KUL2017 – ABSTRACT SUBMISSION (short presentation, workshop, round table)

Format: Short presentation

Ethics course module – a do-it-yourself guide for teachers, with a specific example

Sheila Galt
Dept. of Microtechnology and Nanoscience (MC2)
Keywords: engineering ethics, research ethics, duty ethics, consequence ethics, stakeholders

SHORT SUMMARY

Do you wish your students could get some subject-relevant training in ethical reasoning? Got an idea for a learning goal? Any lesson plans? Ever wondered how to examine such learning? Would you like a DIY guide? Come and get one teacher's take on all this!

ABSTRACT

Intended audience:

This presentation will address questions mainly of interest to teachers and educational leaders working on including ethics in engineering educational programs.

Problem statement:

The mere idea of teaching ethics to engineering students is something that can make some engineering faculty feel uncomfortable, while others may be very eager, but lacking suitable teaching tools. Still, it is both required by law, and recommended by the profession that engineering students should have suitable knowledge and training in order to make well-grounded decisions which include ethical aspects. Chalmers is just starting to integrate ethics into various programs, with professional support available, but the scope of the change that is needed suggests that a "do-it-yourself" guide for teachers might be in order to speed up the process. But what should that guide include?

Suggested solution:

As a complement to existing support made available through e.g. Chalmers Insidan (Ref. 1), I would like to give a rudimentary suggestion for a DIY guide, and a specific example of how an ethics course module can be designed and fairly easily incorporated into an existing course. Low hanging fruits can be harvested, with positive side effects of the ethics course "digression" which include training in generic communication and reasoning skills, as well as bringing students into a closer personal relation area which should be positive for other learning interaction within the group.

DIY guide suggestion:

- Choose a learning goal formulation for your course (together with your PA), possibly with inspiration from the program goals and/or the formulations in the national degree goals.
- Think through a few examples where ethical decision making meets your course's (or program's) specific subject matter.
- Look over the contents of the Insidan support page (Ref. 1) and choose course literature for your module.
- Talk to the Chalmers "Pedul" for MHU/MTS and/or Chalmers' own philosopher.
- Design activities and assignments which will support the learning goal you have formulated. Consider including "real world" scenarios and/or professionals to add relevance for the students.
- Think through how you can gather evidence that each student has achieved the learning goal.
- Consider formulating criteria for differentiating how well the goal has been reached, as input to the final grade in the course.
- Write all these details clearly in the course PM, and revise the course plan in the Student Portal.

Example learning scenarios:

Since the course I teach (Ref. 2) is obligatory in its master program, it was a suitable candidate for an ethics module. The ethics module was introduced in this course for the first time during the academic year 2015/16. The decision to include an ethics module was taken after the official publication of the course plan (one year before the course was given, in study period 3). In order to test the ethics module and provide the current students with an opportunity to learn about ethical decision making, an optional learning goal was introduced in the course PM, with optional activities that could generate bonus points towards the final grade. However, this "extra" status required that it be possible to pass the course, and achieve high grades even without the bonus points from the ethics module.

The ethics learning goal is now officially included in the course plan for the present academic year 2016/17. It is

phrased: “After completion of the course the student should be able to identify ethical issues in the area of photonics and discuss methods to deal with them, based on a basic theoretical framework.” Active participation in all three ethics seminars and the individual ethics essay home assignment will be obligatory now that the learning goal is an official part of the course plan. With clear quality criteria and active participation monitoring, it should be possible to reduce the risk of students finding the ethics module too easy, and not taking the learning seriously.

The teaching (Ref. 3) included three seminars where students were actively discussing and documenting their discussion in the web-based student response app “Socrative”. In the first seminar, students familiarized themselves with the “Framework for ethical decision making” (Ref. 4) which was our only course literature as such in this module. Scheduled in Study period 3, it was suitable to make use of the Career fair “Charm”, asking the student to interview a professional at Charm about their experiences in ethical aspects of decision making. The second seminar focused on sharing the results of these interviews, which were then individually documented as material for bonus points. An individual short essay was the core activity in this module, with the students coming up with their own subject-relevant topics, and applying the “Framework” to this topic, again for bonus points. Note that the bonus point system will be replaced by obligatory activities and assignments in this year’s version of the course.

