CSCI 4000
Ethical and Professional Issues in Computer Science

Chapter 8 & 9: Computers and Health;
Computers and Education

This course is not primarily a lecture course. It will rely heavily on a discussion of the issues presented in the textbook *Computer Ethics: A Global Perspective* by Giannis Stamatellos. These slides present ideas and quotes from the textbook primarily to inspire and promote discussions in class. A focus will be placed on:

1) the local and global impact of computing on organizations and society as well as on

2) how ethical principles and leadership quality impact individuals, organizations and society.
Ch 8 – Computers and Health

The extensive use of computers can cause health problems called technostress symptoms.

1. Repetitive strain injuries. (RSI)
   • Carpal tunnel syndrome. (Often involves wrist and hand pain, but can involve the back neck, shoulder and feet.)

2. Computer vision syndrome. (CVS)
   • Caused by improper lighting, screen glare, poor screen resolution.
   • Irritated eyes, blurred vision, headaches, other.
Ch 8 – Computers and Health

Issues related to RSI and CVS.

• Difficult for manufacturers to keep up with the latest knowledge about these issues.

• Ignorance of employers about the potential health problems caused by IT equipment.

• Employers are generally not liable for these problems in the workplace “... because of compensation statutes that provide income to those injured on the job.”
Medical Robots are possibly the most widespread use of robots. Four types.

1. Assistance robots – assist patients in recovery and in remote communication with doctors.

2. Care robots – assist the elderly and special needs persons.

3. Prosthetics – “use robotic mechanisms to provide artificial or bionic limbs ...”
Medical robots continued.

   - Assist surgeons with complex operations.
   - Advantages.
     - Faster training of surgeons.
     - Lower costs for hospitals.
     - Support more consistent operations.
     - Provide stability and precision in operations.
   - Example: da Vinci surgical system.
Ch 8 – Computers and Health

Disadvantages of medical robots.

• High costs – often too expensive for most people.
• Require use of personal data, which must be kept secure. Who has access? Who maintains the data?
• Reliability.
  ✓ Hardware malfunctions.
  ✓ Software bugs.
  ✓ Misuse.
• Who is responsible for a medical error: designer, manufacturer, hospital, or doctor?
• Dehumanization – contact with doctors/nurses is reduced.
Ch 8 – Computers and Health

Telemedicine – the delivery of clinical services to remote areas using telecommunication technologies.

How telemedicine can be used.

• In medical diagnosis and treatment.
• In preventive and therapeutic services.
• In doctor and patient education.
• In medical administration (supervision, satellite offices?)
• In research.
Disadvantages of telemedicine.

- Unreliability
  - Patient may not be able to communicate.
  - The communications technology may fail.
  - Problems with system reliability or data could endanger patients.

- Requires training by doctors, nurses and patients to prevent incompetent use.

- Can be intrusive on doctors.
Ch 9 – Computers and Education

Computer and information technology in schools.

1. Supports the learning process.
   - Smart classrooms and high-tech systems.
   - Internet access.
     - Library access.
     - E-book access.
     - Multimedia sources: images, sounds, etc.
     - Online course availability.
     - Etc.
   - Recording of classroom sessions.
Ch 9 – Computers and Education

A concern:

Does student dependence on computers cause

• Loss of skills.

• Computer addiction.
Ch 9 – Computers and Education

Computer and information technology in schools.

2. Supports school administration.
   • Student database management.
   • Library management and organization.
   • Security
     ✓ Authentication of student identity. (e.g biometrics.)
     ✓ Verify student attendance.
     ✓ Surveillance
Surveillance uses on campuses: How does this seem to you?

• School entrance – check for unauthorized visitors.
• Parking areas – secure cars, monitor driving behaviors.
• Library – protect books, etc. from theft.
• School yard – monitor behavior, prevent accidents.
• Laboratories – in case of emergencies.
• Bathrooms – monitor for inappropriate behavior.
• Classrooms – evaluate lessons and student behavior.
Ch 9 – Computers and Education

Proponents say that surveillance
• Improves security of students and teachers.
• Improves emergency response.
• Improves quality of learning in the classroom.

Opponents say that surveillance
• Invades privacy of both students and teachers.
• Creates anxiety.
• Students may simply accept such a system and not develop a sense of their own right to privacy and the importance of such a right.
Electronic learning (e-learning or telelearning)

The use of computer and telecommunication technologies to provide resources for educational and training activities.
Ch 9 – Computers and Education

E-learning advantages.

• Wide availability – to remote learners, persons with special needs, the elderly, confined persons (hospitals, prisons, etc.)

• Equality of access. (What about those with no access to high-tech infrastructure?)

• Easy access – can study when and where you want (no need to travel to school, etc.).
Ch 9 – Computers and Education

Ethical and social issues raised by e-learning.

• Quality of online sources.

• Quality of access – Is what is presented biased or complete? Does your search engine have bias?

• Plagiarism issues.

• Cost – What about those who cannot afford high-tech equipment, e-course fees, etc.

• Dehumanization – Contact between student and teacher is reduced or lost. Some feel that student-teacher interaction is vital to learning.
Chapters 8 and 9 – Study Guide

Remember our focus in this second half of the class:

Does a student demonstrate an understanding of the social issues and responsibilities in society that involve computing and information technology?

When you study these remaining chapters focus on the phrase “issues and responsibilities”. In Chapter 8 ask yourself, “What are the social issues and responsibilities associated with the use of computers and telecommunications in health care?” In Chapter 9 ask yourself, “What are the social issues and responsibilities associated with the use of computers and telecommunications in education?” For both of these contexts, what are the advantages and disadvantages of information systems and technologies. What are the responsibilities involved?