

KI researcher: 'Kick out politicians who give students hazardous e-readers with unproven educational value

Thanks to the so-called PISA* (OECD's Programme for International Student Assessment) survey, in Sweden we now know: student scores in maths, reading comprehension and natural sciences are plummeting. The results are prompting rage in Swedish schools. Something is wrong.

The government response is to force all students to go through another school year. In addition, a series of panic measures has been initiated by the authorities. But do not expect schools to be given peace and quiet, so that they may be able to figure out how to get things to work while dismantling those gadgets and administrative 'reins' that do not.

For years schools have undergone a multitude of changes and been given new assignments, including being forced to monitor more grade control data and using new and more administration. Some changes are good, some bad. Changes include an enormous amount of computerized teaching where students via their apps, mobile phones and tablets are supposed to gain new knowledge. Pedagogy innovators have deleted textbooks and pencils, blackboards and pointers, and instead replaced them with new wireless e-readers and cell phones. Academics, such as myself, have many times - usually completely unheard - raised a warning finger to the educational establishment.

Today it is very difficult to be a teacher and take responsibility for teaching in the classroom where students' cell phones are constantly ringing, text messages are being sent back and forth, and surfing the entire time online or playing games through iPhones and iPads. All this when students really should be working on their school assignments.

In Sweden, there have been several cases where the teacher was reprimanded because he or she "violated the students' privacy" after taking cell phones from students, while other teachers have been criticized for being too strict with students for not allowing them to do what they want during school hours.



**Assoc. Professor and Asst., Professor
in Neuroscience,
Karolinska Institute, Stockholm.
Photo: Ida Nordlander**

In Sweden - which has one of the most highly computerized educational systems in the world – results have plummeted regarding reading, writing and math skills. Today the system can not afford to hire enough staff, no, and it has even been suggested that "tired of school" students will not be asked to finalize 2/3 of their secondary education. So the new tools do not impress - it just seems like we should be spending money on well-trained teachers with old teaching materials.

Simultaneously there is a tendency for students in alternative schools such as Waldorf, Montessori and Reggio Emilia, to do slightly better and mature mentally faster; and it's very interesting because these schools do not use computers to the same degree as mainstream schools.

These new wireless devices are now flooding schools and homes. Examples of such sources of microwave radiation are wireless routers, computers with wireless network cards, wireless landline phones, tablets (like the iPad), mobile phones, etc. Several years ago evidence surfaced that exposure from electromagnetic fields can cause serious biological effects and health effects. Against this backdrop, many like myself protested, including parents, teachers and school staff in Köping as seen in Bärnslagsbladet (April 18) in 2012 under the headline "No to wireless at school".

Children are probably sensitive to pulsed microwave radiation from iPads and routers

There are now numerous scientific studies that children are likely to be more vulnerable to pulsed microwave radiation than adults. New research shows, among other serious effects on behavior and learning ability, that there is general agreement among scientists that electromagnetic fields penetrate further into the brains of children than in adults because the skulls of children are thinner. There is also a broad consensus that children are more vulnerable to adverse effects from radiation because their bodies are developing, thus, by definition, more sensitive to environmental toxins. Children are not "little adults"!

The Council of Europe's Environment Committee has called for strong measures to protect the public against mobile phone radiation

The World Health Organization in 2011 classified electromagnetic fields from wireless sources as possible carcinogens. In its Resolution No. 1815 from May 2011 the Council of Europe's Environment Committee recommended strong measures to protect the public against harmful effects of wireless radiation, including a ban on mobile phones and wireless internet in schools. It also wants to reduce the recommended maximal exposure level of mobile telephony sharply, all this completely in agreement with the Seletun declaration of 2010. In it, an international group of scientists urge on a stop to further expansion of wireless systems and require new guideline limits.

In February 2010 The Seletun Scientific Panel published a resolution with a wide range of common positions and recommendations, based on a review of the then-available research on the health effects of electromagnetic fields. Since then there have been many more reports ...

The Swedish Radiation Safety Authority (SSM) misleads

Sometimes you see in the debate that someone - usually from a radiation safety organization - claims there is no danger and that "the radiation is so weak". Weak compared to what?, I wonder. Today there are children in radiation levels that could easily be 1,000,000,000,000,000,000 times higher than our natural background radiation. So how can the phrase "so weak" be justified?

A child using a laptop to download from a wireless Internet connection is exposed to the same amount of radiation (about 1,000 $\mu\text{W}/\text{m}^2$ and above) as if he/she were near a cellular base station (50-100 meters away). There are many parents who are not aware of this. The figures are not plucked from the air, but taken from readings in schools in Oslo by the Norwegian Post and Telecommunications Agency. Whether it's about base stations, wireless or cell phones, it is the same type of radiation we are talking about (in the range of 1-2.5 GHz).

Autism and ADHD-like behaviors

A group of researchers in California recently conducted a large study of mobile phone use in pregnant women. They looked at all the kids who were born in Denmark in a given year and interviewed the mothers about their mobile phone use during pregnancy. They also asked about the child's mobile usage and behavior.

To the researchers' surprise it turned out that the mothers who had used mobile phones the most during pregnancy had the greatest risk of having children with behavioral difficulties.

It was about both autism and ADHD-like behaviors. The increase in risk was statistically significant. The risk also increased further if the child himself used a cell phone.

[Divan HA, Kheifets L, Obel C, Olsen J (2008) "Prenatal and postnatal exposure to cell phone use and behavioral problems in children", *Epidemiology* 2008; 19: 523-529]

Symptoms: headache, abnormal fatigue and irritation

Such a study might not be sufficient to conclude that electromagnetic fields are dangerous to children. German researchers wanted to measure the radiation dose that children and adolescents are exposed to in daily life. They asked about 3,000 children and young people in Bavaria to walk around carrying a dosimeter from morning to night. The dosimeters measured the radiation from cell phones, base stations and wireless networks.

