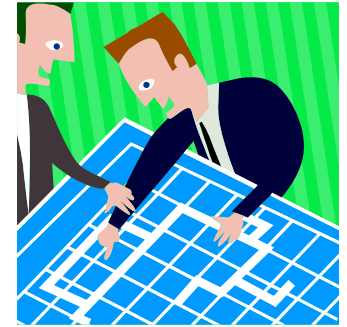




INFO5990 Professional Practice in IT

Lecture 11A



Professional dilemmas in Information Technology

Will cover only 3 case studies today



Assignment 2

- Marks not always what you think. Some critical information may be missing.
- Its like saying a client needs a RAM, but not specifying anything about it !
- Some very good proposals
- Hard work does not mean marks !
 - It means meeting the requirements
- Ask who is the client / audience of your report !
- What they need to know/understand

Guest Lecture



Allan has been involved in high-growth businesses for the past 20 years, three of which were spent in Silicon Valley in the USA. Previously, he spent 8 years in Management Consulting with McKinsey & Company and as a Director of Ernst & Young's Management and Technology Consulting practice after an early career in professional and systems engineering roles.

Currently a Commercialisation Advisor for AusIndustry, Director of Rough Diamonds, etc, etc, etc



Allan brings Christmas presents to Info5990 !!

By the end of this lecture you will be able to:

- Appreciate the issues raised in the professional/ethical dilemmas studied
- Make informed decisions in cases of professional dilemmas that you encounter
- Make informed decisions about the pros and cons of whistleblowing

Professional Dilemma's

Dilbert at its best – watch these

<https://www.youtube.com/watch?v=A-6QnKuJs5o>

<https://www.youtube.com/watch?v=loXqK6D6lbk>

Review: What does “*behaving ethically*” mean for IT professionals

- ‘Unethical’ does not necessarily mean ‘unlawful’ or ‘illegal’
- ‘Ethical’ means behaving according to the code of ethics of your profession
- One way of thinking about ‘ethical’:

“would you be happy to see details of your dealings on the front page of the *Sydney Morning Herald*”



Case study 1

The Flaw in Intel Pentium chip



Flaw in Intel Pentium chip (1994)

Dr. Thomas R. Nicely's email

It appears that **there was a bug in the floating point unit (numeric coprocessor) of many, and perhaps all, Pentium processors.**

For example, $1 / 824633702441.0$ is calculated incorrectly (all digits beyond the eighth significant digit are in error).

...

By computing $(824633702441.0) * (1/824633702441.0)$, which should equal 1 exactly (within some extremely small rounding error; in general, coprocessor results should contain 19 significant decimal digits). However, the Pentiums tested return 0.999999996274709702 for this calculation.

Faulty Pentium arithmetic

$$(824633702441.0) * (1/824633702441.0)$$

$$= 0.99999999996274709702$$

Result should be 1.00000000000000000000

Pentium chip time line

- In 1994 the pentium processor was used in 80% of PCs
- **June 1994:** Intel testers discover a division error in the Pentium chip. Users were not notified. Deliveries continued.
- **October 19:** Dr. Nicely is certain that the error he found is caused by the Pentium processor
- **No response from Intel.**
Flurry of posts to group notice boards on internet

Pentium chip time line (ctd)

- **November 27:** Intel agrees to replace chips for users *“engaged in work involving heavy duty scientific/floating point calculations”*.
- **December 12:** IBM halts shipments
- **December 20:** Intel apologizes. Agrees to replace flawed Pentiums upon request. Sets aside \$420 million to cover costs.

The Flaw in the Intel Pentium Chip

The facts

- Flaw: incorrect answers given only when performing certain double-precision arithmetic
- **Intel claimed the flaw to be insignificant**
- Pressure brought to bear through the internet
- After much pressure from publicity, Intel agreed to replace all flawed chips upon request

The Flaw in Intel Pentium chip

Ethical questions

- What was the responsibility of the engineers once they were aware of the flaw?
- Would it have been sufficient to issue a warning such as:
“This chip may produce incorrect results under some conditions”.
- Was it ethical for Intel to continue selling the product once the flaw was unknown?
- Is it ethical to sell any product with a known flaw?

