Resources for Teaching Neuroethics

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Neuroethics is a new field and many people are teaching it for the first time. The goal of our breakout group – and this document – is to supply some helpful advice for teaching neuroethics. The tips for course planning, resources, teaching methods and resources that follow were compiled from my own experience and that of many other contributors named here. More ideas will undoubtedly come up at this year's breakout session. In the meantime, the info below will get you started!

I. Course Planning

A. Special challenges of teaching neuroethics

i. The course may appeal both science students with little humanities background and humanities students with little science background, a hard mix to teach. Consider prerequisites; see also II A and B, below.

ii. Critical thinking and analysis of values are hard to teach in a large lecture course. If class is large, consider discussion sections; also online discussions.

iii. Your chairman may view neuroethics as a low-priority frill. To pitch the course, emphasize the critical thinking component and name other good schools that offer it.

B. Syllabus repository

See how other instructors have designed their course. Assorted syllabi for undergraduate and graduate courses on neuroethics are available at http://www.neuroethics.upenn.edu/index.php/resource-center/course-syllabi

If you teach a neuroethics course, please send us your syllabus!

II. Teaching Methods

A. Teaching critical thinking, analysis of ethics, values

In addition to free-flowing discussion and structured debates, here are three other methods to get students thinking critically about the social and ethical issues:

i. Role playing. This can help the whole class examine issues from multiple perspectives, gives students some "cover" since they are not representing themselves, and is usually quite entertaining! See examples in Appendix.

ii. "Scaffolding" methods. These are ways of providing structure for students' thinking, speaking and writing about ethical issues, to encourage reflection and analysis. See examples in Appendix.

iii. Online discussions. These unfold over the course of a few days, enabling students to reflect and engaging students who are shy in class. It is a natural mode of communication for this generation and can be implemented on "BlackBoard" type platforms.

B. Teaching relevant science to nonscientists

i. Offer science tutorials, during class time or outside, eg a psychopharmacology tutorial prior to the classes on enhancement.

ii. "Field trips" to local labs, scanners and other research sites. This is fun and lets students to see the concrete context of the science they're learning about. Students can also ask the lab host questions about neuroscience that are beyond your expertise.

C. Connecting out

i. Have students bring in news, from general media or the scientific literature, and present the scientific and ethical issues (thanks to Eric Racine; see IIIC for good sources)

ii. Schedule video interviews with neuroscientists and neuroethicists at other institutions using Skype; easy to project video and sound in classroom; students conduct the interview (thanks to Ken Foster)

III. Online Multimedia Information

A. Online courses in neuroethics

Columbia University's online course: Neuroethics: Implications of Advances in Neuroscience (see Appendix) ccnmtl.columbia.edu/projects/neuroethics/index.html

Neuroethics from "Neuroscience for Kids" website. (This is a great site that is suitable for all ages. Extensive links within the site provide a great basic introduction to neuroethics and to the relevant neuroscience. See Appendix) http://faculty.washington.edu/chudler/neuroe.html

Virtual Mentor, the AMA's ethics education site, with monthly themed issues featuring essays, reading lists and test questions. Many relevant topics, especially:

Gray Matters: Neuroethics in the Twenty-First Century
http://virtualmentor.ama-assn.org/2010/11/toc-1011.html
Ethical Issues in Neurology
http://virtualmentor.ama-assn.org/2004/08/toc-0408.html

Penn's Neuroethics Open Educational Resource, including videotaped lectures, slides and open access readings (see Appendix) https://pennlpscommons.org/noer

B. Lectures/documentaries/TV programs

The following series include programs that make the relevant science accessible to nonscientists and would provide a good starting place for student discussions:

Charlie Rose (for his brain programs see http://www.charlierose.com/view/collection/10702)

TED conference (for brain-related talks see http://www.ted.com/talks/tags/id/150)

Wired Science

Scientific American Frontiers

C. Neuroethics and neuroscience news

Canadian Neuroethics Interest Group newsletter: Brainstorm. To receive, email neuroethics@ircm.gc.ca

Dana Foundation two different parts of the website are worth checking: http://www.dana.org/ and http://www.dana.org/neuroethics

