutral tools’. Combined, these discourses lead us to *the paradox of educational technology*: When something good happens, we praise technology; but when something bad happens, we blame the students (occasionally, this blame also extends to their teachers). Already in 1977, Langdon Winner pinpointed and excoriated this paradoxical, split view: “The irony is that both points of view are entertained simultaneously with little awareness of the contradiction such beliefs contain. There is even a certain pride taken in embracing both positions within a single ideology of technological change” (p. 46). Unfortunately, the idea is still prevalent today, as encapsulated in Kevin Kelly’s (2011) recent assertion that, “At a macroscale, the technium is following its inevitable progression. Yet at the microscale, volition rules” (p. 187). In light of the ubiquitous character of technology in today’s educational system, however, such a dual definition is inadequate and unhelpful on both empirical and theoretical grounds (Friesen, 2011). It is just as wrong to ‘technologize’ the benefits associated with the use of educational technologies as it is to ‘psychologize’ the problems. As such, the present article is motivated by the modest goal of turning a *paradox* into a mere *ambiguity*.

A critical study of educational technology

In this article I seek to highlight the complementarity and interdependence of educationally ‘good’ and ‘bad’ processes through a critical study of educational technologies-in-use. I here follow Neil Selwyn, who has long argued for the value of critical and even *pessimist* studies of educational technology. What immediately strikes a person venturing into the academic subfield of educational technology, Selwyn (2011) argues, is the unbridled optimism of many of its claims. Scholars tend to start from the assumption that using educational technology is exclusively beneficial and that the sole challenge facing us is how to best harness its powers. According to Selwyn (2015), much of this discourse is hyperbole or even ‘bullshit’ in the sense of philosopher Harry Frankfurt, which means that it does not set out to lie *per se*, but that it disregards how things really are.

Selwyn (2011) urges us to challenge these prevailing assumptions by taking a pessimist stance. The purpose of a pessimist stance is neither to regard educational technology as a defeatist endeavor nor an *a priori* dismissal of any positive developments, but an increasing acknowledgement of the unintended consequences of using educational technologies. Hence, a pessimist stance rejects both optimistic determinism (‘benevolent force’) and instrumentalism (‘neutral tools’). Specifically, Selwyn’s (2009) critical study of educational technology entails a movement away from so-called ‘state-of-the-art’ research that addresses what *could* and *should* happen in an indeterminate future toward ‘state-of-the-actual’ research that explicates what is *actually* going on here-and-now in the messy realities of our educational system. In this endeavor, researchers should focus on developing nuanced and thick descriptions of present use of educational technology, including compromised and problematic uses. The upshot of such an analysis is to highlight the complex and often ambiguous nature of educational technology. This is what I aspire to do in what follows.

Departing from the fact that the contemporary classroom is no longer a bounded and discrete space, the article uses ethnographic participant observation to provide thick descriptions of technologies-in-use at a Danish business college. These observations suggest that educational technologies play much more nuanced roles than hitherto imagined. Building on the notion of

spatial imaginaries, the article explores two complementary patterns of spatial relations in the classroom: Educational technologies open a gateway to the world that can be used both to bring relevant information into the space of the classroom ('outside-in') and to escape educational activities in favor of off-task activity ('inside-out'). By exploring these twin movements, this article not only hopes to provide a glimpse into the 21st century digitized classroom, but also to showcase the uneasy position of educational technology between burden and blessing.

