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Do we need a digital school uniform? Arguments for and against a smartphone ban in schools

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ABSTRACT

A topic of discussion around the globe is whether smartphones should be banned from schools to provide better learning environments and to support in-person social interactions among children and adolescents. First, countries such as France and China recently established smartphone bans. In the present article we reflect on arguments for and against smartphone bans. We discuss whether a digital school uniform – meaning the same smartphone rules for all (a ban) – represents a timely intervention.

Specifications table.

Subject area:	Smartphones
Category/categories of societal impact:	Societal Technological
Sustainable Development Goals (SDGS) the research contributes to:	GOAL 3: Good Health and Well-being GOAL 4: Quality Education
Resource availability:	As this is a review of former research, no data will be provided.
Related research article:	Does not apply
Stage of research:	In Progress.

Social impact: the smartphone's impact on societies around the globe

The smartphone represents an innovative technology which dramatically shaped how people interact and find their way in unknown territory. The smartphone comes with many undisputed advantages such as the opportunity to build social capital by manifold communication possibilities, having access to relevant information in real-time and many other functions. Aside from these positive aspects, several negative side effects of excessive/problematic smartphone use are discussed in the scientific community [1]. In particular, in the hands of children and adolescents, smartphones represent a topic of fierce debate in societies around the globe [2]. Such debates are ongoing, although it has been clearly put forward that the smartphone is just a vehicle to access diverse content from messenger/social media platforms, video games to e-mail functions [3]. Therefore, the smartphone itself might not be the actual problem, but clearly it empowers users to stay constantly connected as long a signal is available. Still, the fact that much of daily life happens on the phones these days, makes the smartphone THE symbol for constant distraction wherever people go. This phenomenon aligns with the youth word "Smombie" describing a person behaving like a Zombie, being totally absorbed by the phone.

In particular, several smartphone apps rely on the data business model, in that people pay for a use-allowance of social media and other apps with their own data. This model led to the creation of highly immersive platforms luring in users again and again to the platforms [4] with the result of fragmentation of everyday life (see a study on FOMO, disruptions and surface learning [5]). Users of smartphones and installed apps can experience constant interruptions, likely resulting in less productivity [6,7]. But note that the association between smartphone use and productivity might represent an inverted U-function [8] with healthy use even increasing productivity. In this context, the digital Goldilocks hypothesis can also be mentioned [9]. In particular, distractions due to the smartphone and its apps are seen critical in the context of learning environments: A visible meta-analysis suggests that (longer/excessive) smartphone use is associated with worse academic performance [10]. The question arises if learning environments – in particular schools - would profit from a smartphone-ban, which is discussed based on own work and that of others. Our own work [3,11–13] touches on the following points regarding investigation between academic performance and smartphone use, in general overcoming

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methodological limitations of self-report surveying when doing smartphone use assessment by relying on objective tracking technologies and studying addictive use of the smartphone, which is not the same as frequent smartphone use.

Methodology: an overview on relevant studies including their methodological approaches to understand detrimental aspects of smartphone use

Smartphone studies in this field often are hampered by the fact that people experience time distortions on their phones and have problems in assessing their actual (objective) usage [14]. Therefore, it is interesting that a recent own study observed a negative association between smartphone use assessed via Apple's screentime tool and GPA scores [11]. This study goes a step further, because screentime is assessed objectively. In general, we think that it is of importance to implement digital phenotyping and mobile sensing principles [15] – hence the recording of digital footprints - in smartphone research to supplement the knowledge we have to this day. This is part of our ongoing research strategy also documented with papers from the past [12,13], where we also presented a smartphone application, which can be used to record participants' actual behavior on the smartphone including insights into call behavior, apps installed, time spent on the smartphone and apps, etc. This app called Insights provides more fine granular information than Apple's screentime feature. We also mention another app-framework, which is available to study human behavior: the AWARE-framework.[1]

Of interest, when studies correlated addictive tendencies towards the smartphone assessed via self-report and learning performance (hence not only time spent on the phone, but assessment of criteria such as loss of control over usage, functional impairments and so forth) negative associations were again visible [16]. In sum, longer or excessive use of the smartphone is associated with decreased learning success. Please note that weighing the pros and cons around the actual nature of excessive smartphone use is still a matter of debate, although it has been shown in many of our and other publications that problematic smartphone use assessed within an addiction framework is robustly associated with depression and anxiety tendencies, whereas this link might be explained by transdiagnostic mechanisms including boredom proneness and fear of missing out [17]. Coming back to the smartphone- learning-association, it is also true that effect sizes often are mild, and the studies often cannot disentangle cause and effect. Are low grades perhaps the reason for overusing the phone (to escape from negative effect?) or is it the other way around - that prolonged phone use and perhaps constant interruptions drive worse academic performance? We think that it is of utmost importance to go beyond cross-sectional studies to study the impact of smartphones on society and also to include more neuroscientific driven research, which is even harder to establish when doing longitudinal studies due to heightened costs and need for equipment. A review on brain imaging findings on smartphone (over-) use has recently been published showing that the neurobiology underlying smartphone (over-)use is poorly understood [18]. To sum up here: Ultimately experimental work and certain kinds of longitudinal studies will help shed light on causality, and this is also of importance to answer the overarching question in this paper, namely if smartphones impact in such a negative way on young minds, that they need to be banned from schools – among others, due to a negative impact on learning. This said, decreased academic performance is just one reason why debates about smartphone ownership and frequent use in childhood and adolescence exist.

