

## Chem 360 Lecture 10b

Ethics in Science  
Final Paper is due

## Remaining schedule

- Today is the last lecture day
  - Today (June 2):
    - Pick up graded intro and abstract, etc.
    - Ethics discussion
    - Final paper due (any problems?)
    - Guideline for final exam
  - Fri (6/4)– personal furlough day-no class
  - Wednesday (June 9, 2010; 8-10:30am) – **Final Exam.**

**Ethics** –Discipline related to what is good or bad, right or wrong behavior

- **Ethical Theories (at least 2 branches):**
- Principle based theories
- Virtue based theories

## Principles based Ethics theories:

- Identify ethical principles, evaluate choices in terms of these principles, and they must be relevant to all similar cases
- Eg. Four(4) principles: respect for autonomy, beneficence, nonmaleficence, justice
- “How should the good person proceed to make a decision in this situation?”
- “a procedure of deciding rather than providing a norm for behavior”

## Virtue-based ethics theories:

- Identify the ethically virtuous person, evaluate choices in terms of the behavior of the virtuous person, and are situation based
- “*What* should a good person do in this situation?”
- e.g. Plato’s Republic: 4 cardinal virtues – wisdom, justice, fortitude and temperance.
- Aristotle: virtues as moral and intellectual.
- 9 intellectual virtues, the most important:wisdom; sophia (theoretical) & phronesis (practical wisdom).

## Imperatives for All Ethical Theories

- **Human Welfare** – The good of the greatest number of people is the criterion for action. Example – immunization
- **Human Justice** – Fairness for all is above benefit for some. Example – monopolies
- **Human Dignity** – Freedom of choice, privacy, respect choices of others and allow them space to live in – Example – religious minority practice in midst of majority.

**Conflicts:** homosexuality, gun control, abortion, etc.

What other ethical conflicts do you know about?

**Ethical reasoning**

- All things considered, what ought to be done? Besides theoretical principles we need to consider law, facts of the case, emotions, values, needs, beliefs, etc.
- The essential component in reaching ethical decisions is *practice!*

**Things to keep in mind:**

- There is no one ethical theory accepted by everyone.
- Moral dilemmas exist and cannot be ignored
- There is a difference between ethical and scientific reasoning – Scientific reasoning brings particulars under universal rules whereas ethical reasoning often evaluates new and unrepeatable situations.

**A Framework for Ethical Deliberation**

- What are the facts of the case?
- Who are the stakeholders?
- Is the law relevant?
- What are the underlying values, principles, standards or codes?
- Are there any conflicting or competing claims?

**Framework for deliberation...**

- What social and intellectual traditions are involved?
- What factors are given weight and what are excluded?
- Are there any precedents to guide you?
- Are the circumstances atypical or exceptional?
- What are the alternative options?

**Framework for deliberation:**

- What priorities do these options reveal?
- What would be sacrificed for the greater good in the various options?
- What position do you support and why?

### Ethical Problems in Science may arise from...

- Ignorance:
  - Plagiarism
  - Rules and policies
  - Repetition of experiments
- Stress
  - Deadlines
  - Patience
  - Seeking help vs cheating
  - Multiple solutions to a problem

### Ethical problems arise from...

- Witnessing Misconduct
  - Make sure of what you see
  - Distinguish Mistakes vs. unethical behavior
 (n.b. Whistle blower is often severely punished)

### Components necessary for an ethical behavior to occur

- sensitivity – recognition that a problem exists
- reasoning –process of thinking about possible courses of action
- commitment – conflict such as wealth vs. ethical values
- perseverance –external pressures that prevent ethical action

### The ethical answer...

There are often no simple right answers in ethical questions.

... but there are usually many wrong answers.

### Example: Noah's Dilemma

- **Abstract:** Noah, a post-doctoral researcher, is under pressure from his mentor, Dr. Peacham, and colleagues to complete his part of a research project so that the group might submit their results for publication before their competitors. His colleagues have successfully obtained results that Peacham has anticipated, but Noah has achieved the expected result in his part of the project on only eight of his ten runs. During a hastily arranged dinner, Noah's girlfriend (who is unhappy with the amount of time he is spending in the lab) suggests to him that it seems reasonable to simply omit the two runs that do not support the conclusion.

### Example: Noah's Dilemma

- This example explores such issues as
  - a) the pressures scientists experience to complete projects to get the data right and to publish their findings,
  - b) the relationship of mentors to those supervised,
  - c) loyalty to and honesty with one's collaborators, and
  - d) the selection and reporting of data and record keeping.

### Noah's Dilemma, Discussion questions:

- 1. If Noah were sure of why two of the dilutions were off- perhaps because he miscounted as a result of a distraction in the lab-would that justify his dropping them from his experiment?
- If a researcher believes that some data points are out of line for reasons unrelated to the experiment, such as errors introduced by sloppiness, wouldn't he/she be wasting time and resources to repeat the entire series of experiments?

### Noah's Dilemma, Discussion questions:

- 2. If Noah does drop the two outlying dilutions, should he bother informing his collaborators or Dr. Peacham?
- If they all agree to drop the data, should they mention it in their manuscript submitted for publication?

### Noah's Dilemma, Discussion questions:

- 3. Is it ever proper for a researcher to ignore or fail to report data if he/she considers it bad or insignificant?
- If not, what should be done with such data?
- 4. What are the appropriate criteria for data selection?

### Noah's Dilemma, Discussion questions:

- 5. If Noah does report on only eight runs of the experiment, how will he be able to reconcile that with the full complement of data noted in his notebook?
- Should he alter his notebook to conform to the data he actually uses?

### Noah's Dilemma, Discussion questions:

- 6. What responsibilities does Dr. Peacham have as a mentor to Noah, Miranda, and Jeff?
- Is he sufficiently sensitive to the pressures that his trainees are experiencing?
- Is it appropriate for him to "test" those he supervises in order to see how they react under pressure?
- 7. Is Isabelle sufficiently sympathetic and supportive of Noah?
- Do family and friends have any responsibility to learn how science works?

### Last items to discuss:

- Regarding the Final Exam. A review guide will be posted. A brief description of exam:
  - The bulk will be on "editing" sentences to match the guidelines you have learned.
  - Similar format to the quizzes, just 3 -4 times longer.
- Peer-group grading.
  - Be able to name your group members' by heart.
  - You may be asked to rate them in terms of criteria related to their contribution to peer group work.

Last last announcement...

- **Katherine Carter Award for Scientific Writing.**

The award is given in honor of Katherine Carter, Professor of English, CSULA, who died from breast cancer at age 40. The endowment came from funds donated in her name by Hendrick Keyzer, Emeritus Professor of Chemistry, from his Statewide Outstanding Professor Award. This award was previously \$100, but will be determined by the Awards Committee and it will go to the student who writes the top paper in Chemistry 360, Writing for Chemists.

Thank you for a great quarter!

»That's all!

»(see you on Wednesday!)