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Smartphones in Classrooms: Reading, Writing and Talking in Rapidly Changing Educational Spaces

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With the introduction of the mobile internet, human sociality is undergoing massive changes. Smartphones are small, flexible and powerful resources at the core of human sociality in an increasingly connected society. The number of smartphones in the world is estimated to be approximately 4 billion, and steadily increasing. Already in 1982, Walter Ong wrote his brilliant and much-cited *Orality and Literacy*. It quickly became the bedrock of the understanding on how literacy has fundamentally changed human societies. The book has the subtitle *The Technologizing of the Word*. At the time of writing, Ong did not know that 35 years later, literacy would take its next big step in changing oral sociality, with the massive introduction of text and image-based screen-mediated interaction.

Today, smartphones are ever present and used in multiple ways; communicating with friends, colleagues and family, presenting oneself on social media, planning daily activities, seeking information, entertainment, paying bills, navigating the car and many other everyday activities. Opinion-makers have fully realized and deployed, to the regret of democratic societies, the power of smartphones as a media for influencing attitudes via social media, e.g. Facebook, Instagram and Twitter. In short, in less than ten years smartphones have become what seems to be a fundamental and constitutive aspect of human interaction in many settings, including education.

Against the background of the rapid rise in the use of smartphones, screen use has also been the object of moral discussions, where many people advocate norms about mobile free zones in some social domains like, for example, work meetings, at the dinner table or the theatre – and most of all the moral discussions in the public debate have focused on phones in schools and classrooms. In Sweden, for example, several political parties have put the mobile phone discussion on their political agenda and recently France, as another example, decided upon a

total ban of mobile phones in schools. The political debates about smartphones in schools are primarily based on moral attitudes, and there is a great lack of research-based knowledge about what really goes on in classrooms that have been connected from within via the students' own phones. In this special issue, we address this lack of knowledge and present six articles that take a close interest in how smartphone use affects classroom interaction and social life in schools.

However, the articles in this volume do not approach the matter of smartphone use in classrooms from an explicitly normative point of view. Our point of departure is not that phones in school are bad, nor that they are good. This special issue does not provide answers to how one should use screens to achieve learning goals most beneficially. Nor does it conclude in a blistering criticism of the damage screen use in schools does to learning and education. This does not preclude the possibility of either. But what we as researchers in the research projects generating the reported results believe is of value, is the empirical scientific foundation provided for by careful and close descriptive work.

One could argue that the rather small-scale studies that are presented in this issue do not give a representative and fair picture of emerging processes in Nordic connected classrooms. Certainly, there are a lot of activities going on in schools where digital devices are used in the classroom interaction in other ways than discerned and described here. However, the strengths with the methods used in the studies presented in this special issue are that they enable insights from the students' point of view based on multi-source data, captured in detail and at the very moment of happening, thus providing access to the time and space contexts of interactional processes in relation to digital devices. The studies describe the contexts of the beginning and end of phone use, how and with whom these processes are unfolding, what is actually happening on the screens, and how these processes are embedded in co-occurring classroom activities.

Classrooms in change

The work has been carried out in schools and classrooms, spaces that are at the centre of the societal reproduction of literacy. In line with Ong's (1982) argument, classrooms are at the very heart of the literate technologizing of the world. It is where children learn to read, write and count; where citizens are socialized into worlds of letter and meaning. For students and

teachers, life in classrooms has always been about both identity processes and learning, or as Biesta (2015) describes, the purpose of education as an institution for accomplishing qualification, subjectification and socialisation. For a long time, the interactional infrastructure (Schegloff, 2007) assumed and expected to carry the mediating responsibility for teaching and learning has been text and talk. This emphasis has been further underlined by the growing emphasis in learning theory in the last decades on the importance of interaction for learning. The socio-cultural perspective has become a recognised norm for conceptualising the relationship between interactional processes at different levels, and learning.

Against this general background, a large body of empirical and theoretical work has been carried out from different points of view, and with slightly different approaches to the role of talk and interaction for learning. The continued contribution of research on classroom interaction over 50 years has by now contributed to the establishment of a robust understanding on how participation in classrooms is organized, and how this organization has implications for teaching and learning.

From the interactional stance taken in this special issue, learning and change are understood as social actions that are ubiquitous of human interaction, where people deploy a wide range of available resources to accomplish a shared understanding in their everyday lives (Melander, 2012; Rusk, 2016; Sahlström, 2011; Tanner & Sahlström 2018). We know from earlier work that the interactional infrastructure of the learning space of the analogue classroom heavily favours teachers in terms of quantity of talk and interactional rights and responsibilities. For students, classrooms still seem to be primarily for listening and taking in, despite the heavy emphasis on the importance of participation in recent research literature (c.f. Klette et al, 2017). There is also a rapid increase in educational technology, with smartboards, laptops and pads of different kinds being used in teaching and learning, and with concepts such as “flipped learning” gaining ground. This development is a result of long and hard work, which is aimed at introducing digital technology into classrooms.

