

Social and ethical issues in computer science

social: issues about computers in society
— social, political and legal

ethical: making decisions about “what is
right”

Social informatics

Rob Kling :

“... is the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts. ”

What is Social Informatics and Why Does it Matter?, *D-Lib Magazine*, 5:1, 1999.

<http://www.dlib.org:80/dlib/january99/kling/01kling.html>

Computer technology—a double-edged sword

- Probably the most significant technology since the industrial revolution
- Power has potential to:
 - make routine tasks quick & easy
 - save lives
 - explore space and the world
 - communicate
- Power has potential problems:
 - loss of privacy
 - theft
 - breakdown of complex systems that we rely on

Why is it important that we look at this technology from a social informatics perspective?

Issues to consider

An example : the ATM

- Impact on employment
- Alienation and customer service
- Crime
- Privacy
- Errors and dependability

So, are ATM's a good or a bad development?

Other issues relevant to this area:

- intellectual property
- general social issues:
 - local community issues
 - class separation; issues of gender, race, disability, the disenfranchised
 - the workplace; homelife
 - education
- freedoms
- professional ethics

What are we weighing up here?

It is important to compare computers and technology to

- the real alternatives

rather than

- some idealised situation

Some benefits

- general — enhanced experience, including entertainment, convenience, communications, transport, education, crime fighting;
- medical — devices, patient records, diagnosis, tele-medicine;
- use of technology by people with disability — I/O devices, prostheses, artificial organs
- science & engineering
- automation
- identification systems
- reduced paper use
- others . . . ?

Some questions

- jobs that have been made obsolete by computers?
- jobs that did not exist before computers?
- benefits and disadvantages of having library materials in electronic format?
- newspapers?
- devices or machines that have embedded microprocessors?
- systems that are computer-controlled?
- applications where a computer error could be life-threatening?
- what is the role of ethics in all of this?
- others ... ?

There is a huge range of topics within this area; we only look at some of them.

Computerisation and work

The way people work has changed:

- jobs are changing
- computers are being used in the workplace
- people are working more flexibly
- telecommuting

Are jobs moving to those primarily in support of the computer industry?

Do jobs require much more computer literacy than they used to?

Income and productivity How long do people work?

- Working hours have decreased ...
- ...or have they?
- Pay has gone down ...or up ...?
- Quality of life ...?

Many of these concerns have also been concerns with the introduction of other technologies.

The work environment

Teleworking: there are various paradigms, in general working from outwith the employer's central premises.

- benefits to employers . . .
- . . . and employees?

- problems for employers . . .
- . . . and employees?

How can problems be addressed?

Consider side effects

Use of computer technology in the workplace

Employee monitoring

“Technology now allows employers to cross the line from monitoring the work to monitoring the worker” — Cindia

Cameron

Why should this be something you even think about?

- keystrokes
- physical surveillance
- customer service calls
- e-mail, voicemail, files, Internet access

What kind of monitoring do we do at Wits?

What is appropriate, what is ethically acceptable?

Health issues

- crt screens
- RSI

The psychology of email

Ethics and Computer Science

1. ethics as a field
2. the relevance of ethics to computer science

Various views on the answer to the question “*what is computer ethics?*”

Maner — “computers bring new ethical problems”

Johnson — “computers just bring a new slant to old problems”

Moor — “social and ethical use of new technology”

Gotterbarn — “applied ethics for computer professionals”

Think of examples of each of these.

Ethics

Moral philosophy

Concepts of right and wrong behaviour:

- metaethics — where do our ethical principles come from?
 - metaphysical issues
 - psychological issues
 - linguistic issues
- normative ethics — arrive at moral standards that regulate right and wrong conduct
 - deontological theory
 - consequentialist theory
- applied ethics — taking specific controversial issues, use normative ethics (and metaethics) to try to resolve the controversy

Assume people are *rational* and have *free choice*

Metaethics

The origin and meaning of ethical concepts

Metaphysics—the kinds of things that exist in the universe: *are moral values “eternal truths” or human conventions?*

- moral realism — moral principles have an objective foundation, not based on subjective human convention
 - eternal law (spirit-like objects)
 - divine commands
- moral skepticism — deny that moral values exist objectively (though do not reject moral values themselves)
- moral relativism — moral standards are grounded in social approval
 - abortion (China vs. Ireland); stealing; killing; suicide; circumcision

Psychological issues

Why be moral?

