BISHOPS
DIOCESAN COLLEGE

Friday, September 18, 2020

WiFi and Health Issues

Mr Reeler, asked me to investigate possible health issues relating to WiFi use. The reply is lengthy as I really did want to give concerns the attention they deserved and also to give assurance of the measures that are in place and the considerations that are taken to best support educational needs.

I must also state that I am no expert in radiation, although I do keep a very careful eye on international trends and also work closely with other schools in the country.

WiFi devices have been in use for more than 20 years. They are found in every home, office, school and public place in almost every country. Their effect on health and long-term security remains a hotly debated topic. People have different perspectives and priorities on how best to manage any number of modern lifestyle challenges. Concerns and fears include the explosion of technology, whether to avoid food with hormones / preservatives, what sort of car / cell phones / lifestyle would least harm future generations and how to work towards a future free of racial and social inequalities.

Background and Explanation

For many years Bishops operated in a wired environment until the demand for connectivity anytime / anywhere, as well as risks of damage to people and machines resulting from trailing cables, led to the introduction of a wireless solution. Other problems such as broken network points, lack of flexibility of

where 'learning' could happen, and loss/theft of fly leads and ethernet adapters disrupted the academic program. When modern laptops no longer came standard with ethernet ports the demands for ubiquitous WiFi connectivity ultimately led to a campus wide WiFi migration. However, as with any technology introduction the school takes a sensible precautionary approach and continues to keep the technology under review.

WiFi is now available in Houses and common areas as well as classrooms.

Grade N - 10: 6.30am until 10pm

Grade 11: 6.30am until 11pm

Grade 12: 6.30am until 12pm

Restrictions of when WiFi is available outside of Academic hours have been relaxed because it is felt that limiting school WiFi access simply means that learners use their own data and are not protected or governed by school Internet restrictions.

5G and Cell use at School

Many health concerns are aimed specifically at mobile phones, particularly as these are carried and operated closer to the body than laptops and iPads are. Prep and PrePrep learners are specifically asked not to bring phones, or iPads with sim cards in, to school. At the College the learners are allowed, but are not required, to bring a cell phone. A phone on silent mode can still be a distraction in class and therefore all teachers and boys are asked to turn off their phones during class time. Staff and boys are asked to respect this school decision, but it is not easily enforced.

As there is no expectation from the school that learners should bring mobile phones to school and as the school has no control over broadcast of 5g, we will

need to limit this response to WiFi concerns, other than offer a few suggestions below:

Simon Lee of ISASA reminded us of this article on Mybroadband which examined the health implications of non-ionising radiation in terms of 5G.

> https://mybroadband.co.za/news/cellular/356065-mybroadband-investigation-radiation-from-cellular-towers-vs-a-phone-against-your-head.html

Some cell phone usage suggestions include

1. Do not carry a powered-on device close to the body for an extended period
2. Use speaker mode, headphones, or ear buds to place more distance between the head and the cell phone
3. Avoid making calls when the signal is weak as this causes cell phones to boost RF transmission power
4. Reduce the amount of time spent using the cell phone
    - Do not bring the phone to the dinner table
    - Limit phone use during social interactions
5. Do not to sleep with a powered-on device next to you https://pmg.org.za/committee-question/12242/

ICT Vision and WiFi Provision

The ICT vision for the school is to offer a world-class education that prepares our learners for a technology centered future. This is achieved by prioritizing and supporting ICT integration in a safe and secure environment, one that encourages collaboration and communication and is supported by an Academic Intranet that is aligned with 21st Century skills and education around sustainable development goals (SDGs). Ubiquitous access to Intranet and Internet is necessary for this.

As a school we need to optimise associated hardware, software and staffing needs for maximum educational benefit and yet still operate within budgetary constraints and in overall balance with other competing needs of the school.

At Bishops, Cisco (Meraki) wireless access points are used. All Meraki products meet EMF requirements, and this is demonstrated with a CE Declaration of Conformity which declares product compliance to areas of EMC, Safety, Wireless/RF (if applicable) and RoHS. Their website offers proof of compliance for not only Europe but also for many other regions as well. These can be downloaded from their website: https://meraki.cisco.com/compliance . The school's distributor, Three6Five and Cisco have both advised that there is no reason why schools and others should not use responsibly managed, modern, correctly mounted, controller based, IEEE standard compliant WiFi equipment.

