

Saying Good-Bye to WiFi

A Waldorf School Takes a Precautionary Step

BY RONALD E. KOETZSCH, PhD

In the summer of 2010, a prospective parent walked into the office of Caroline Askew, admissions director at the City of Lakes Waldorf School in Minneapolis. The parent was an attorney with two young daughters. Caroline is accustomed to answering all kinds of questions from parents, but this mother had questions and concerns that Caroline had never heard before.

The parent first inquired whether or not the school utilized a WiFi system—an array of wireless transmitters that allows persons with laptop computers or smartphones to access the Internet and their email from any location in the building. On learning that WiFi was in use, she asked Caroline, “Would the school be open to the possibility of removing the system?” WiFi transmitters constantly emit pulsed radio frequency radiation (RFR), and this mother was concerned about the possible effect on the health of her children. She had done much research and had compiled a collection of documents—articles from scientific journals and abstracts of scientific papers—that pointed to the possible dangers of microwave radiation in a WiFi environment. She asked Caroline if the school would be willing to consider those documents in order to make an informed judgment.

City of Lakes first installed a WiFi router in 2004 in preparation for an accreditation team visit by the Association of Waldorf Schools of North America. WiFi use was limited until 2008, when the school hosted the Association’s annual summer conference. In time, staff members came to depend on the wireless network to work throughout the day on personal laptops. The majority of faculty and staff did not question the safety of the WiFi system. One class teacher was an exception and frequently caused havoc and frustrated his colleagues by intentionally disabling the system.

This teacher was very sensitive to electrical influences (electrosmog) and tried to raise awareness about the problem. He left his class in the middle of fourth grade due to health issues.

At the close of her interview with the concerned parent, Caroline Askew, herself a mother of young children and a person with broad interests, agreed to read through the binder of material. Most of the documents were abstracts of scientific studies on the effects of cell phone use and exposure to the pulsed radio frequency radiation emitted by cell phones. The studies also included research on possible health concerns related to WiFi routers, cordless phones, and cell phone towers. The research had been conducted at various universities and research centers in Sweden, Australia, China, the United States, and other places around the world.

Two documents from the Parliamentary Assembly of the Council of Europe expressed deep concern about the “potential dangers of electromagnetic fields and their effect on the environment.” One article mentioned that the World Health Organization had identified pulsed radio frequency radiation as a class two carcinogen. Another reported that some public school systems in Canada had removed WiFi from their schools out of concern for the health of the children. A letter from David O. Carpenter, MD, Director, Institute for Health and the Environment, University at Albany–SUNY, strongly advised against the use of WiFi in schools. One recurring point was that whatever ill effects pulsed radio frequency



The City of Lakes Waldorf School building was originally an insurance company building, built in 1923. Its brick walls minimize WiFi penetration from external sources into the building.



A WiFi router, which typically can transmit radio frequency radiation about 150 feet in all directions indoors and about 300 feet outdoors

emissions may have, children, because of their size and ongoing, rapid growth and development, would be particularly vulnerable.

Caroline shared the concerns with her colleagues. She asked Betsy Leighton, director of IT at the school, and Bob Amis, a science teacher, to read through the material and offer additional perspectives. In February 2011, Caroline and other City of Lakes staff attended the regional Great Lakes conference at the Chicago Waldorf School. The keynote presenter was Michael D'Aleo, a highly respected Waldorf high school science teacher. Caroline asked Michael if he thought the concerns about WiFi were credible. He answered in the affirmative and added that he is one of the small percentage of the population (about 3%) who are electrosensitive (ES), i.e., extremely sensitive to electromagnetic and radio frequency influences.

Following the regional conference, a presentation of the issue was made at a City of Lakes weekly staff meeting. Most staff members were open to further investigation, although there was significant reluctance to eliminate the convenience of WiFi. Some people had recently purchased iPads, which cannot function without a wireless connection to the Internet. A few faculty and staff were and remained staunchly skeptical.

At this point, the mother who had initially raised the concern and was now a parent in the school offered to pay for an inspection of the school building by a company called Intentional Environment. The company specializes in creating healthy environments by identifying and eliminating energetic interference created by electromagnetic fields (EMFs), pulsed radio frequency radiation, and other factors.



Marti Stewart, administrator, and Caroline Askew, director of admissions, at City of Lakes Waldorf School

One weekend, the company's two owners spent many hours assessing electromagnetic fields and radio frequency radiation throughout the school

building, using a variety of electronic meters and measuring devices. In many places they found high levels of RFR from the school's WiFi routers as well as from WiFi transmitters outside the building.