In 2010-2011, however, the well-known learning spaces of classrooms were invaded by smartphones emerging from the pockets and backpacks of the first fully connected generation. The articles in this volume are interested in what happens when an interactional power tool with immense capacities is introduced into the highly constrained and well-known interaction ecologies of classrooms. The presence of smartphones, and the continuous

possibility of being connected that they provide, changes the classroom as a space for learning. As a point of departure, the research presented in the six articles of this special issue all take an understanding of social interaction as constitutive for human sociality in all different domains of human life (Enfield et al., 2006), and hence also for social life in classrooms.

Being constantly connected through mobile devices like the smartphone means that students have access to a new resource that they can use for a broad range of interactional purposes in the classroom. The smartphones – handy in size, offering an enormous amount of information, and useful for relational purposes with people also outside the classroom – seem to have a potential to profoundly change social interaction in classrooms in ways that challenge previous understandings of interactional order and participation in classroom interaction. For the students, the smartphones offer an additional resource, a screen-mediated means of participation in social interactions that are outside of their own personal preferences, and used in ways that the teacher has limited access to and control over, which leads to i.e. participation which is “under the teacher’s radar” (Asplund et al, 2017).

Studying changing educational spaces

A difference between the new connected sociality compared to face-to-face interaction in the same physical space lies in the visual aspects of the interactions (Holm et al., 2018, Tanner & Roos, 2017). Connected sociality relies primarily on the visual affordances of screens. Thus, a challenge for interactional research on smartphones is to develop research methods that can document the visuality of screen-mediated social interaction. Another challenge lies in the rapidly changing context and content of screen-mediated sociality, coined by Karpf (2012) as *internet time*, and the risk that rapid changes make research results less sustainable. An ambition with the studies in this special issue is to try to see beyond specific apps and programs used at the time of our data collection.

To a large part, the research presented in the articles relies on methods used in two Nordic research projects in Finland and Sweden, where Wi-Fi technique was used to mirror the screens of focus students’ smartphones. The screen recordings were then compiled with two simultaneous video recordings from the classroom, one focusing on the students’ desk and surrounding peers in the classroom and one focusing on the students’ laptop screen and/or paper-based resources in literacy practices. The three video sources bring us closer to gain an insight into how different modalities interplay and are coordinated.

It is sometimes argued that being connected through the phone draws people away from the real world and its relations. However, from the perspective of the individual student, the interactions on the mobile phone seem as real as the face-to-face interactions in the physical space of the classroom. The simultaneous use of different recording resources makes it possible to carry out analyses on how the different interactional spaces, connected and in the physical environment, are managed and coordinated in social interactions involving a multitude of different co-participants. As Aarsand and Forsberg (2009) have shown, doing video ethnographic research involves methods that enter the private and corporal sphere of the research persons, which might be experienced as intrusive. This is equally true for documentation of screen-mediated sociality, and for combinations of video ethnography and digital ethnography.

As the internet has developed into a site for human social interaction in most domains of social life, it has become a research field of great importance for understanding contemporary sociality. However, the ethical challenges in this kind of research are many and complex, and the long-term ethical consequences of using data from the internet are difficult to overview. A working committee of researchers within the AoIR (Association of Internet Researchers) points out some major tensions in this kind of research (Markham & Buchanan, 2012). They conclude in a recommendation for an approach that is case-based and process focused, and which emphasizes the importance of addressing and resolving the ethical aspects that arise in each stage of the process. Reasoning similarly, Kinder-Kurlanda and Zimmer (2017) argue for ethically-informed research practices, seen as deliberative processes that come out of decision making under great uncertainty.

In the research presented in this special issue an integrated part of the process has been the continuous negotiation and dialogue between researchers and participants before, during and after data collection. An important point of departure has been to develop a close co-operation with all the parties involved during the field work. Researchers and informants have had a continuous dialogue about the recordings, what they focus on and for what purposes they could be used for. The Wi-Fi techniques used to mirror the students' screens (somewhat differing depending on the different operating systems on different phones) was well known by the students, and all focus students during the recording had control over how to turn off the mirroring whenever they wished to do so (however, this was something they only rarely did). Considerable effort was made to develop trust and a dialogue between the researchers and the students. In this way, the process of getting informed consent from the

research participants was not just about getting a signature on a form, but a continuous process where the researchers were open for negotiations and collaboration with the students.