Student achievement measures:

Of the 32 students following the course, most of them attended and participated actively in the three seminars (and were thereby awarded a token bonus). 14 chose to submit the Interview assignment and 15 chose to write a short essay. 11 out of 15 students were awarded the extra bonus point for high quality in the essay assignment.

- The criteria for grading the essay assignment, included in the instructions to the students, were as follows:
- The essay addresses all of the relevant steps in the “Framework for Ethical Decision Making” (also making note of which aspects that might be deemed irrelevant in your chosen case.)
- The essay is clearly written so that the reader can easily follow your reasoning behind each step.
- The length of the essay is within the suggested range of 1000 – 3000 words.
- References are clearly given to information sources such as various codes of ethics.
- The essay is written with due respect given to academic honesty when it comes to using your own words rather than creating a “cut-and-paste essay”.
  (Not fulfilling this criterion is called plagiarism and … just don’t!)

Student acceptance of teaching methods:

In the course evaluation questionnaire, the students indicated that they were most helped by the seminars.

References:

1. Chalmers Insidan resource page for ethics teaching:
http://www.chalmers.se/insidan/SV/utbildning-och-forskning/grundutbildning/program/miljo-och-hallbar/etik

2. Study Portal Course plan for academic year 2016/17:
https://www.student.chalmers.se/sp/course?course_id=25017

3. Ethics course module documents on PingPong for academic year 2015/16:
https://pingpong.chalmers.se/courseId/6373/content.do?id=3367226

4. Framework for ethical decision making, Tom Adawi, 2005, available at:
http://document.chalmers.se/doc/1b3f09fb-57f0-4dcb-8aa0-103a3156d869

Ethics course module – a do-it-yourself guide for teachers, with a specific example

Sheila Galt – Short presentation MP9 – KUL – Chalmers – 2017-01-12

Why ethics in “my” course?

- To contribute to the development of competent engineers.
- To fulfill the national requirements for engineering degree programs.
- To help Chalmers reach its goal of ethics in at least one obligatory course per master programme.

- To set an example for other teachers.

Added learning benefits

- Subject relevance with realistic scenarios from industry and society
- Communication skills (both oral and written)
- Students get to know each other better
- Formal and informal group work enhanced

DIY guide suggestion:

1. Choose a **learning goal** formulation for your course (together with your PA), possibly with inspiration from the program goals and/or the formulations in the national degree goals.
2. Think through a few examples where ethical decision making meets your course's (or program's) **specific subject** matter.
3. Look over the contents of the **Insidan** support page (Ref. 1) and choose course literature for your module.
4. Talk to the Chalmers "**Pedul**" for MHU/MTS and/or Chalmers' own philosopher.
5. Design **activities and assignments** which will support the learning goal you have formulated. Consider including "real world" scenarios and/or professionals to add relevance for the students.
6. Think through how you can gather evidence that **each student has achieved** the learning goal.
7. Consider formulating **criteria for differentiating** how well the goal has been reached, as input to the final grade in the course.
8. Write all these details clearly in the **course PM**, and revise the **course plan** in the Student Portal.

A specific example

- Fundamentals of Photonics, MCC045
- Master programme Wireless, Photonics and Space Engineering, MPWPS
- Obligatory course study period 3
- 32 student 2015/16
- Examiner Sheila Galt

- Ethics learning goal, learning activities and examination
- Non-compulsory but with bonus points 2015/16 – ”extra” learning goal
- Compulsory activities and examination 2016/17 – “official” learning goal

DIY Quick Guide

1. learning goal formulation
2. specific subject matter
3. Insidan support page
4. Pedul and/or philosopher
5. activities and assignments
6. evidence of each student's achievement
7. criteria for differentiating
8. course PM and course plan

1. learning goal formulation

After completion of this course, the student should be able to:

identify ethical issues in the area of photonics and

discuss methods to deal with them,

based on a basic theoretical framework.