When the building WiFi was turned off, they were able to assess the levels of the AC (alternating current) electric fields coming from building wiring, appliances and other electronic devices. In some areas, they detected what is called "dirty electricity." This is AC current that has tiny energy spikes in the sine wave of the current flow. Dirty electricity is also considered a possible health risk.



A sign in the school lobby

The team discovered other problematic factors:

- Fluorescent lights emitting unnecessary RFR
- Electric cords wrapped around metal water pipes and creating very strong electromagnetic fields
- A strong EMF created by a large transformer located on a pole right outside one of the lower-grade classrooms
- "Dirty electricity" being generated by the motor for the school elevator

Following the assessment, the company gave the school a sixteen-page report, describing the problems present and recommending measures for remediation. The first and most important recommendation was to remove the WiFi routers from the school and have staff and faculty connect to the Internet by Ethernet cables instead. Other recommendations included rewiring lights, putting long extension cords in metal conduits, using outlet filters to eliminate dirty electricity, installing metal window screens to prevent radio frequency radiation from coming in from the outside, and not placing student desks in particular areas of certain classrooms. The recommendations were not particularly costly, and the school was able to implement many of them. Additional improvements have been made each year since.

City of Lakes Waldorf School has not chosen to publicize its decision to remove WiFi. Staff and faculty have adapted to the nonwireless environment. Parents and visitors to the school are not surprised when they discover they cannot get a WiFi connection to the Internet with their laptop or smartphone. There are, after all, "Cell Phone Free Zone" signs in the school lobby. A visitor with a laptop can, if necessary, access the Internet via a hardwired connection.



This window in the second-grade classroom is now equipped with metal screening, which shields the room from WiFi radiation from outside the building.

Is WiFi Really Harmful?

In the binder presented to the school by that first concerned parent, there were about fifty abstracts of scientific studies. Some focused on the effects of cell phone use: the combined impact of the heat and

the pulsed radio frequency radiation that cell phones generate. Those studies indicate the following problematic effects of relatively long-term (ten years or more) cell phone use:

- Oversecretion from the parotid (saliva) gland on the side used for the cell phone
- Increased risk of tumors in the parotid gland
- Increased risk of glioma (a brain tumor that develops from glial cells)
- Increased risk of acoustic neuroma (a tumor in the ear that develops from nerve cells)
- A correlation between the amount of cell phone use and behavioral and mental health problems

Most of the studies involved the effects of short-term exposure to pulsed radio frequency radiation on human beings, on animals (rats, mice, rabbits), and on plants. Some of the studies were carried out on the actual subjects (in vivo), and others involved cells taken from the subject and exposed while in a test tube or other vessel (in vitro). These various studies indicated that exposure to pulsed radio frequency radiation does the following:

- Changes electroencephalogram (EEG) patterns in the brains of human beings—in particular, a reduction in alpha waves, associated with relaxation, with women being more affected than men
- Reduces the ability of human adults to do tasks involving spatial memory
- Decreases the attentiveness of young adults when performing memory tasks
- Affects melatonin levels during sleep
- Affects the changes in blood chemistry related to the circadian rhythms of waking and sleeping
- Causes breakdown in DNA strands and thus changes the structure and functioning of genes, i.e., is genotoxic (an in vitro study of human cells and

an in vivo study involving brain cells of rats both indicated this effect)

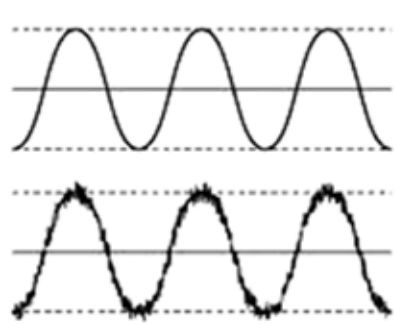
- Adversely affects the quality, viability, duration and motility of sperm cells (this effect also was observed with human cells in vitro and rat cells in vivo)
- Negatively affects the function of the thyroid gland (in rats)
- Decreases the function of endocrine cells that secrete digestive hormones (in rats)
- Affects the function of the inner ear (in rabbits)
- Affects the function and structure of normal human hemoglobin (in vitro)
- Disturbs the normal functioning of worker honeybees
- Causes genetic damage in mung beans and inhibits their germination and root formation
- Compromises the blood-brain barrier (the BBB is a selective permeable barrier that allows into the brain fluid the nutrients, water, and other things the brain needs, but keeps out potentially toxic substances; the relevant study involved rats)

