

Schools, Wireless Technologies and Health Risks – How to minimise radiation exposure

Mikko Ahonen

University of Tampere, Department of Computer Sciences, 33014 University of Tampere, Finland

Wireless technologies like GSM, 3G and Wi-Fi have been actively marketed to homes and schools. The radiation exposure of children has simultaneously increased and even multiplied. Recently, the European Parliament recommended that mobile phone base stations should not be installed close to schools and mobile phones should not be marketed to children under 12 years old¹. The existing ICNIRP radiation guidance levels for non-ionising radiation in Western countries are rather old and are based only on thermal effects and limit tissue heating². At the same time, non-thermal, biological effects are being reported in 68 % of independent studies³. Some researchers see that frequencies, the method of modulation and duration of exposure should be taken in account when setting guidance levels and when utilising technologies^{4,5}. The electromagnetic fields (including microwaves) related possible health risks will be illustrated in the actual presentation through research findings and radiation measurements. The research question here is how wireless information systems can be implemented in a sustainable way in public places like kindergartens, schools, and libraries. Therefore, health-related, technical and pedagogical viewpoints are demonstrated. This research is based on our earlier work with ubiquitous computing and mobile learning⁶. As a conclusion, health risks in schools can be minimised by installing base stations with proper safety distance, by keeping the exposure time of children in minimum, by investing in cable infrastructure and by encouraging asynchronous communication.

References:

1. European Parliament (2009). Avoiding potential risks of electromagnetic fields. Statement and press release 2nd April 2009. http://www.europarl.europa.eu/news/expert/infopress_page/066-53234-091-04-14-911-20090401IPR53233-01-04-2009-2009-false/default_en.htm
2. ICNIRP (1998). International Commission of Non-Ionising Radiation Protection. Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields. URL: <http://www.icnirp.de/documents/emfgdl.pdf>
3. Huss, A., Egger, M., Hug, K., Huwiler-Müntener, K., & Rösli, M. (2007). Source of funding and results of studies of health effects of mobile phone use: systematic review of experimental studies. *Environmental Health Perspectives*, 115(1), 1-4. doi: 17366811.
4. Belyaev, I. Y., Markovà, E., Hillert, L., Malmgren, L. O. G., & Persson, B. R. R. (2008). Microwaves from UMTS/GSM mobile phones induce long-lasting inhibition of 53BP1/gamma-H2AX DNA repair foci in human lymphocytes. *Bioelectromagnetics*. doi: 10.1002/bem.20445.
5. Blackman, C. (2009). Cell phone radiation: Evidence from ELF and RF studies supporting more inclusive risk identification and assessment. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*. E pub ahead of print. doi: 10.1016/j.pathophys.2009.02.001.
6. Ahonen, M. & Syvänen, A. (2006). How can electronic portfolios facilitate collaborative problem-finding in the innovation process? IADIS Mobile Learning Conference, Conference Proceedings, Dublin, Ireland.