2. specific subject matter

- laser eye safety
- military applications of lasers
- photonics for medical diagnostics
- placebo “low level laser therapy”

3. Insidan support page

- Chalmers Insidan resource page for ethics teaching: http://www.chalmers.se/insidan/SV/utbildning-och-forskning/grundutbildning/program/miljo-och-hallbar/etik
- Framework for ethical decision making, Tom Adawi, 2005, available at: http://document.chalmers.se/doc/1b3f09fb-57f0-4dcb-8aa0-103a3156d869

1. Facts & Issues
2. Stakeholders & Obligations
3. Options & Consequences
4. Assessment & Action

4. Pedul and/or philosopher

- Pedul: Ulrika Lundqvist
- Chalmers' philosopher: Karl de Fine Licht

5. activities and assignments

- Seminar 1:
  - Introduce Framework for Ethical Decision Making
  - Identify subject-relevant ethical issues
- Assignment 1:
  - Interview an engineer or scientist at CHARM
- Seminar 2 :
  - Share and analyze interview content, noting where Framework applicable
- Assignment 2:
  - Formulate an essay topic with an ethical dilemma
- Seminar 3:
  - Group analysis of essay topics
- Assignment 3:
  - Individual essay applying Framework for Ethical Decision Making

6. evidence of each student's achievement

- Obligatory active participation in seminars logged on Socrative.
- Individual interview "news article" published for bonus points.
- Obligatory individual essay
  - submitted through Urkund
  - graded by examiner

7. criteria for differentiating

- The essay addresses all of the relevant steps in the "Framework for Ethical Decision Making" (also making note of which aspects that might be deemed irrelevant in your chosen case.)
- The essay is clearly written so that the reader can easily follow your reasoning behind each step.
- The length of the essay is within the suggested range of 1000 – 3000 words.
- References are clearly given to information sources such as various codes of ethics.
- The essay is written with due respect given to academic honesty when it comes to using your own words rather than creating a "cut-and-paste essay".

(Not fulfilling this criterion is called plagiarism and … just don't!)

8. course PM and course plan

		16-17	Ethics in Photonics	Seminar 1	
3	Mon. Jan. 30	10-12	Fourier Optics	Lecture 6	
	Wed. Feb. 1	10-12	Fourier Optics	Exercise 3	
		13-15	Diffraction, Imaging, Holography	Lecture 7	
		15-17	Free-space Propagation	Numerical 3	2:Resonator
4	Mon. Feb. 6	8-10	Electromagnetic Optics	Lecture 8	
		10-12	Diff, Imaging, Holography + EM	Exercise 4	
	Wed. Feb. 8	10-16	CHARM - no obligatory activities		
		16-17	Ethics in Photonics	Seminar 2	Interview
5	Mon. Feb. 13	10-12	Polarization, Crystal Optics	Lecture 9	*labs start*
	Wed. Feb. 15	10-12	Waveguides and Optical Fibers	Lecture 10	*this week*
		13-15	Polarization, X-tal, WGs + Fibers	Exercise 5	
		15-17	FDTD Maxwell's Equations	Numerical 4	3:Imaging
6	Mon. Feb. 20	10-12	Nonlinear Optics	Lecture 11	3:peer review
	Wed. Feb. 22	10-12	Nonlinear Optics	Exercise 6	
		13-15	Photons and Atoms	Lecture 12	
		15-17	FDTD cont. / Matrix Methods	Numerical 5	4:FDTD
7	Mon. Feb. 27	10-12	Photons and Atoms	Exercise 7	Lab report
	Wed. Mar. 1	10-12	Amplifiers and Lasers	Lecture 13	
		13-15	Amplifiers and Lasers	Exercise 8	
		15-17	Matrix Methods cont.	Numerical 6	5:Matrix
8	Mon. Mar. 6	10-12	Ethics in Photonics	Seminar 3	
	Wed. Mar. 8	10-12	Course Summary	Lecture 14	
		13-15	Old Exams	Exercise 9	
		15-17	Individual help available	Drop-in	Essay
9	Mon. Mar. 13	14-18	Exam		

DIY Quick Guide

1. learning goal formulation
2. specific subject matter
3. Insidan support page
4. Pedul and/or philosopher
5. activities and assignments
6. evidence of each student's achievement
7. criteria for differentiating
8. course PM and course plan

Thank you for listening …
… and good luck!