Various views:

- psychological egoism (Hobbes) — many of our actions are prompted by selfish desires
- psychological hedonism — pleasure is the driving force behind our actions
- psychological altruism (Butler) — some actions come from instinctive benevolence

David Hume — only emotions can motivate people to act morally.

Immanuel Kant — true moral action should be motivated only by reason.

Kurt Baier — moral decision making involves giving the best reasons in support of one course of action over another

Lawrence Kohlberg — followed on the work of Jean Piaget, on the development of moral thought and behaviour in children.

Table 1: Kohlberg's stages of moral development

Level 1 preconventional		Level 2 conventional		Level 3 postconventional	
Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2
obey authority and avoid punishment	different sides to an issue; more than one authority	be a good person	be good within society	basic rights and democratic processes	interest in just principles

6 stages of moral development; only reach level 3, stage 2, in mid-twenties.

Linguistic issues

- what do things like 'right' and 'good' mean?
- descriptive components — cognitive meaning
- accomplishment oriented components — non-cognitive meaning

example: *It is good to donate to charity*

Normative ethics

Example: do to others what we would want others to do to us

(In contrast, descriptive ethics)

Deontological theories

From the Greek *deon* = duty

Various theories within this categorisation:

- duty theory — lists of virtues character traits that a person should try to acquire
- rights theory — rights that all people have and others are obliged to acknowledge
 - natural
 - universal
 - equal
 - inalienable
- categorical imperatives (Kant) — “treat people as an end and not a means to an end”

Consequentialist theories

An action is morally right if the consequences of that action are more favourable than unfavourable:

- ethical egoism—to the agent
- ethical altruism—to everyone but the agent
- utilitarianism—overall favourable

Different types of utilitarianism:

- act — tally the consequences of each action (for each action in each situation)
- rule — tally the consequences of adopting a rule (eg stealing is wrong)

Applied ethics

Some important distinctions:

- right, wrong, **okay** (ethically obligatory, ethically prohibited, neither)
- negative and positive rights (liberties and claim-rights)
- wrong and harm (an act does not have to cause harm to be wrong; just because an act is not ethically wrong does not mean it does not cause harm)
- separate goals from constraints (the goal of a business is to make profit—ethics is to do with *how* those goals are achieved)
- personal preference and ethics (eg. doing work for a group that advocates some policy that you personally disapprove of)
- law and ethics — these are **not** the same thing! Legal obligation and ethical obligation are also different

Professional ethics

The professional is a specialist; the products of professionals affect many people.

Ethical rules are not universal, but the tools we use should include:

- reason
- introspection
- observation of human nature, values and behaviour
- an understanding of ethical principles

Ethical behaviours within a profession are based on ethical theory **and** what is possible using current technology and what is generally accepted practice.

Professional responsibility includes:

- maintaining a level of competence
- learning enough to do a good job
- honouring agreements and contracts made

Do organizations have ethical status? Is it only individuals who should be expected to behave ethically?

Professional codes of ethics — eg the ACM code of ethics and professional conduct

An approach for ethical analysis (Baase)

1. identify all people and organisations affected (stakeholders)
2. list all possible actions
3. consider impact of each action on stakeholders
 - consequences
 - risks
 - benefits
 - harms
 - costs
4. identify responsibilities of decision makers & rights of stakeholders
5. decide which choices are ethically wrong, ethically obligatory, acceptable but not required
6. if there are several ethically acceptable options, consider ethical merits of each

An example:

You are a computer system manager. An employee is out sick and another employee requests that you copy all files from the sick person's computer to theirs so that they can do some work.

What do you do?

Obvious risk is privacy. Other risk is there might be a complaint suit from the employee. If the work that needs to be done (by employee making request), risk of it not being completed.

Ethical decision depends, in part, on policies and expectations at particular company. Also on perhaps requiring more information.

Can call sick employee, but this might not be possible. Request authorisation from project manager, or employee's line manager.

In actual case, system manager refused to transfer all files, but agreed to transfer specific files if given the filenames.

Another example: release of personal information.

You work for one of the large credit card companies. Someone asks you to get a copy of a person's file. He will pay you R1000.

What do you do?

Who are the stakeholders?

What alternative actions are open to you?

Which are ethically prohibited or obligatory?

A variant of the scenario:

You know another employee sells files with people's personal information.

Again, what do you do?

