Participative Learning delivers Computer Ethics: how to prepare future computer professionals

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Do you feel threatened?

Spend some time thinking about what information is collected about you, by whom and for what purpose.
PUBLIC and PRIVATE SECTORS

ONLINE and OFFLINE

- retail
- law enforcement
- leisure
- education & social work
- work
- census
- utilities
- home
- health
- jobs & welfare
- insurance
- car
- finances

ONLINE and OFFLINE
ONE SET OF LINKS

- Police National Computer
- Local police systems
- National Criminal Intelligence Service
- Home Office & security
- Probationary Service
- Local Authority social work records
- Education & school records
- Office of Population Census & Surveys

- Driver & Vehicle Licensing Centre
- Customs & Excise
- Banks
- Inland Revenue
- Dept for Work and Pensions

- Hospital & GP records
- Post Office postcode index
- Widely available

- NHS Register
- NHSnet
- Dept of Health

- law enforcement
- car
- finances
- education & social work
- jobs & welfare
- health
- home
- census
WHAT IS BIG DATA?

VOLUME
Large amounts of data.

VELOCITY
Needs to be analyzed quickly.

VARIETY
Different types of structured and unstructured data.

WHAT ARE THE VOLUMES OF DATA THAT WE ARE SEEING TODAY?

- 30 billion pieces of content were added to Facebook the past month by 500 million plus users.
- Zynga processes 1 petabyte of content for players every day, a volume of data that is unmatched in the social game industry.
- YouTube: More than 2 billion videos were watched on YouTube yesterday.
- LOL: The average teenager sends 4,762 text messages per month.
- Twitter: 23 billion searches were performed last month on Twitter.

WHAT DOES THE FUTURE LOOK LIKE?

Worldwide IP traffic will quadruple by 2015.

By 2015, nearly 3 billion people will be online, pushing the data created and shared to nearly 8 zettabytes.

HOW IS THE MARKET FOR BIG DATA SOLUTIONS EVOLVING?

- A new IDC study says the market for big technology and services will grow from $3.2 billion in 2010 to $16.9 billion in 2015, that’s a growth of 49% CAGR.

Everyday business and consumer life creates 2.5 quintillion bytes of data per day.

90% of the data in the world today has been created in the last two years alone.

Key questions enterprises are asking about Big Data:

- How to store and protect big data?
- How to backup and restore big data?
- How to organize and catalog the data that you have backed up?
- How to keep costs low while ensuring that all the critical data is available when you need it?

2/3rds of surveyed businesses in North America said big data will become a concern for them within the next five years.
“And big data may be as important to business – and society – as the Internet has become. Why? More data may lead to more accurate analyses. More accurate analyses may lead to more confident decision making. And better decisions can mean greater operational efficiencies, cost reductions and reduced risk.”

http://www.sas.com/big-data/
Look at the focus - where is emphasis?
Need to know

Nice to know
ICT Relationship Trinity

Vendor

Trust

Developer

Recipient

Infrastructure

Application

Direct

Indirect
Typical timelines

- Misalignment of timelines
- Lag
- ICT policy vacuums
- Appropriateness
Fit-for-purpose systems

• Systems to fit users’ needs rather than users fit system’s needs

• Design for All
  – One solution is no solution

• Adding goodness
  – Rights and Justice
  – Care and Empathy
Toolset for doing ICT ethics in practice

- Product Process
- DIODE
- SoDIS
- Professional code of ethics
- Dependency mapping
- Ethics case analysis
Process and Product

- complex
- interrelated
- issues
- ethical
- social

Decide → Develop → Deliver
Process

Virtuous action

Education & Training

Design & Governance

Conduct

Product

- Embedded ethical values
- Applications
- Evolving Technology
- Impact
music technology

- Young people 11-17 years of age
  - social or emotional disorder
  - learning disability
  - immigrant with little host language skill
- Reduce risk of marginalisation and social exclusion
- Early competence in music
  - develops language skills
  - improves socialisation
  - stabilises emotions
  - enhances intellectual capability
- Non traditional music education
  - wireless handheld computer
  - music generator: composition, instruments, song sheets, playback
  - group interaction online and face to face
  - implicit individual learning plans
Ethics Checklist