Without going into theoretical excursions, I should note that my research is indebted to Estrid Sørensen's (2009) work on the materiality of learning and to posthumanist mediation theories (e.g., Latour, 1994, Verbeek, 2005). These writings all strive to overcome the dichotomy between human beings and technologies by recognizing, describing, and analyzing their mutual intertwinement. A basic assumption in mediation theories is that technologies do not just carry human intentions from A to B, but influence, shape, and, and translate whichever intentions they are supposed to carry. As Bruno Latour (2002) puts it, "If you want to keep your intentions straight, your plans inflexible, your programmes of action rigid, then do not pass through any form of technological life. The detour will translate, will betray, your most imperious desires" (p. 252). When technologies are viewed from this meditational perspective, they can no longer be taken as either benevolent forces or neutral tools, but must instead be regarded as active mediators of human perception and action (Verbeek, 2005). I should also interject a note about the terminology of this article: I discuss the use of 'educational technologies'. Employing this phrase upfront, however, tends to signify something particular, namely that the *technologies* in question (e.g., laptops) be used solely for *educational* purposes. As will become evident throughout the article, this is not always the case. It should thus be noted that I use 'educational technologies' as a floating signifier whose semiotic purpose is to enroll the article in a particular field of research.

Method and site

The empirical material presented here is part of a broader study on technological mediation in the classroom. The study is conducted as a long-term, multi-method qualitative inquiry at a large business college in Denmark. A business college is an institution that provides general upper secondary education in commerce covering lines of study that range from global marketing and communication to innovation and event management. Students are young men and women aged approximately 16 to 20 years. This particular college and its institutes are located at three different addresses in a Danish city and employs the technological strategy of letting students bring their privately owned devices to school in a model known as *BYOD*, *Bring Your Own Device*. These devices are all wirelessly connected to the Internet, and laptops by far constituted the majority of educational technologies in the college at the time of data collection, which began in August 2013 and spanned a year and a half.

I initially interviewed six individual teachers about their use of educational technologies. All six teachers kindly agreed to subsequently let me follow their teaching through participant observation (Aagaard & Matthiesen, 2016). Whenever I introduced myself to one of their classes, I explained that I was interested in students' use of educational technology. This would sometimes prompt witty responses like, "Oh, we use Facebook quite a lot". I was very upfront about in fact being interested

in this off-task activity too, but I explicitly and consistently made it clear to the students that I was not a ‘snitch’, i.e., that I did not report back to the teachers. One time, before I had a chance to introduce myself, a couple of the students actually asked me whether I was a new student, so I surmise that my relatively young appearance may have made me blend into the classroom in ways that an older researcher might not have. Situated in the back of various classrooms, I quietly participated in a total of 50 lessons in various courses such as marketing, business economics, and English, while gathering an impression of the contextual embedment of technology, which I documented through handwritten fieldnotes (Emerson, Fretz & Shaw, 2011). After six months of observation, I started interviewing students about their use of educational technology (“how do you use technology in class”, “have you ever used it for off-task activity”, “when do you typically do this”, etc.). The sole selection criterion for participation in the interviews was *volunteering*. This criterion was selected to avoid pinpointing individual students, which could give my observations an inimical aura of surveillance. Each interview lasted for approximately fifteen minutes and 25 students were interviewed in total.

A little backstory to my observations may be illuminating: During my own time as a student, I had the pleasure of becoming a student instructor and teach a class of twenty intelligent, kind, and enthusiastic first-year Psychology students. Over time, however, I began to notice how some of my students would sometimes ‘vanish’ into their laptops and how this would influence the atmosphere of the classroom. The social dynamics of discussions in particular took a hit when people ostensibly vanished into their screens. Simultaneously, however, I was also a student myself and occasionally engaged in the same off-task activities during my own lecture courses. As Dan Hassoun (2015) points out, when critics mourn students’ diminished attention spans, they sometimes forget that being a student at a lecture can be, frankly, a boring experience. I can only echo this sentiment. The following observations thus stem from what Hassoun calls a *schizophrenic position*, “at once in tune with the pedagogical needs of being an instructor and the emotional-attentional flows of being a student listening to lecture” (p. 5). All the names used in the text are pseudonyms.