Johns Hopkins' Program in Ethics and Brain Sciences News Round-Up http://www.bioethicsinstitute.org/web/page/769/sectionid/767/pagelevel/2/interior.asp

Society for Neuroscience's Neuroscience in the News http://www.sfn.org/NeuroscienceInTheNews.aspx

Appendix Materials

1. Role Playing -- 3 examples

Example 1, courtesy of Linda Hogle

ReNuRon, Inc. is a company that has designed a neural therapy to enhance memory and learning. Specifically, human neural progenitor neurons from adult donor cells will be implanted into the hippocampus of the brain, which plays a critical role memory and learning. The healthy donor cells secrete signaling molecules that target receptors on cells responsible for encoding and integrating memory, spatial memory as well as object recognition. The hypothesis is that the cascade of chemical signaling begun by the transplanted cells stimulates neural plasticity that enhances the subject's own memory mechanisms. Preclinical trials look promising in mice. Mice were implanted with the cells, given learning tasks and sacrificed the same day. Not only were they able to perform learning tasks better than before the trial, but immunocytochemical analysis of brain sections through the hippocampus demonstrated of that the desired signaling molecules had been released. Phase II trials on healthy human volunteers had no deaths or serious side effects. Now the company wants to begin large-scale human trials.

The intended market for the transplanted cells is normal adults. The marketing group feels there would be a huge demand for the transplanted cells from aging baby boomers who want to sustain their adult peak level of mental functioning or at least, prevent loss of memory and new learning capability, and wants to target this group.

You serve on a newly created special advisory panel called the Presidential Bioethics Advisory Commission, which advises the White House on matters of high priority related to science and medicine that may have ethical, social or policy implications. You must make recommendations about going forward (or not). There are several possible options:

Ban the therapy in the U.S. outright for all purposes

Ban for some uses; allow for others (which, and why?)

Allow for all purposes (must go through usual clinical trial oversight and FDA oversight for safety & efficacy only)

Allow but under strict regulation (specify how you will regulate, who will regulate (at what levels)

Some other alternative?

The panel consists of:

- representative of the Neurotechnology Industry Association
- ethicist who is concerned about the meaning of neural enhancements for human dignity
- ethicist who is concerned about human flourishing and scientific freedom
- psychiatrist representing patients' welfare
- member of Congress active in advancing health care reform
- representative from FDA's Center for Biologics with expertise in clinical trials

By the end of the assigned time, the committee must present a clear statement of position and recommendations. Whatever you choose, you must clarify your justifications.

In your deliberations, please consider:
What are the core issues of the case?
What/whose interests are at stake?
What are the ethical concerns, if any?

What are the social repercussions, if any? (in terms of what would be the effect onAmerican society, the effect on treated individuals and their interactions with others, possible changes in work life and organization, etc)
What might be effects on individuals if they more efficiently integrate memories, and remember more than 'normal'?
For the Committee's conclusions:
How will you deal with public opinion of your conclusion (or not)? How will you weigh the interests of relevant groups?
Are there pragmatic issues to deal with that might dramatically affect your recommendation (the ability to execute policy, political climate, funding, etc)?
As you deliberate, take care to think through all the downstream implications of each alternative you consider.

Example 2, from Neuroethics: An Introduction with Readings by M.J. Farah

Explore different perspectives on the practice of brain enhancement by role playing. Groups of three can enact the following situations:

(a) An executive is exasperated with her secretary's inattention to details and disorganization and as a last resort asks the secretary to try a cognitive enhancer. The secretary is reluctant and talks it over with her husband, and then meets again with her boss.

(b) A middle school student is performing below his potential and finds school boring, although he does not have a learning disability or medical condition. His teacher meets with the mother to recommend trying a stimulant-like nutritional supplement, making a case that the supplement will help her son. The mother then explains the idea her son, asks him how he feels about it, and encourages him to try the supplement.

(c) A military pilot is embarking on a long and dangerous mission and is ordered by his superior to use a powerful new cognitive enhancer, and is told that the long-term effects are unknown. He considers refusing and discusses what to do with his navigator, who has been given the option of using the enhancer, but is not required to.