Further example:

You are the manager of a university computer system that provides computer accounts and email facilities to students. You discover that a handful of students have been spamming the entire class and sending junk email to all of the email aliases. You are unable to find out exactly who these students are as they are using a facility outwith the university and posting anonymously.

What do you do?

Dependable computing

Failure of computer systems can have many negative effects:

- death, injury (safety-critical systems)
- other harm to individuals
- physical damage
- direct economic costs
- indirect economic costs
- inconvenience

Like other failures, can be caused by a variety of factors.

Need to consider risk of computer system:

- of using system
- of not using system

Risk is

- harm that can be done
- multiplied by probability that the failure will occur

In engineering areas, reliability theory is well developed, but it is

- difficult to quantify
- difficult to determine probability of

software failure

Examples of problems:

- individuals
 - billing errors
 - database accuracy errors
 - consumer hardware & software
- system failures
 - communications
 - business and financial systems
 - destroying business
- safety critical systems
 - computers in the air
 - air traffic control
 - medical (ex — Therac-25)

Some factors why systems fail:

- complexity of systems
- non-linearity of software
- not catering for unexpected inputs or circumstances
- real world (physical) interaction
- insufficient testing
- carelessness
- pressure to get a product out quickly
- inadequate attention to potential safety risks
- data-entry errors
- inadequate user training
- overconfidence in software
- insufficient legal or market incentives

Another perspective:

- getting the requirements right
- validation
- design & implementation
- testing & verification
- models of the world
- interaction with humans
- project management
 - skills
 - process used
 - culture of organisation
- fault-tolerance, backup
- safety analysis

In summary ...

- many issues have also been relevant to other technologies
- perfection is not an option
- study failures to reduce their occurrence
- balance risks against:
 - other methods
 - benefits obtained

Privacy

2 aspects to this:

- personal privacy
- privacy of communications — this is more related to issues of security

Personal privacy issues are not unique to computerisation;

Computers are not necessary to the invasion of privacy.

Personal privacy

What is privacy?

Many different definitions, perspectives:

- is it a separate right?
- is it part of other rights?

We look at 3 key aspects of privacy:

- freedom from intrusion
- freedom from surveillance
- control of information about oneself

Personal information is not limited to 'sensitive' information.

Why is it valued?

Important part of other rights to be claimed —

association, speech, property, . . .

Protects individual dignity; protects the person from harm

A reasoned approach to privacy involves a balancing act:

- safeguarding personal and group privacy in order to protect individuality and against unjustified intrusions by authorities
- obtaining relevant personal information necessary for rational decision making
- conducting appropriate surveillance in order to protect public safety

Government databases & private databases :

- many people are not aware these exist
- information provided by someone in one context might be used in another

Potential risks:

- unauthorised use by “insiders”
- inadvertent leakage of information
How might this happen?
- propagation of errors
What are the consequences of this?
- intentional uses that some people find unacceptable.
What are examples of these?

Various philosophical, legal and economic views.

Principles of Data Protection (UK):

Data must be:

- fairly and lawfully processed;
- processed for limited purposes;
- adequate, relevant and not excessive;
- accurate;
- not kept longer than necessary;
- processed in accordance with the data subject's rights;
- secure;
- not transferred to countries without adequate protection.

Data may only be processed by registered data controllers

Personal data includes facts and opinions about an individual

In SA, Section 23 of Interim Constitution says:

Every person shall have the right of access to all information held by the state or any of its organs at any level of government in so far as such information is required for the exercise or protection of any of his or her rights.

How does this interact with privacy, data protection?

Currently, SA **still** does not yet have data protection legislation

Privacy of email and web access

- government, employer, ISP, individuals, etc.
- is what you access on the web 'private' ?

Many legal cases, one is Weir, 1998:

- convicted of possession of child pornography
- email mailbox overflowed, and when ISP investigated, they discovered pornographic material
- they notified police, who got a search warrant
- Weir argued that email was private, and police did not have grounds to search
- Judge found: *There is a reasonable expectation of privacy for email, though because of the nature of the technology not as high as for first class post*
- In this case, it was found the actions of ISP and police were reasonable and Weir was convicted.

Summary

Personal privacy is a controversial issue:

- an important right
- difficult to define nature of the right
- people exist in society
- competing
 - individual rights
 - community rights
- technology developing fast
- need to look at social, legal and technical solutions

Open source software; free software

What are these? What is the difference between them?

Open Source Initiative : focus is on making the principles of free software attractive to the commercial world.

Free software (Richard Stallman) has to include the following:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.