Through the focus students' use of social media, people that were unaware of the research project also became involved in it. This is a circumstance that is relevant for much research on the Internet, where boundaries between what could be counted as public or private participation become blurred and are open to different interpretations (Markham & Buchanan, 2012). Ess (2017) points out that privacy in Internet research has shifted from a primarily individual conception of identity and selfhood to a more relational conception. While open blogs, tweets and websites in these projects were considered as public media, other kinds of on-line participation, for example Facebook, Tumblr or Instagram, were carefully considered in relation to the contextual circumstances. If a posting could be tied to an individual person not knowing about the study, it was not included in the data. However, some postings on these media channels were obviously contextualised in a way that was meant to be public and reach a very large number of people; they were often shared, and it was not possible to relate them to an individual. Such cases were subsequently included in the data. Posts in chat conversations between only a few people, like for example Snapchat, Messenger or Kik, were only included if the person writing a post had given an informed consent to participate in the study. From the beginning, all data was coded with fictive names on all the participants and careful measures were taken not to reveal their identities in publications or presentations unless they gave an explicit permission to show data for a specified purpose.

It has turned out to be difficult for both the researchers and the informants to fully grasp the degree that a personal online conversation could be or become sensitive or potentially harming for someone. In addition, it is worth noting that the screen as a modality for interaction has other features of visibility than face-to-face interaction, i.e. who can see what is written and for how long a posting on social media can be seen. To a large extent, it appears to be differences in dimensions of time, visibility and spatiality of the screen-mediated interactions that make it difficult for both researchers and participants to foresee for whom and in what moments data is accessible. This calls for a need to take great care in selecting what data to include in studies like these, even if it sometimes means excluding some of the most interesting material.

Changed time and space relationships in classrooms

The articles in this special issue address research questions and answers relating to the presence of smartphones in classrooms. The articles also focus on research methods that can explore, in detail, multidimensional aspects of situated interactions involving reading, writing and talking in various kinds of textual practices. In short, the articles address issues relating to classrooms in connected change. The article by Sahlström et al., *Connected Youth, Connected Classrooms. Smartphone use and student and teacher participation during plenary teaching*, takes a typical classroom practice - plenary teaching - as a point of departure and focuses on the role of mobile phones. Sahlström et al. show from an interactional perspective, that instead of being a challenge to plenary teaching, mobile phones rather enable and preserve this kind of instructional organization. By using the concept of digital labour, Paakkari et al. examine and discuss the digital work students engage in on their smartphones while producing content on social media platforms (*Digital Labour in School. Students' Social Media Use during the School Day*). Paakkari et al. show that while smartphones can be seen as offering the students the role of unpaid "child workers", they also bring a new group of commercial actors inside the classroom space. This, the authors claim, is a new situation for the Nordic idea of a common school for all, and it remains an open question as to whether these activities can be combined with this idea. In the article by Ståhl et al., *Exploring Competencies through Interaction with Images in Social Media*, a specific focus is put on the learning processes that take place through interacting with images on social media via mobile phones during classroom interaction. Distributed via the mobile phone, Ståhl et al. show that four competences are present when interacting with images in social media: Visual Competence, Technical Competence, Knowledge of Social Norms and Knowledge of Self. The authors also highlight that the mobile phone is a resource for communicating personal identity in the classroom. Also, Rusk shows in his article, *Mobile Phones as a Resource for Co-constructing Multilingual Identities in Monolingually Oriented Classrooms*, that via their mobile phones, multilingual students are provided with a way to bring in their multilingual identity and be multilingual without contesting the language of instruction in the situated classrooms in a way that is not possible in peer-to-peer face-to-face interaction in classrooms. These multilingual practices are done by the students while also non-problematically orienting to the language of instruction in the classroom. From a literacy perspective using the concept of chronotypes, Gilje addresses in his article, *Smartphones and Laptops as Boundary Objects in Lower Secondary Classrooms*, the fact that although many

schools are equipped with digital and mobile technologies, it is still an important question how these technologies can be resources for new, and emergent learning environments. The result of the study shows that students, while bringing in their own technology and using digital technology as boundary objects in the classroom, extend time and space, and integrate information and knowledge into their literacy practices. Finally, Juvonen et al. also address questions related to literacy, more specifically writing practices, analyzing practices of task-oriented individual and collaborative text planning processes, where digital devices such as smartphones are used as resources for making progress (*'Being stuck'. Analyzing Text Planning Activities in Digitally Rich Upper Secondary School Classrooms*). The article shows that even though expectations are high that digital devices can solve problems occurring during text planning activities, an active and supportive role from the teacher is necessary.

The articles all present new knowledge of processes that seem to change constitutive aspects of the sociality of youth, inside and outside classrooms. The studies in this issue analyse processes that are still in formation, but which seem to have a similar considerable capacity to transform historically stable ways of teaching and learning, in the same way as the literacy processes analysed by Ong (1982) have transformed social practices. However, in addition to being more limited, less general and without claims to becoming future classics, the articles differ from Ong's work in that they study emerging process, rather than aggregately looking back at centuries of change. Hence, the results presented represent the beginning of knowing, rather than conclusive truths.