Entering the classroom

Figure 1: The layout of a typical classroom

Above, I have attempted to illustrate the layout of a typical classroom in the business college. Whenever class begins, a so-called *regional structuring* of the classroom occurs (Sørensen, 2007b): An assemblage of teacher, teacher's desk (with a desktop computer), blackboard, and smartboard constitute a region 'up there', while students seated at desks arranged in rows of tables that face the teacher form a region 'down here', where I am situated myself. As agreed with the teacher and explained to the students, I am positioned at the back of the classroom with a notebook on my lap and a pen in my hand, not directly participating in the educational activities of the classroom. The classrooms are approximately eight by six meters and host up to 32 students seated in rows of eight, which means I sat less than one meter away from the students next to me (designated as D6 and D7 on the illustration). I did, nonetheless, observe students in those seats engage in off-task activity.

When class is in session, students tend to focus either on the activity 'up there' or on each other or their laptops (for better or worse) 'down here'. The rhythmical interaction between these two focal areas means I often slipped out of the students' fields of attention. As Heidegger (2007) notes, human beings are not inert entities in three-dimensional Euclidian space like water in a glass, but caring beings engaged in situations, which means that what is 'closest' to us is not what is at a minimum spatial distance from us, but that with which we are currently engaged. As students were engaged in something else, whether it was listening, note taking, discussing, or Internet shopping, I often felt far away from them despite a small physical distance. It was only when teachers directed attention at me by explicitly addressing me, directing questions at me, or providing me with pedagogic rationales in the form of running commentary that I suddenly felt conspicuous. This open acknowledgement of my presence often felt like the teacher was somehow 'breaking the fourth wall'. Students regularly talked to me and asked me about my project during recess, but in class they seemed to forget my presence. When I believe to have observed activity that was relatively unaffected by my presence in the classroom, it is therefore not because I claim to have performed a kind of *god trick* (Haraway, 1988) of seeing things from nowhere (despite the overhead perspective of my illustration). On the contrary, I believe my particular observations were made possible only *because* of my specific sociomaterial position in the classroom.

Permeable boundaries and spatial imaginaries

Digital technologies have become ubiquitous in our educational system. As one of the students told me, they basically use technology all the time: "We work on the computer, write on the computer, get assignments on the computers, often even get texts on the computer [...] On a day like this I haven't brought a single book, because I exclusively use my computer". As mentioned earlier, this extensive use of digital media makes the technologically equipped contemporary classroom a fluid environment with fuzzy and permeable boundaries that are constantly transversed by flows of data.

In describing the interactions that result from these permeable boundaries, I take inspiration from Estrid Sørensen's (2007a) notion of *spatial imaginaries*, which describe the patterns of relations among humans and learning materials in the classroom. This kind of topological approach looks at space as a web of moving relations that may have nothing to do with geographic terrains or metric distances. Instead, spatial imaginaries help us map out the complex relations between media, space,

and bodies. Indeed, some scholars argue that the strategy of developing such spatial metaphors is “perhaps the only conceptual tool we have for understanding the development of a new technology” (Sawhney, 1996: 293). I will now describe the twin spatial imaginaries of moving *outside-in* (to) and *inside-out* (of) the classroom.

Moving outside-in: Inviting presence

The first situation is an experience I had one Wednesday morning during something as mundane as an English lesson. It is an episode that I suspect that none of the students, and perhaps not even the teacher, will remember today. To me, however, it vividly illustrates educational technology’s ability to bring the world into the classroom.

All students were seated at their desks, while the teacher Leo was meticulously going through English sentences on the blackboard in order to teach the students proper grammar. This is standard practice when teaching English grammar in Danish high schools and colleges. The importance of proper punctuation, for instance, is illustrated by writing “We are ready to eat children” on the blackboard and then, after a brief rhetorical pause, adding a comma so the sentence instead reads, “We are ready to eat, children”. This particular English lesson was about the genitive case in which one adds apostrophe-S (’s) or a preposition (usually *of*) to show possession. During the preceding minutes, Leo had read individual sentences aloud and students then converted these sentences into genitive cases by using the relevant grammar rules. “My mother has a hat”, he would say. “It is my mother’s hat”, a student replied. Back and forth in a steady pace.