Recalls in automotive industry

- 2003-2006: PEUGEOT recalled 240, 000 of its 307 hatchbacks due to insufficient sealing of the antilock brakes which could lead to a short circuit.
- 2004-2008: FORD recalled Territory models due to issue with fluid leak in the front brake which could result in reduced braking effectiveness.
- Feb. 4, 2010: TOYOTA recalled 8.1 million vehicles for an issue in which accelerator pedals could become stuck in floor mats. Alleged to have caused 19 deaths in a decade.
- Oct. 10, 2012: TOYOTA is recalling 7.43 million vehicles for a faulty power-window switch which affects more than a dozen models 2005-2010.




The Flaw in Intel Pentium chip

What can we learn?

- How should we deal with faults in our products?
- How much to tell end-users?
- The possible impact of bad publicity and the might of the internet
- Importance of acting 'ethically' at all times

Q1. Which of the following best describes the Pentium chip fiasco?

- A. A total disaster in microprocessor design
- B. A situation that did not deserve the public bagging it received.
- C. A serious error for which the engineers should have been sacked
-  D. An incident displaying bad judgment in public relations.
- E. An example of when the public had no right to know what was going on.

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	

Q2. Which of the following describes a valuable lesson for Intel to have learned?

- A. Make press releases through the proper channels
- B. Information spreads quickly on the Internet even if it is not accurate.
- C. It is a good idea to reply promptly to emails from knowledgeable academics
- D. Trying to bluff the public can be very expensive
- E. ALL of the above



Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	



The Bay Area Rapid Transport (BART)



The Bay Area Rapid Transport Case

The facts

- Holger Hjortsvang (systems engineer) ATS
 - concerned about processes and control
 - wrote five memos to superiors
- Max Blankenzee (young programmer)
 - several memos to superiors
 - warned not to be a “troublemaker”
- Robert Bruder (electrical engineer) Construction
 - observed ‘unprofessional’ installation and testing
 - noticed ‘unrealistic’ opening dates

Towards end of 1971

- The three engineers briefed Daniel Helix (a board member), who presented a report 'from interested persons' at a board meeting.
- ***The report was dismissed.***
- The 'dobbers' were easily identified and given the option of resigning or being sacked
- Californian Society of Professional Engineers (CSPE) investigated and confirmed substance of complaints

What Happened ?



Michael Mayer / The Chronicle

Further confirmation

- The Post Report, a study by a special panel commissioned by the California State Senate further confirmed the concerns expressed by Bruder, Hjortsvang, and Blankenzee.
- Substantial information pointing to poor engineering practice was uncovered.
- October 2, 1972 a BART train overran the station at Fremont
 - several passengers were injured
 - found to have been caused by a failed transistor in the Automatic Train Control system

Legal wrangles


- The three engineers prepared to sue BART for \$885,000 in damages
- 1972 Local chapter of CSPE was charged by head office of 'unethical behaviour' and 'criticising colleagues'
- Later overturned and the chapter commended
- 1973 IEEE decided on two measures:
 - 'mechanisms to support members' and
 - to be able to 'interfere' on behalf of the three
- 1975 before matter came to court the three settled out of court, reportedly for \$75,000

Whistle blowing on the BART system

Dilemma - Questions


1. What was the responsibility of the engineers once they were aware of problems?
2. Did the engineers act ethically?
3. Was the company justified in dismissing them?
4. Should the professional body (CSPE) have supported them?

Q3. Which of the following best expresses Hjortsvang's concerns.

- A. There were too few checks and balances
-  B. There was inadequate supervision of development practice
- C. Management tended to interfere with the engineers' work
- D. The BART system was over ambitious and under engineered
- E. There was no way the project would be finished on time

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	

Q4 Which of the following best describes the reaction of the BART board to Daniel Helix's report?

- A. They rejected the report by nine votes to one
- B. They identified the instigators and sacked them
- c. They were grateful for the information
- D. They were appalled by the evidence of poor practice
-  E. BOTH (A) and (B)

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	

End of the affair


- Despite their considerable sacrifice, the plight of H, B and B was largely ignored
- Perhaps their claim was weakened by Helix making their initial report anonymous – a valuable precedent lost?
- H, B and B reckon it took them 2 years to get back on track
- 1978 the three received the first IEEE award for 'Outstanding Service to the Public Interest', with a certificate and \$750 each!

The Bay Area Rapid Transport Case

What can we learn?

- Ethical behaviour is not always easy
- Quality control is an essential element of good practice
- Supervision must be thorough
- Communication between management and line workers is not always easy
- It is important to report poor practice
- 'Whistle blowing' takes courage

Q5. Which of the following best describes the latest scientific evidence concerning LFE fields?