Example 3: The National Academy of Engineering provides numerous role-playing exercises; thanks to Emily Bell for calling these to our attention

These are all related to research ethics, including treatment of human and animal subjects, conflict of interest, whistle blowing, and other topics in research ethics

http://www.onlineethics.org/Topics/RespResearch/ResCases/RCRroleplays.aspx

2. Scaffolding student thinking, speaking, writing

Part of the appeal of neuroethics to students is that it engages their emotions about right and wrong. For students who need help going from gut reaction to well-reasoned argument, these methods can help.

A. Essay template (thanks to Judith Grisel)

"Fill in the following essay. Your writing need not be a single phrase or sentence (and probably shouldn't be). This template is meant to help you organize your thoughts and writing around a complex topic. There is no word limit.

In recent discussions of INSTRUCTOR FILLS IN a controversial topic has been _____. On the one hand, some argue that _____. From this perspective, _____. On the other hand, however, others argue that _____. In the words of one of this views main proponents, "_____". According to this view, _____. In sum then, the issue is whether _____ or _____. My own view is that _____. Though I concede that _____, I still maintain that

_____. For example, _____. Though some might argue _____, I reply that _____. This issue is important because _____."

B. Think-Pair-Share (thanks to Jon Lepofsy)

This forces some reflection, lets students try out their arguments on just one partner first, gives everyone an equal chance to express themselves.

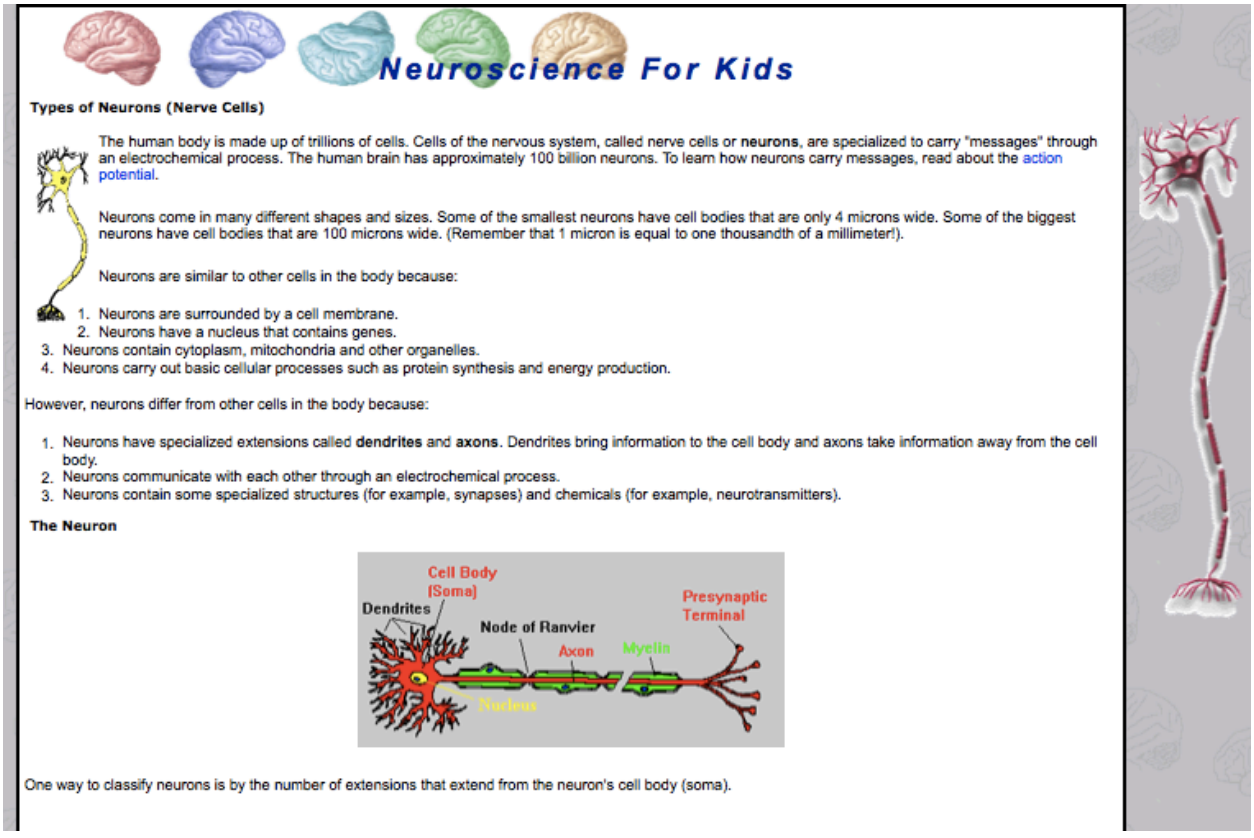
Think: The teacher provokes students' thinking with a question or prompt or observation. The students should take a few moments to think about the question.