The reasons include:

- Modern WiFi equipment uses Beam Forming Technology with Antennae Array Technology that improves the communication by focusing the signal and lowering the power levels needed to achieve reliable WiFi communication. This technology is generally not featured in cheap/home equipment but is available in Enterprise Grade WiFi equipment. Staying reasonably abreast of current technology as it improves is also good for keeping these levels as low as possible.
- By designing a WiFi Network with careful spacing of WiFi Access Points and locations the signal levels are kept as low as possible because the Client device and the Access Point it is attached to is in close range. An example of this is dense placements of Access points with most access coming from the immediate spaces, not needing to 'talk' through walls and other signal affecting materials.
- Careful Channel Selection also helps with reducing the Signal to Noise Ratio allowing lower power levels by keeping same channels physically

apart. Enterprise WiFi setups such as at Bishops manage this automatically

- Bishops has a WiFi Access Point (AP), managed by an enterprise controller, in virtually every academic classroom for reasons described above. The controller has automated transmit power controls that allow each wireless access point to independently reduce the power sent to its antenna's based on the room size and usage conditions

EMF SA have been contracted to measure levels in many schools in the country and thereafter have endorsed the Wifi installation thereof. Bishops have been in contact with EMF SA and are contracting them for such an investigation. This has taken some time to arrange because of the current Covid situation and is scheduled for term 4. We will revert to you thereafter. In the interim let us assure you that EMF SA confirm that they recognize that Wi-Fi is an essential teaching tool and advise their clients to follow the A.L.A.R.A. Principle (As Low As Reasonably Achievable) in terms of electronic provision.

Would reverting to a wired solution be something to consider?

It would be very difficult to revert to a model that we know could not meet connectivity needs (flexibility of seating arrangements) and that we know was fraught with other problems.

Of interest is that Initial calculations of costs to install a wired infrastructure to replace current WiFi provision and to provide like for like access are conservatively about 6 million once off, with a 30% of initial capital recurring annually. This increased cost would impact budget and unbalance the synergy between ICT and such a project would need approval and planning. We would also need to consider whether the associated increased power requirements of a fixed network infrastructure would impact negatively on the school's sustainability footprint. The main point however is that there would be little to

gain by removing school WiFi as the suggested health risks associated with 'radiation' would remain. It would only be school WiFi devices that would be removed from the equation. Learners would still use modern devices, with batteries and WiFi. Any new technology bought to detect and disable WiFi on all devices, block 5g, block Satellite Internet, manage unauthorised 'hot spots' and detect hidden SSID's would operate on the same non-ionising frequency as the WiFi itself.

We concur with EMF SA that WiFi is an essential educational tool and commit to following the "A.L.A.R.A. principle".

WiFI and Health Risks

There are two schools of thought regarding EMF radiation: one claiming there is no harmful effect and the other that there may possibly be a harmful effect over time. In 2011, the *International Agency for Research on Cancer* (IARC) reviewed the published literature and categorized RFR as a "possible" (Group 2B) human carcinogen. This means that they are not totally ruling it out after tests on rats showed that, with doses at almost 100 times that any human would ever be exposed to, there was an increase in cancer rates. It is certainly not disputed that electromagnetic fields above certain levels can trigger biological effects.

The current debate on the effects of WiFi radiation is centred on whether long-term low-level exposure can evoke biological responses and influence people's well-being. Heating is the main biological effect of electromagnetic fields of radiofrequency (microwave cooking) and the heating effect of radio waves forms the underlying basis for current guidelines.

The levels of radiofrequency fields to which people are normally exposed are very much lower than those needed to produce significant heating. Scientists are investigating the possibility that effects below the threshold level for body

heating may occur as a result of long-term exposure. To date there is no empirical evidence of adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields.

Barnabas Kunsch, Austrian Research Centre Seibersdorf says that: "The absence of evidence of detrimental effects does not seem to suffice in modern society. The evidence of their absence is demanded more and more instead". This explains the overwhelming evidence of huge investment in ongoing research even after scientists have already proven that there is no convincing evidence for an adverse health effect of non-Ionizing radiation or a cause-effect link between electromagnetic fields and cancer.

Some people interpret the above statements as if Science was deliberately misleading or not protecting humanity. That is not our perspective.

Human health studies can easily identify large effects, such as a connection between smoking and cancer. Unfortunately, they are less able to distinguish a small effect from no effect at all. Were electromagnetic fields (at typical environmental levels) strong carcinogens, then it would have been easy to have proved this by now. However, if low level electromagnetic fields are a weak carcinogen, or even a strong carcinogen but only to a small number of people, that is more difficult to demonstrate. Even if a large study shows no association, one can never be entirely sure that no relationship exists. The absence of an effect could mean that there really is none or it could just as well mean that the effect is simply undetectable with our method of measurement. Negative or inconsistent results are generally less convincing than strong positive ones.

Our research, as non-experts in this area, has led us to conclude that scientists and medical experts agree that any health effects of low level electromagnetic fields, if they exist at all, are likely to be very small compared to other health risks that people face in everyday life.

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https://www.forbes.com/sites/quora/2016/05/19/a-radiation-oncologist-says-everything-you-need-to-hear-about-wifi-and-cancer-risk/#57110c607267

School Council has thus mandated that the school should continue to educate our learners on safe and responsible Internet interaction and practices in a controlled WiFi networked environment that provides access to modern tools and best equips our learners for their futures.

The school commits to following both local and International educational discussions on the topic of electronic safety and will continue to monitor the situation in the best interests of our staff and learners.

Kind regards

Sally Bowes

ICT Director