As made evident in the work presented, classrooms as spaces for teaching and learning are both radically changed and conserved by screen-mediated sociality. The most considerable change concerns the way classroom walls have become permeable, leaking information and interaction in both directions. As Paakkari and Valasmo and Ståhl et al. show in particular, the visual and textual domains of life outside classrooms have now become an integral part of the everyday life of upper-secondary students, also inside the previously confined and restricted spaces of classrooms.

Simultaneously, classrooms have also become part and parcel of life outside schools. In the studies in the issue, the data is generated inside schools, resulting in a focus on how the social spatiality of classrooms is transformed by screen-mediated sociality. In the studied

classrooms, students are constantly available for initiatives from the outside, and can also themselves participate in social spaces outside of the classroom. From this follows an educational interest in how classrooms are possibly changed by the on-line, real-time presence of other social spaces, and we can conclude that being connected changes the classroom as a social space. However, what is not investigated here is whether and how classrooms and schools, through screen-mediated sociality, are influencing and changing social spaces outside schools.

The results of the analyses in the different articles show that the time and space relationships between classrooms and other social spaces have changed. We can be present in many situations at the same time, face-to-face and at times in several virtual spaces, and the multi-presence can be both synchronous and asynchronous. To most of us, this is a recognizable aspect of many social situations. Less immediately self-evident, however, is that despite the paradigmatic change in the simultaneous presence of the outside world in the classroom, the sequential features of screen-mediated interaction are not simultaneous in the same way as in face-to-face interaction. Whereas addressed initiatives in face-to-face interaction in general require an immediate response, and where the lack of any such interaction in general results in immediate repair practices (Schegloff, 2007), screen-mediated sociality does not rely on the same kind of sequential features. This means that there are ample possibilities for slotting in screen-mediated interaction actions into the much more sequentially demanding and constraining face-to-face-format of classroom teaching and learning, without violating interaction-structural expectations of either modality. In practice: students can, and are shown to, choose when to read and respond to messages, and to organize their attention to screens in relation to the sequential unfolding of teaching.

The two-way permeability of classroom walls introduced by smartphones is but one facet of an on-going massive spatial redistribution of sociality. The findings of the articles in this issue seem to suggest that this redistribution is not a matter of straightforwardly breaking down boundaries, with a simultaneous increase in interactional entropy, but a matter of reshaping time and space boundaries for social interaction. Through their smartphones, the students move between participation online in social media, where it is possible to delay an answer to an invitation, to scroll back in previous postings and repeatedly reflect upon chat histories and to choose in which order and when to read messages. Hence, participation in screen-mediated interaction is constituted through a different interaction order compared to

the face-to-face interaction to which they also divide their attention. In so doing, the students seem to show considerable skills in deploying interaction-infrastructural sequential features of different interactional modalities to stitch together participation in both face-to-face teaching and screen-mediated interaction.

In future work, we believe there is considerable potential in exploring whether the very differences in sequentiality are part of what affords the many times seemingly-effortless simultaneous presence of screen-mediated and face-to-face interaction. Work along these lines could also possibly be of value for differentiating and empirically substantiating differences in attentional requirements in different modalities, opening the possibility that there are differences in attention orientation between social modalities. This could also imply that the generally assumed conflicting relationship between screens and teaching could be formulated in a more reflexive way.

A conclusion to be drawn from the articles in this special issue is that it is not primarily the teaching practices that become disrupted or disturbed by the presence of smartphones in the classroom. The teacher can still hold the same kind of lectures and organise different tasks in pretty much the same way as during the pre-phone era. Instead, what has changed is that the individual students' possibilities for participation have increased. The interactional constraints of classroom interaction have, to some extent, been released through the almost infinite possibilities for parallel interactions online. Whether task-oriented or not, this parallel screen-mediated participation is adapted to each student's initiatives. As such, every student's participation online is individual and students will meet different contents on their different screens. And unless they show their screens to each other, which they rarely do, neither peers nor the teacher will have access to the screen content on the phones. Hence, the major consequence of screens in connected classrooms is related to an extensive increase of individualisation – perhaps better described as personalisation – of each student's participation in the classroom. Via their screens, different students meet different contents to an extent not previously possible. This leads to an educational differentiation between students of a new kind. This educational differentiation, where most of the students' screen-mediated participation goes on under the teacher's radar, raises new questions to teaching. Instead of debating the disturbance of screens for teaching, we propose that we need to discuss what teaching should look like in a connected classroom in order to be able to balance the increased educational differentiation and make room also for collective learning processes

in the physical space of the connected classrooms. The most important discussion is therefore not to debate whether phones should be banned, but how best to take advantage of the physical space of the classroom as a meeting point in an era of increasingly connected sociality both in and outside schools.

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