

# Chapter 14

## Amateur Radio in Education

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### ABSTRACT

*The intention of this chapter is to increase capacities in educators for using computer- and communication-related technologies and to help them to acquire systematic knowledge in basic computer networking and communicating with their peers, other teachers, students and their parents. In form of introducing 'packet-radio', one of the most popular amateur radio computer-related communication modes, the mission of this chapter is to motivate teachers and students to use the amateur radio hardware and software for designing AMUNETs – the Amateur Radio University computer Networks – within their school buildings and around university campuses. The purpose of this chapter is to involve scholars to the world of amateur data exchange in an easy way by describing simple experiments related to networking simulations in local area networks. The goal of those experiments is to provide enough knowledge and experience with the amateur radio software before starting experimentations with real radio devices.*

### INTRODUCTION

The U.S.-based Association for Computing Machinery (ACM) regularly distributes its on-line newsletter *ACM TechNews*<sup>1</sup>. During the last 4-5 years, this author collected a worryingly increasing number of TechNews headlines, as follows:

“The number of women in the U.K. IT industry continues to decline”,

“IT-related degrees has [sic] fallen about 50 percent”,

“Australia is currently in the middle of the worst IT shortage in its history”,

“Is Computer Science Dying?”,

“U.S. students are falling behind in science, technology, and engineering”,

“Decreasing numbers of women in IT”,

“The number of computer science graduates in Canada continues to dwindle”,

“Japan is starting to run out of engineers and is

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facing a declining number of young people entering engineering and technology-related fields”, and so forth.

It is obvious that the world of science and technology is going to face more and more similar stories. According to the titles listed above, it seems that from the beginning of the new millennium, the educational systems in (some of) developed countries keep failing to motivate young generations to choose their professions in information and communication technologies and electrical engineering areas. For that reason, it is an imperative for educators and technology practitioners to search for new ways and methodologies of persuading young pupils and students that technical professions are not reserved for technological ‘geeks or computer ‘hackers’, which is a common prejudice these days. That means it is necessary to include alternative views and methods to show to the youngsters that electrical engineering and computer science are suitable for all, including women and minorities.

Amateur radio can have an important role in efforts to (a) attract more young people to the field of engineering, and (b) create a positive image of information technology in the minds of prospective students. According to Davidoff (1994), we should support the amateur radio in education because it may lead many young people to consider their career in science and engineering. We also share Davidoff’s viewpoint that “it’s economically advantageous to a modern country to have a significant number of citizens well trained in these [amateur radio] areas.” (Davidoff, 1994, p. 4/17).

The amateur radio is an old fine hobby from the days of inventing Morse alphabet and implementing telegraphy. Since the second half of the 19<sup>th</sup> century, millions of volunteers learned new skills in communications – while attending the amateur radio courses and successfully passing examinations; getting the first amateur radio licenses and transmitting signals to the spectrum. The electronics industry recognized the incoming

‘flood’ of the new communicating enthusiasts, coming from all over the world and predicted them to become a good market. The radio amateurs are capable to establish unusual radio paths via Moon and artificial satellites, to exchange voice transmissions with crews on the space ships, even to make an urgent search for medicines on the other continents. Today we have many opportunities to purchase sophisticated and computerized amateur radio ‘gadgets’ which include not only traditional but also fascinating brand new communication modes. Besides telegraphy and radiotelephony, there is a variety of computer-related possibilities to explore.

The amateur radio encourages teachers and students to learn various mechanical and electrical skills needed for constructing amateur radio repeaters (radio-relay devices), maintaining antenna towers, cabling systems, installing e-mail servers and exchanging practical experience with surrounding schools and universities. Dealing with computer hardware and software require from educators to acquire basic knowledge in electronics design and programming. Preparing technical equipment and establishing direct keyboard-to-keyboard contacts between students, teachers, or both - on one side of the link, with remote correspondents on the other side, produces a lot of excitement. In addition, wireless communications with the astronauts on space missions opens new horizons in physics, astronomy, biology and related disciplines. McLarnon (2008) clearly states that the major impediment to the use of amateur radio in distance education is the knowledge and effort required to establish the initial infrastructure, because it is not as simple as connecting a modem to a telephone line and running some software. The proficiency needed to build reliable antenna systems, repeatedly test radio link performance, install various kinds of networking software, and deal with unexpected problems that inevitably crop up, one can only gain through experience. That is why we want to add the amateur radio to the experiments in school labs.

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