These and many other studies are readily available on the Internet. The website of the National Center for Biotechnology Information, whose mission is to advance science and health by providing access to biomedical and genomic information, can be found at www.ncbi.nlm.gov/pubmed

It should be noted that there are also studies that indicate little or no ill effect from cell phone use and exposure to WiFi. These studies, like the studies just cited, are of necessity short-term studies. Even a study focusing on the effects of ten years of cell phone use is, in the context of a normal human life span, a short-term study. In any case, there is as yet no unanimity in the scientific community about these issues. Studies funded by the communications industry tend to find no harmful effects.

Rudolf Steiner, founder of Waldorf Education, considered electricity a realm of “subnature.” Early in the 1900s, Steiner predicted that by the end of the century there would be so much electrical influence in the environment that it would be detrimental to human health.

Dr. Michaela Glöckler, who is head of the Medical Section at the Goetheanum, the center of the world anthroposophical movement located in Dornach, Switzerland, has for some years been warning about the dangers of WiFi. This past February at a conference on technology in education at Rudolf Steiner



Wave profile of normal alternating current (above), contrasted with the wave profile of “dirty electricity” (below)

College in California, she addressed the issue. Dr. Glöckler explained that a WiFi router, even when it is not in use, is constantly emitting a very regular high frequency pulse of energy. The human body also operates with electrical energy, and the cells communicate by means of electromagnetic fields. However, the pulsation is slightly random and irregular and not exactly the same speed as that of the router. Thus, the pulsed WiFi signal can interfere with the natural, optimal functioning of the body.

Dr. Glöckler stated that we can and should use electronic technology. However, we should use it only when it is necessary. She strongly advised against the use of WiFi in schools when wired connections can serve the same purpose. She emphasized that children, due to their small size and rapid development and growth, are particularly at risk. Dr. Glöckler also advised people with serious health problems to avoid WiFi environments, since exposure may compromise the immune system. She pointed out that work spaces can usually be arranged to provide Internet access via a cable and, if WiFi is an absolute necessity, at least the router can be turned off when not in use.



Dr. Michaela Glöckler, internationally known medical expert and pediatrician

In Dornach, Switzerland, the Goetheanum contains many offices, lecture rooms, a cafeteria, and other spaces where one would expect to find WiFi. However, WiFi is available only in a limited area on the ground floor of the building and only for visiting conference participants. In talks and private conversations, Dr. Glöckler has often speculated that WiFi may be the asbestos of the twenty-first century—something universally accepted as perfectly safe and then, in time, after much harm has been done, discovered to be a serious hazard.

Recent research has provided some evidence of the possible short-term effects of electromagnetic fields and pulsed radio frequency radiation. At this point, however, no one can know or predict the long-term

effects. WiFi networks and the continuous exposure to radio frequency radiation are recent—only within the past fifteen years—factors in our daily lives. Long-term studies have not yet been possible. Until time allows such studies to be conducted, we and our children are subjects in an extended biological experiment.

In the decision to have WiFi in a school or in our homes, it is perhaps wise to apply the Precautionary Principle. This principle, developed in the early 1980s, is meant to guide decision making regarding ecological and health policies. In the agencies of the European Union, the Precautionary Principle is officially recognized as a determinative guideline in making decisions that affect the environment and public health.

The Precautionary Principle states that when a new device, activity, or policy is proposed, and before it is implemented, those who will provide and profit from it must prove conclusively that it is not harmful. The burden of proof should be on those proposing and promoting the innovation. Those who question or oppose the innovation should not be required to prove that it is harmful.

At this time, no one, including the very powerful electronic communications industry, has proven conclusively that exposure to WiFi is safe. There is no proof that short- or long-term exposure to WiFi for children or for adults is benign.

City of Lakes Waldorf School took a courageous and perhaps prescient step in eliminating WiFi and going back to hardwired access to the Internet. The school ran the risk of being perceived as alarmist and for taking a side in an unresolved scientific controversy. However, the school chose to act out of concern for the health and well-being of the students entrusted to its care.

The school is in good company, though. The Israeli Department of Education, the French National Assembly, the European Environmental Agency, the Council of Europe, and the German government are but a few of the many governments, government agencies, and scientific authorities which are now warning about and/or banning WiFi in schools. ☺



An outlet filter that reduces dirty electricity