Suddenly, after uttering the phrase “My heart belongs to daddy”, Leo hesitated. He had an amused look on his face and it seemed like he was reminded of something, but none of us knew what he was thinking about. “My heart belongs to daddy”, he repeated, hesitated, looked around, and gave us a final moment to make the connection to whichever real-life event this sentence evidently referred. The students looked bewildered. Admittedly, I was equally clueless. Invigorated, Leo turned to the teacher’s desk, where a computer is permanently connected to the smartboard and a set of speakers. He opened the Internet browser, went to YouTube, and typed the sentence “my heart belongs to daddy” into the search bar. He then managed to locate a grainy video clip from the movie *Let’s Make Love* (1960), clicked the link, and for the following two minutes and four seconds, the mediated presence of Marilyn Monroe lit up the screen while her rendition of *My Heart Belongs to Daddy* blared through the speakers. As the video ended, she disappeared from the classroom just as suddenly as she had entered. There was no ensuing discussion of what we had just watched and the transformation of sentences into genitive cases continued without further ado. Leo had no ulterior didactical motive, no hidden pedagogical agenda. Apparently, he merely wanted to share his appreciation for Marilyn Monroe and therefore invited her into the classroom. In fact, nothing groundbreaking seemed to happen in the unfolding of this situation. To me, however, the situation seemed significant for two reasons:

First, the welcome departure from the monotony of English grammar reminded me of a scene from *The Shawshank Redemption* (1994) in which the protagonist Andy rebels against the lethargy of prison life by locking a prison guard in the bathroom and broadcasting a duet from Mozart’s *The Marriage of Figaro* (1786) via the prison’s public address system. Another prisoner, Red, narrates

the situation: “It was like some beautiful bird flapped into our drab little cage and made those walls dissolve away, and for the briefest of moments, every last man in Shawshank felt free”. While I acknowledge the hyperbolic nature of a school-prison analogy (and do not wish to make any direct comparisons between subject positions of students and prisoners), this is similar to what transpired in the classroom in the sense that mediated content can be interpreted as powerfully present in ones sociomaterial circumstances. As eloquently captured in Red’s bird metaphor, this can be understood as a movement *outside-in*.

Second, a sudden impulse made Leo the curator of a spontaneous ‘show and tell’ featuring a clip from the golden age of Hollywood. For the short duration of time that the ensemble of teacher, computer, smartboard, and speakers brought Marilyn Monroe into the communal space of our classroom there were no students present, only an audience. This audience may not have witnessed anything connected to the official school curriculum, but I hesitate to explain away the episode as mere digression, which I think would be an unfeasible and reductive move. Although far from the wuthering heights of Goethe’s *The Sorrows of Young Werther* (1774) or Friedrich’s *Wanderer Above the Sea of Fog* (1818), grasping this kind of pop cultural movie reference may be considered part of the students’ cultural formation, their *Bildung*. In any case, the complimentary positions of curator and audience were made only possible by the presence of educational technologies. When you are connected to the Internet, digital information is instantly accessible at all times. It was thus with some amusement that I later noted that the smartboard was called a Promethean Activboard [sic] after the Greek mythological figure Prometheus, who brought fire to mankind.

At the risk of anthropomorphizing information, I have described a situation that involved Marilyn Monroe, but the entry of factual answers is equally plausible in other everyday scenarios. Such entrances may happen by way of both teachers and students. Indeed, I often witnessed students use information searching strategies to contradict what the teacher ‘up there’ had just said. The teachers in my project often praised this newfound ability of technologically equipped students to keep them on their toes. The teacher Nick spoke in enthusiastic terms about this development:

Nick: When I say that we need to know the economic growth rate in India over the last twenty years, it's amazing how quickly some of my students are able to find this information, because they're so good at information searching. They're seniors and it's international economics. Right away we can get the information up on the smartboard. They just send me the link. It's absolutely fantastic. I need some information, but I outsource the task immediately just by saying so. They think it's fun to find it. It's absolutely fantastic. The negative part is that it has become so damn difficult to get away with little fibs [laughs], because sometimes you get caught when you go, "So and so" and they go, "Hey Nick, that's not true, because it says here that...". They actually google it. So they check up on you, but in a positive sense."