Pair: Students pair up to talk about the answer each came up with. They compare their mental or written notes and identify the answers they think are best, most convincing, or most unique.

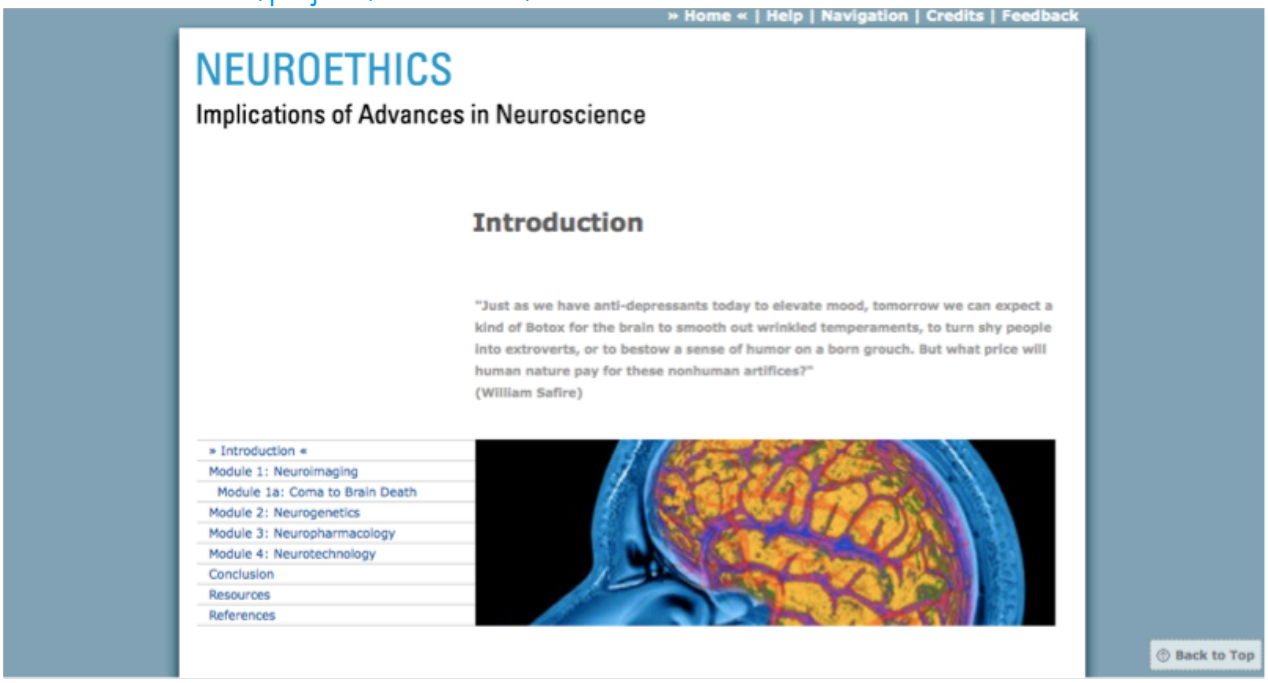
Share: Students share their answers with the group; the teacher or a designated helper can record these responses on the board.

3. Online educational sites

http://faculty.washington.edu/chudler/neuroe.html



ccnmtl.columbia.edu/projects/neuroethics/index.html



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