Beyond the academic performance issue above, research suggests that smartphone use can negatively impact social interactions via phubbing (phone snubbing; [19]), thereby reducing the quality of social interactions (negative perceptions of the person using the phone, [20]). For a good overview on complexities of the general smartphone-use-well-being-associations see recent work [21], discussing under which circumstances well-being might decrease due to smartphone use (but can also be enhanced). In this context, we again highlight overview-work from our labs linking overuse of the smartphone to negative affect (depression, anxiety, etc.; [17]). Again, studies in the field often are hampered by their cross-sectional character. In a very different context, we put forward that the use of social media (often via smartphones) has been associated with body dissatisfaction and eating disorder tendencies in young adolescents likely due to constant interactions with photoshopped pictures depicting seemingly beautiful persons [22]. In addition, at times young minds can be confronted with gruesome content and misinformation campaigns in the online world [23], especially when one's phone is constantly available. Finally, topics such as cyberbullying [24] and cyber- or online-grooming [25] need to be mentioned as dangers arising from smartphone- and accompanying app-use; in particular cyberbullying is a relevant factor in the school context.

Implications: implications from the literature to answer the question on smartphone bans in schools

The above discussion has led to debate on whether smartphones should be banned from schools. The idea behind such a smartphone ban is that young minds putatively find better learning environments in schools, and without smartphones in-person social and physical interactions will be improved. What does empirical work conclude about these topics? The learning literature is relatively clear on the matter (see meta-analyses [10,16], although effect sizes are mild). Before checking on empirical evidence linked to other negative aspects of smartphone use in schools, it is of interest to mention that several countries in the meanwhile introduced smartphone bans in schools, but to varying degrees. Among the countries are France,[2] China[3] and also many schools in several states of the USA ban the smartphone. Such a ban is also discussed on US-federal state level.[4] In Germany, we know that at least some schools either ban smartphones in general or at least while class occurs. In the UK general smartphone bans are presently being controversially discussed.[5] Here also a couple of years ago a study observed that smartphone bans in several schools led to improved grades, but students with poorer grades in particular profited.[6] Further support for the positive effects of smartphone bans have been observed in regions of Spain, where the smartphone ban in schools not only led to improvement in grades, but also less bullying [26]. Relatedly, in Denmark a smartphone ban during recess led to increased physical activity in ten- to fourteen year-olds, but see for nuances in the paper [27]. More research points to positive effects touching upon the quality of social interactions without smartphones. Here it was observed that those with a smartphone don't value spending time with friends as much [28] (p. 17). Please note that the latter work did not focus on learning environments. See these and further arguments also in Table 1.

This all said, we are not blind to reports in the field, that some prominent observations such as from the „brain drain study" showing that the mere presence of the phone was associated with poorer

[1] https://awareframework.com/.

[2] https://www.forbes.com/sites/alexledsom/2019/08/30/the-mobile-phone-ban-in-french-schools-one-year-on-would-it-work-elsewhere/?sh=aa1f35e70 (Accessed 10 February 2023)

[3] https://www.bbc.com/news/technology-55902778 (Accessed 10th February 2023)

[4] https://le.utah.gov/~2023/bills/static/HB0270.html (Accessed 27 April 2023)

[5] https://www.theguardian.com/politics/2021/aug/16/plan-to-ban-phones-from-classrooms-is-out-of-touch-say-uk-school-leaders (Accessed 10 February 2023)

[6] https://cep.lse.ac.uk/pubs/download/dp1350.pdf (Accessed 10 February 2023)

Table 1
Summary of arguments for and against smartphone bans in schools.