The use of educational technologies allows students to “check up” on the teacher and challenges the traditional educational power structure in which the teacher is the sole gatekeeper of knowledge in the classroom. Ultimately, such invocations of Google and Wikipedia may lead to an unprecedented democratization of knowledge in the classroom. This outside-in movement of information, whether factual or pop cultural, is exactly what is usually cherished about educational technology and in

such cases the use of educational technologies can in fact be said to ‘enhance’ the activities in the classroom. So far, so good. What I seek to challenge next, however, is that this porous membrane only leads to technology-enhanced learning. To quote Ludwig Wittgenstein (2009): ”A main cause of philosophical diseases - a one-sided diet: one nourishes one’s thinking with only one kind of example” (§593).

Moving inside-out: The great escape

I now want to describe the inseparable counterpart to *outside-in*, namely the movement *inside-out*. This particular episode stems from a marketing lesson in the autumn of 2013. The teacher Nick had just assigned some tasks to the students, which he then permitted them to complete in small groups. Students always seemed to appreciate being ‘released’ from the classroom to go work elsewhere (to continue the school-prison analogy). On this day, the working groups spread all over the school, including the cafeteria. It was around noon, so perhaps the idea was to get ahead in line during the forthcoming lunch break. During the group work, I situated myself at a table in a secluded corner of the cafeteria. From this safe distance (which means a few tables away), I followed the work of a five-man group sitting around a large table in the cafeteria. On the side of the table opposite from me, two students each had a laptop. On the other side of the table, the three remaining group members shared two laptops between them. From my position, I witnessed the following scenario play out (below is a digital rendition of a crude sketch from my notebook):

Figure 2: An interaction in the school cafeteria

During the group session, an assignment gave rise to an academic problem, and the five-man group summoned Nick for assistance. While Nick and the two students across from me focused on the group’s tentative answers on one of the students’ laptop screens, the remaining three group members alternated between Facebook and the online betting site Unibet. This activity happened in complete silence. The two students jointly browsing Unibet never shared a word. While these three students were all physically present, it was obvious from where I was sitting that none of them were paying attention to anything educationally relevant at that time, certainly not what Nick and the rest

of their group members were discussing. In fact, they seemed quite preoccupied with their off-task activities. I was actually impressed by the sheer audacity of these distracted students: Nick was literally standing right in front of them and assisting their fellow group members with an academic problem. He could have addressed either of them at any point in time. Fortunately, he did not. When after a few minutes Nick had helped solve the group's problem, he moved along to help the next group, which meant bypassing the pillar in the cafeteria in a curved trajectory and progressing toward the other side of the table (see the sketch). As Nick made this movement, the distracted students reacted instantaneously. Without missing a beat, the two students at the helm of the laptops immediately changed the windows of their screens to academically relevant displays in the form of note documents and the Student Plan. Such a maneuver is no simple reflex, but a skilled response that requires detailed knowledge of laptops and keyboard shortcuts (e.g., Alt-Tab on a Windows computer, Command-Tab on a Mac).

I have picked this particular situation, because it showcases several important aspects of technologically mediated distraction. First, this distraction can be conceptualized as an *inside-out* movement that takes students away from their immediate educational circumstances. Just as laptops and tablets open up the possibility of bringing the outside world into the classroom, they also constitute a backdoor through which students may occasionally escape. As extensively described in the media multitasking literature, this particular multistability presents a major challenge for the educational system (Aagaard, 2015b). The magnitude of this problem is immense, and countless students are quietly and constantly engaged in all kinds of off-task activities. This distraction can be considered a form of *absence-in-class*, which may in fact have the same negative impacts on school outcomes as the more traditional and formalized absence-from-class (Jonasson, 2011). In these situations, the use of educational technologies not so much enhances as it invades, supplants, or displaces learning. This brings me to a second point.