It turned out that the quarter of the children who were most exposed to radiation had more concentration problems at night than the rest of the kids. The same group also had more headaches and were more irritated than other young people.

The results of the Bavarian study were again statistically significant.

[Heinrich S, Thomas S, Heumann C, von Kries R, Radon K (2010) "Association between exposure to radiofrequency electromagnetic fields were assessed by dosimetry and acute symptoms in children and adolescents: a population-based cross-sectional study," *Environmental Health* 2010, 9:75-83]

So the question is what mechanism can explain these symptoms in children and adolescents. Scientists Buchner & Eger in Germany measured levels of stress hormones in 60 residents in an area before a base station was erected. They were measured again after six months and again after one and a half years after the antenna became operational.

It turned out that people had much higher levels of the stress hormones adrenaline and noradrenaline six months after the base station became operational, and after another year, the situation had not improved. Living with such constant stress to the body is obviously harmful to health.

[Buchner K, Eger H, "Veränderung klinisch bedeutsamer Neurotransmitter unter dem Einfluss modulierter hochfrequenter Felder - Eine Langzeiterhebung unter lebensnahen Bedingungen", Umwelt - Medizin - Gesellschaft 2011: 24 : 44-57.]

Do not think this is just about the kids. Even fetuses are affected significantly and in a particularly scary way. Scientists Jing, et al., of the Department of Public Health, Shandong University, China, have studied the impact of mobile phone radiation on pregnant rat fetuses. The researchers measured changes in both neuronal neurotransmitters and effects on antioxidant enzymes which protect our cells from oxidative stress.

They conclude that mobile phone radiation during pregnancy resulted in damage to the fetal brains! They were born already brain-damaged. What mothers and fathers want that for their children? (Jing J, Yuhua Z, Xiao- Qian Y, Rongping J, Dong- Mei G, Xi C, "The influence of microwave radiation from cellular phone on fetal rat brains," Electromag Biol Med 2012; 31:57-66.)

Students and teachers more and more frequently report abnormal fatigue in their working environment and you can not dismiss current suspicions that exposure from wireless networks can play a role in this. It is therefore important to ensure that wireless networks in kindergartens and schools are not causing significant and unnecessary risks for the health of our children and their teachers. Academically, the subject is not very complicated but for a layman can seem difficult to assess. The lack of knowledge today is due exclusively to the lack of research resources, not a lack of ideas, hypotheses, theories or interest.

The Precautionary Principle must be applied

Based on the above information the organization Citizens' Radiation Protection in Norway, <http://www.folkets-stralevern.no/>, has urged parents to sign a formal agreement where a parent does not consent to the exposure of their children to microwave radiation from wireless communication technology either in the classroom or indoors in general. As a parent, you are encouraged to require that the school / preschool exercises precautions to minimize radiation exposure and to demand wired solutions for data networking and telephony indoors. You are also encouraged to demand answers on who is responsible for the child if damaged by radiation exposure.

Time is not on our side. We must quickly decide how to proceed. In Sweden the choice seems to be having "artist types" running around in the community - wildly creative but totally impossible to put at the controls of an airplane or be responsible for the safety of a nuclear power plant. Alternatively should we have a population that is completely

egalitarian, equipped with all the basics to work in our society? Will the next generation be capable at all of handling the different functions society requires? Do we want a society where we accept math, reading and writing difficulties that are solely due to the teaching handled by unauthorized personnel, through strange "apps" and in a computerized educational chaos?

But our Education Minister Jan Björklund has instead appointed an advisory committee of international experts called "the school commission". A new agency (an "educational research institute") is to be established to investigate these issues. In addition, Björklund intends to create a Swedish Education Council. He also talks about various new investigations and new reforms.

We do not need more research!

The only thing needed is a competent staff with good pay who can work in peace without being threatened, harassed or violated. Their work with students shall be in accordance with traditional effective educational models, with proven pedagogical aids, peace and quiet in class, concentration, joy, enthusiasm, teaching instead of gaming and mobile browsing, information tailored to each individual's ability, and demands on teachers and students in relation to future levels of responsibility. (However, during the public debate I have not heard or read anywhere that one should bet again on the school, the teachers, the educational content or the often poor school facilities and the salmonella-contaminated school lunches. But these are left unattended. Sounds like something out of a New Year's fun cabaret, right?)

Peter Kadhammar at the Swedish tabloid Aftonbladet notes in his excellent column from January 17, 2014, that "In the knowledge society literacy skills have been lost". As I have pointed out many times this has happened in spite of (!) the vast amounts of electronic gadgets introduced and now used in our Swedish schools. All iPads, WiFi, "surf the web pages", computer games, laptops, sending text messages during class, smart phones, etc., do not seem to have done their supposed job of teaching?

Enough is enough. We need peace and quiet in the classroom. Put away the e-reader and mobile and kick out school politicians who want to spend money on unproven educational gadgets that are also probably merely health hazardous.

* The latest global PISA education ranking study released in December 2013 pushed Sweden below the OECD average in maths, reading comprehension, and natural sciences. <http://www.thelocal.se/20131203/sweden-slides-in-global-education-rank-pisa-students-schools>

Text: Olle Johansson, Associate Professor in Neuroscience, Karolinska Institute, Stockholm
<http://newsvoice.se/2014/01/23/ki-forskare-porta-skolpolitiker-som-vill-ge-formodat-halssofarliga-lasplattor-till-eleverna/>