Arguments *for* a smartphone ban in schools	Argument *against* a smartphone ban in schools
Less distraction, better academic performance	Parents and children can communicate less or not at all
More physical activity	Young minds need to be prepared for a world full of distractions
More in-person social interaction	High costs to proceed with the intervention (see costs for sealed bags)
Learning to deal with boredom, which might trigger mind- wandering and creative thoughts*	A ban goes against the tenets of free society and liberty around the globe
Children will no longer have the argument that others are allowed to have a phone at school, In some countries the smartphone is the only chance for children to but they alone are not allowed have access to education	

* This argument is not further discussed in the article and relies on creativity research in the area of mind-wandering [29].

cognitive performance [30] did not replicate or effects are subtle [31]. And also other points might speak against a smartphone ban. Some might argue that it is more important to prepare children and adolescents for a world full of distractions, hence needing to be taught effective strategies to handle their phones. Further, from a parent's perspective (and perhaps also the children's perspective) one might feel better if the child (or parent) can be reached anytime. Furthermore, it is not easy to effectively establish smartphone bans in schools. For instance, schools could use what became fashionable in recent concerts by Bob Dylan (where smartphones were banned during performances)[7]: The concert attendees had to put their smartphones in a bag which was sealed when entering the concert and opened again after the concert was over. But such smartphone bags are costly and in New York students had to pay about a dollar each week to put the phone in storage.[8] Finally and of relevance, we mention that a smartphone ban might be seen as going against the tenets of free society and liberty around the globe. Smartphone bans in learning environments can also touch on ethical aspects. In particular in poorer countries, it has been claimed that the smartphone provides important access to education.[9] Hence, the digital divide needs to be considered. Further, legal work to establish a smartphone ban is not trivial; for instance in Germany it would need to be established in all federal states.

In sum, arguments for and against banning phones from schools are manifold. Some arguments can be backed up by the literature and in parts by our own work (loss of productivity in those who are smartphone/social media "addicted" [6,7]; lower grades in persons with higher objective smartphone use, [11]), but often effect sizes are not large (see meta-analysis on smartphone (over-)use and learning [10,16]). Nevertheless, positive effects in diverse areas could result from a school ban of smartphones and it will be very interesting to see evaluations of new smartphone policies from countries such as France. Personally, we believe that smartphone bans might be in particular relevant for the youngest students attending elementary school and those reaching puberty. With growing age (and evolving self-regulation strategies), one could consider allowing smartphones again during recess (not in classes), but again the positive effects of restricting smartphones during school breaks in promoting physical activity and in-person social interaction should not be forgotten. Exact age guidelines when smartphones in school might be allowed while puberty is ongoing will also clearly remain a matter of discussion. Of note, age-guidelines about general ownership of smartphones (not specific to use in school) should further be considered and given the brevity of this article format cannot be further discussed.

Some might argue that use of smartphones in the classroom can support the learning process. We believe that interaction with software and the Internet clearly should have its place in the classroom, but only where it supports the learning process or student's creativity. In this realm, school tablets or laptops should be provided, where students will not have distracting apps at their fingertips and no further software should be used or installed that does not support the learning process. Finally, we point to an argument for smartphone bans which likely will bring relief to many parents. With a digital school uniform – hence the same smartphone ban rule for all – children will no longer have the argument that others are allowed to have a phone at school, but they alone are not allowed. A digital school uniform could also be seen in a wider context, namely by providing all students with the same technologies such as tablets with learning software when deemed necessary (while banning distracting technology). This likely will lead to more digital equality, because children would not compare the kind of smartphones they have, and so forth. This said, the effect of smartphones on society and individual well-being are complex. To have a more balanced view in this work, we also hint to research evidence showing that using a smartphone is associated with better well-being, but this same study also showed that higher intensity of smartphone use correlated with lower well-being [32]. A new intervention study found evidence that completely abstaining from the smartphone is a less powerful intervention than restricting smartphone use by one hour a day on several well-being measures [33]. Please note that this work has not been carried out with a focus on children/adolescents and they also do not touch upon questions arising from the smartphone-learning-topic. Finally, another study did not support the idea of a smartphone ban improving grades, but the authors discussed specificities and why they did not observe findings as in the UK [34].

We hope that this article shows that research findings from others and our own groups overall can support a smartphone ban in schools, but based on the existing evidence other academics might arrive at other conclusions. Moreover, we believe that more nuanced solutions might be relevant, in particular when we speak of adolescents and not the very young minds in elementary schools. Hence, we need discussions also going beyond a binary simple ban vs. no ban policy. Finally, we think that it is important that large scale smartphone ban interventions in countries such as France and China need to be thoroughly investigated to find further proof for (or against) smartphone bans in learning environments as discussed in the present work. And again, findings from such investigations might lead to a more nuanced understanding of how to create the best learning environments for students.

Ethics statements

As this is a review, no ethics statement is needed.

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[9] https://www.unicef.org/uzbekistan/media/711/file/SOWC:%20Children%20in%20a%20Digital%20World.pdf

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Contribution section

The first draft of the manuscript was prepared by CM which was critically revised by JDE.

Supplementary material and/or additional information

None.

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