Distracted students may not pay attention to educational activities, but they are not completely absorbed in off-task activity in the sense that they are 'unconscious' of what else is going on in the classroom. There seems to be at least a marginal peripheral awareness at play, which quickly registers physical movement. As such, studying absence-in-class is an elusive and fragile process, and observing it is like trying to observe a mirage: You can gaze at it from a distance, but if you try to approach it, it dissolves and disappears right in front of your eyes. When my observations led to an awareness of my presence, they interfered with the phenomenon. I repeatedly noticed how hard it was for me to observe absence-in-class during group work: As soon as I left my position at the back of the classroom in order to achieve a bigger, better, or just different view of the activities (for example, if groups left the classroom), I suddenly occupied a position that more resembled that of a teacher than a fellow student, which means I no longer escaped students' attention. As I approached a group's table, it was as if they registered a foreign element approaching and thus quickly clicked, toggled, or swiped away from various off-task websites. Without further comparison, I felt like an ethologist who had startled the animals by approaching them too conspicuously. The same process occurred whenever a teacher tried to approach students to obtain a line of sight to their screens. This leads me to a final point about inside-out.

Technological distraction is not a monolithic phenomenon. There are important gender (Kay & Lauricella, 2011), racial (Lee, 2014), and cultural differences (Karpinski et al., 2013) in the use of

educational technologies. Apart from such contextual factors, there are also sociomaterial issues at stake: When it comes to distraction, concealment is key. The regional structure of the classroom means the teacher ‘up there’ only has visual access to the back of a sea of screens. As such, the teacher’s only clue to the content of these screens is the students’ body idioms, facial expressions, and verbal comments. As Lindroth (2012) argues, “While it is an excellent tool for work, the laptop is also a resource for great entertainment, but from the opposite side of the screen it is hard to know which” (p. 140). Teachers occasionally tried to circumvent this issue by taking a few steps down the aisle to inspect students’ screens ‘down here’, but they rarely proceeded all the way to the back end of the classroom. As such, distraction was often most severe amongst the undisturbed ‘boys in the back row’ who chatted, played games, or looked at animated Graphic Interchange Format (GIF) images.² In contrast to the boys in the back row, students in the front rows are positioned in a kind of *perpetual panoptic field*, always potentially viewable by the teacher (Hassoun, 2015). Whenever a teacher approaches, these students will immediately switch to academic-looking Word documents or the Student Plan so that the teacher does not catch a glimpse of the off-task activities, but this constant alertness means these students never stray quite as far from the perimeters of the classroom as the boys in the back row. When it comes to distraction, the materiality of the classroom matters.

Discussion

From an educational perspective, it should now be clear that two complementary processes are at stake in the use of educational technologies: First, there is the movement *outside-in* of information, which offers genuinely new learning opportunities. Simultaneously, however, students often move *inside-out* of the classroom through engagement with irrelevant websites on their digital devices. This departure presents a major challenge to the educational system. Hence, while it is undoubtedly true that introducing technologies in the classroom has brought a lot of educational benefits, there are noteworthy downsides and drawbacks to this technological development.

Combined, the twin movements of outside-in and inside-out dissolve the paradox of educational technology. As a counterweight to current optimistic determinism and *technofetishism* (Hasse & Tafdrup, 2013), it is suggested that educational technologies are multistable and act as gateways both *into* and *out of* the classroom. As such, educational technologies are not susceptible to linear logics of cause and effect, but instead give rise to plural ramifications and simultaneous movements in opposite directions. The argument against technological instrumentalism is subtler. Recall that in the instrumentalist narrative an educational technology fulfills a pre-existing desire, suggesting that distraction is ultimately a matter of subjective volition. While I never encountered any teachers who preached about the infallible wonders of technology (i.e., optimistic determinism) in practice, I did encounter the instrumentalist narrative. Leo, for instance, had the following to say about distraction:

Leo: Of course it's negative when students are using it for something else than what's going on in an English or a French lesson. That is negative. But making it look like students are fleeing from the lesson because technology's available, I think that's wrong. Because I think that oftentimes they would've fled from the lesson anyway. It might be that it's more tempting now, because you can go look at Facebook or you can go on YouTube – I don't think they do that,

however, because after all I would be able to see it if they were wearing earplugs, right? But that they're on Facebook to send a message or something... Of course it's negative, but as a teacher you can't prevent students from letting their mind wander, and I did that myself when I was in high school. You'd just sit there and look out of the window or write your signature two hundred times or something like that.