- A. There is no evidence of LFE fields in everyday life
- B. There is no conclusive evidence of LFE fields from domestic devices
-  C. There is no conclusive evidence of LFE fields interacting with human body tissue
- D. The level of low frequency magnetic field emanating from high voltage wires can be a health hazard
- E. The level of LFE fields emanating from high voltage lines is greater than the acceptable daily limit

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	

Questions of professional ethics

1. When it is a matter of public safety, how much expert evidence is enough?
2. What is the ethical thing to do when designing in a situation where some doubt about safety exists?
3. Must a product be engineered to be totally safe at all costs, even if the user is at fault?
4. Are warnings to the consumer enough to get the designer off the hook?

Questions of professional ethics

5. If there are potential, but not well understood, hazards in building a product, what are the future consequences of doing nothing? Consider the atomic bomb, Chernobyl, Fukushima
6. What about Facebook, mobile phones
7. 'Downstream' liability relating to security issues in IT. Consider protection against user error, virus attack, use of data encryption.

4. Paradyne computers (1980)



Paradyne computers (1)

- 1980, June 10: Social Security Administration (SSA) published Request for Proposal (RFP) for 1800 microcomputers and software to replace existing equipment, with an expected life of 8 years.
- The stakes were high: \$115 million for a federal agency contract was the highest in history.
- They specified an “off-the-shelf” system, intended to minimise the need for testing, and specifically prohibited the demonstration of a “prototype” system.

Paradyne computers (2)

- The Paradyne Corporation, with annual sales of \$78 million, was a leading supplier of modems but had not previously built microcomputers.
- Paradyne proposed a “P8400 model microcomputer based on a Zilog 16 bit Z8000 processor running the PIOS operating system”, (even though their own engineers had stated that it could not be done in the time available).
- Their tender of \$84 million was the cheapest of the six finalists.

Paradyne computers (3)

- 1980, Dec: Paradyne purchased DEC PDP 11/23 microcomputers and installed them in a box with “P8400” pasted over the DEC labels.
- The so-called PIOS operating system was as yet under development and had never been tested on the demonstration equipment.
- All 16 Paradyne computers presented for the demo failed to achieve 10 days continuous testing.
- **However, SSA relaxed the acceptance criteria and Paradyne was able to pass.**

Paradyne computers (4)

- 1983, Mar: Securities Exchange Commission (SEC) filed a complaint against SSA alleging that they had, in 1981, misled the investor community by demonstrating dummy equipment.
- 1983, Apr: Two years after they had been awarded the contract, Paradyne finally had the system performing to specifications.
- 1984, Mar: Sigma Data filed a civil complaint against Paradyne, demanding \$70 million compensatory and punitive damages.

Q6. Which of the following best describes the actions of the Paradyne Corporation?



- A. They were guilty of demonstrating a non-existent system
- B. They showed great initiative in winning the contract
- C. They were a second rate organization who should never have won the contract
- D. They met all the requirements of the RFP, and were the lowest bid, so they won the contract
- E. They showed up companies like Sigma Data as lacking initiative and not being innovative

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	

4. Paradyne computers

The End

- 1987, Mar 6: Paradyne pleaded guilty and was fined \$1 million for “conspiracy to defraud the SSA” plus \$200,000 court costs.
- President Robert Wiggins was forced to resign as part of a plea-bargain, in return for which six charges of bribery were dropped
- Paradyne experienced growing business problems, reporting a \$37 million loss in the last quarter of 1988


Paradyne computers (1980)

Ethics Questions

1. If there had been no glitches, Paradyne could have been able to satisfy the contract. Was it ethical to demonstrate a 'dummy' computer?
2. Paradyne claimed they were simply 'integrating-off-the-shelf' components. Did this satisfy the terms of the RFP?
3. Was Paradyne's ploy unfair to other bidders such as Sigma Data?

Q7. Which of the following best describes the outcomes of the Paradyne affair?

Write down
your score /7

- A. If you want a contract badly enough there is always a way
- B. Innovation always wins the day
-  C. Unethical behaviour can be an expensive play
- D. Government agencies are a soft touch when it comes to technology contracts
- E. If you can't make it, make it up!

Question 1	Question 2	Question 3	Bonus question	Question 5	Question 6	Score / 6
A B C D E	A B C D E	A B C D		A B C D E	A B C D E	