• Process
  – Informed Consent
  – Personal Data
  – Contact with Children
  – Stigmatism
  – Publication
  – Image

• Product
  – Access
  – Cost
  – Context sensitive
  – Image
  – Training
FIVE EXAMPLE TENDERS

A-RESEARCH

B-MARINE

C-QUALITY

D-BORDER

E-PORTAL
Your task (student)

• Read the specification extract from the tender
• In groups, discuss the potential ethical issues
• Split these issues into Process and Product
• Complete the Ethics Checklist form
• Present your findings
  – Outline the system
  – Describe the Process and Product issues
Ethically sensitising the development process

- Feedback
- Reactive
- Too late
- Rhetoric
- Failure

- Feed-forward
- Proactive
- Timely
- Forewarning
- Success

SoDIS Process
The Feed Forward approach of SoDIS

• Identify potential negative consequences for ALL stakeholders
  – the way the product is being developed (process)
  – the product itself
• Social Impact inclusion
SoDIS Project Auditor

SoDIS exercise for students

• Case Start-up Session
  – To review the CHEMCO company. To introduce the requirements of the new production control system. To identify the stakeholders of the system. To initialise the SoDIS analysis.

• PRO-CHEM SoDIS Analysis Sessions
  – To undertake a SoDIS analysis for an allocated stakeholder subset of PRO-CHEM.

• Case Outcome Preparation
  – To review the SoDIS analysis for an allocated stakeholder subset of PRO-CHEM. To identify the main concerns about PRO-CHEM. To prepare a presentation of findings for the Board of Directors.
Software Engineering Code of Ethics and Professional Practice

Short Version

1. PUBLIC - Software engineers shall act consistently with the public interest.
2. CLIENT AND EMPLOYER - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
3. PRODUCT - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
4. JUDGMENT - Software engineers shall maintain integrity and independence in their professional judgment.
5. MANAGEMENT - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
6. PROFESSION - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
7. COLLEAGUES - Software engineers shall be fair to and supportive of their colleagues.
8. SELF - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

source: http://www.acm.org/about/se-code
CompuSol and Chemco case study

Student Task

Use the Software Engineering Code of Ethics and Professional Practice to consider this case study.

1. Did anyone violate any of the ethical principles in the code?
   1.1 If so, was the violation justified?
   1.2 Why do you say so?

2. What “policy vacuum” does the case reveal that could be filled by adding a new principle to the code?

3. How could that new principle be stated and justified?
Ask yourself

• Who is affected by your work?
• Are others being treated with respect?
• How would the public view your decisions?
• How will the least empowered be affected?
• Are your acts worthy of the model computing professional?
Student-led activities
This house believes it is acceptable to force on-line services on those who prefer off-line interaction with government or who are technophobes.

This house supports the development of assistive technologies that exceed human abilities.

This house believes it is unnecessary to consider cultural diversity in generalised ICT products and services in order to promote ICT acceptance and effectiveness.
Student Seminar

• **Cybercitizens and Dataveillance**
  – How to prevent children from accessing unsuitable content
  – Dataveillance in social networking

• **ICT and Social Inclusion**
  – Engaging older, handicapped and other excluded people in ICT
  – How ICT can help disabled people

• **Information Integrity**
  – New media – forms and reliability of information
  – Blurring the boundaries in information integrity context

• **ICT and Professional Responsibility**
  – Sort of different aspects professional responsibility
  – Examples of real situations of professional responsibility

• **Ethics and Application Systems**
  – Employees activities monitoring system
  – Software with Adware is ethical or unethical?
Experiential journey of maturity

• from Tutor-led to Student-led
• from gut feeling & anecdote to rigour & justification

Tell me and I forget, show me and I remember, involve me and I understand.

Benjamin Franklin
The Good, the Bad and the Indifferent