Leo seems to argue that technologically mediated distraction is identical to historically previous ways of being distracted such as vacantly staring out of the window or absent-mindedly doodling on a piece of paper. According to this explanation, technologically mediated distraction is an epiphenomenon entirely attributable to internal psychological mechanisms (a matter of “letting ones mind wander”). Educational technologies make no difference, Leo argues, because the students “would’ve fled from the lesson anyway”. While not denying that distraction has always been part of the classroom, I want to challenge this instrumentalist idea by emphasizing that the sudden impulses to summon Marilyn Monroe or depart to the land of social media arise only in conjunction with our technologically mediated ability to do so. These goals do not exist in isolation from educational technologies, because “technologies co-shape our ability to even catch a glimpse of such goals, and therefore also *set* them as goals” (Kiran & Verbeek, 2010: 418). Technologies are not powerless, inert things, but introduce qualitatively new kinds of distraction, which cannot be reduced to pre-existing humanist problems (Aagaard, 2015a). Leo even acknowledges this idea when he admits that Facebook and YouTube make it more “tempting” to flee from a lesson.

While I have thus far highlighted the interdependent origins of outside-in and inside-out, I now wish to focus on their performative differences in the classroom: The outside-in movement is part of a *communal* experience that requires content curation, while the inside-out movement enacts an *individual* experience that involves content concealment. In the first situation, we see a one-to-many relationship in which students, teacher, and myself all face the smartboard. The smartboard thus constitutes a region to which our collective attention is drawn. Furthermore, the volume of the video is turned up, so everybody in the classroom is engaging with the same phenomenologically public sounds streaming out of the speakers. This alignment of bodies and directional orientation of attention makes this experience communal. In this situation, a teacher wanted to show us something (“look, guys”), but a similar process occurs when a student curates content from the Internet to supplement or contradict fellow students or the teacher (“listen, guys”). External information is enrolled in favor of the here-and-now situation in the classroom. In the second situation from the cafeteria, however, we see multiple one-to-one relationships between distracted students and their laptops. All sounds have been muted, so the only things that matter are manipulation of keyboards and private visual perspectives on screens. Instead of being joint reference points, the screens become individual gateways leading from the educational situation here-and-now to the outside world (of course, what happens in this outside world is emphatically communal, which may be the reason social networking sites like Facebook and Twitter are so tempting). This movement enacts an antagonistic student-teacher relationship in which the teacher becomes a watchful eye from whom students must conceal their activities. Hence, from an educational perspective, the *lines of attention* involved in these two situations are quite different (Sørensen, 2013). Notice that such lines

of attention do not hinge on purely mental processes, but that several things are involved in each configuration: Bodies, chairs, tables, sounds, keyboards, pillars, and screens.³

It is of course true that students also read articles and books, which in a phenomenologically very real sense can also be said to transport them inside-out of the classroom (Gerrig, 1993). A major difference between paper and pixels, however, is that the *typographical fixity* (Eisenstein, 1980) of printed pages in a book ensures that students work with identical readings and thus cannot stray far from the educational territory prescribed by the teacher. Sørensen (2009) describes a reading situation accordingly: "Because the exercise books were identical, the class set performed one homogeneous region, even though each child had his or her own book. This homogeneity limited the degree to which the exercise books formed an extension of the classroom. All pupils were active in the same region of the exercise books, so to speak, and thus the teacher could keep a one-to-many relationship with the children, even when they were working individually and even when she was relating to them one-by-one" (p. 162). Books enlarge the space of the classroom. The movement inside-out, then, may be reserved to the distractive use of educational technologies.⁴

The big question, naturally, is whether it is possible to mitigate the downsides and drawbacks of educational technologies. Is there a way to filter out 'good' from 'bad' movements? Simply banning laptops in the classroom seems unhelpful, since this initiative also removes outside-in movements of useful information in the classroom. What about blocking specific websites such as Facebook and other social media? In my school, teachers told me that tech-savvy students typically found ways around these barriers. Furthermore, specific websites tend to become outdated at a quick pace. Instead, it may be relevant to look for alternative ways to handle these challenges. Taking seriously the notion of educational technologies as *gateways* to the outside world suggests at least one other way: Occasionally closing the metaphorical door to the world. This means situational prevention of the use of educational technologies and could for instance entail shutting the lids of laptops during certain parts of a lesson (e.g., teachers' talks or classroom discussions). Such a maneuver obviously implies a brief elimination of both inside-out and outside-in movements, but during my fieldwork I actually saw this type of open/closed policy implemented with some success in the recurring fight against classroom distraction (Aagaard, 2015a). Or, if being distracted means not partaking in the *communal* activities of the classroom, perhaps students would be less distracted if their screens and/or keyboards were all connected to the classroom's smartboard? In this way, they could all view and work on the same material. The open/closed policy is imperfect (I often observed students using smartphones beneath their desks during these sessions) and the smartboard proposal is speculative, but if any hard-and-fast solutions to technological distraction actually existed, I am sure they would already be in place.

Conclusion

This article provided a critical study of the ambivalent nature of educational technology. Through the use of thick descriptions of technologies-in-use at a Danish business college, it troubled prevailing discourses on educational technology that lead to the *paradox of educational technology*: When something good happens, we praise technology; but when something bad happens, we blame the students. The article instead suggested that educational technologies open a gateway to the

world that can be used both to bring relevant information into the space of the classroom (outside-in) and to escape educational activities in favor of off-task activity (inside-out). In both of these processes, educational technologies act neither as deciding factors nor as neutral tools. There is no paradox of educational technology, only educationally ambivalent ramifications that are prompted by the connectivity afforded by educational technologies. I hope to have sketched out a common ground between existing research on “technology-enhanced learning” and “multitasking”.

The twin dynamics of outside-in and inside-out have profound implications for the educational system. Indeed, these spatial imaginaries challenge the word ‘school’ itself with its etymological roots in Greek *skhole*, which means “a holding back, a keeping clear” and refers to the traditional status of schools as privileged in their seclusion from the rest of society. Humans and technologies are now jointly capable of breaking down all the barriers associated with the traditional classroom. According to this article, such barriers should not be conceptualized only as *limiting* barriers that confine educational activity to the cramped space of the classroom, but also as *protective* barriers that seclude educational activity from the hustle and bustle of the surrounding world. As educators, researchers, and scholars, it is thus imperative that we recognize these changed spatial dynamics invoked by the use of educational technologies and discuss what they mean for our contemporary educational system. Such a discussion concerns not only the pros and cons of using educational technology, but ultimately connects with larger questions of purpose in education (Biesta, 2008): What do we want our classroom interaction to be like? As one anonymous reviewer put it, “This discussion involves teachers, students, and technologies, but also the idea of the school as such”. It is hoped that the empirical and conceptual contributions of the present study will help promote such discussion.

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Notes

1. Although she does not refer to it, Lock’s term is reminiscent of McLuhan’s (1964) notion of a *global village*, which describes how communication technologies have ‘electrically contracted’ the world into a single village by abolishing time and space.
2. The advantage of such animated GIFs is that they are purely visual gags requiring no sound to be understood, which means that they are easier to conceal than videos that have to be muted.
3. With regards to sociomaterial lines of attention, it is worth noting that the word ‘screen’ itself means both showing/projecting and hiding/protecting (Introna & Ilharco, 2004).
4. Of course, additional distractive dynamics such as *inside-inside* in which students communicate with each other inside the classroom by passing notes or sending messages may also exist, but

such dynamics fall outside the scope of the present article.

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