Transformational Bioethics Learning in Brain Science

Presentation to the President's Commission on Bioethical Issues

Mildred Z. Solomon, EdD

President, The Hastings Center
Clinical Professor of Anaesthesia, Harvard Medical School

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Thank you for the opportunity to address the Commission. I've understood your charge to me as a request to answer the question: "How should brain scientists be educated about the ethical aspects of their work?"

My goal is to respond to that question in a way that can inform both the integration of bioethics into brain science ***and*** into future efforts to prepare scientists engaged in other kinds of research of national importance. I've organized my remarks to address three sub-questions:

- Why does our society need scientists with bioethics expertise?
- What kind of bioethics education should we aim for? As you will see, it's my view that we should not aim for training, which I take to be a diminished notion of what is needed, but rather something more robust that I've called "transformational learning;"
- How might transformational bioethics learning experiences be designed right into the conduct of neuroscience research and, more specifically, the BRAIN initiative from its inception?

Why Society Needs Scientists with Bioethics Expertise

The U.S. is a leader in the preparation of scientists, with an elaborate and high quality infrastructure for producing PhDs in both the basic and applied sciences. At the graduate level, U.S. institutions of higher education remain a mecca for training in science and engineering.

Yet despite our ability to prepare scientists, there has been precious little attention to equipping scientists to fully consider the societal impact of the new knowledge and technologies their research produces.

To date, most bioethics education for scientists has consisted of courses in the responsible conduct of research, which primarily aim to prevent misconduct (thankfully a rare event), rather

than on the compelling and intellectually challenging questions our society needs to face about what is best to do with our technological prowess.

There has also been a focus on research ethics -- preparing scientists to design and carry out their research in ways that are respectful of human and animal research participants, protective of privacy, and mindful of the potential for the abuse of scientific power. Research ethics, in my view, should remain a critical focal point for bioethics learning in brain science, but should be carried out in more robust ways that go well beyond "check the box" multiple choice formats that characterize some current approaches.

What I want to emphasize right now is that there is a third focus for bioethics education, one that represents a tremendous, untapped opportunity. We have the opportunity, and I would argue the obligation, to engage scientists in explorations of the ethical and social implications of their work. Scientists should have the capacity to anticipate the societal impact of their discoveries and should be socialized during their training years to see the merit in doing so. These learning experiences should be intellectually rigorous, emotionally meaningful, and recognized as critical to a flourishing society -- not only to ensure public trust in science but also to maximize the likelihood that science will develop in ways that are both respectful of persons ***and*** supportive of community wellbeing.

Brain science, in particular, raises profound questions about what it means to be human, our sense of ourselves as intentional agents, and our views of whether and how to allocate personal blame and responsibility. Brain science also engages questions about cognitive and social-affective enhancement, and about the safety and premature entry of potentially inefficiacious or unsafe pharmaceutical agents and treatments into the marketplace. In addition, the stakes are high, with the potential, on the one hand, for fear-mongering and hyperbole about risks of the science, which could inhibit discovery, and on the other hand, disregard for potential harms [Fins, 2011]. These issues and many others have been well illuminated by thoughtful commentators [see, for example, Farah, 2012], and I am sure we will be hearing more about what these issues are in the presentations later today.

Another reason our society should integrate bioethics into the education of scientists, is that in our pluralistic society, there is a need for a shared secular way to analyze differences in our ethical assessments. This need for a shared secular way to talk about the issues we must face is particularly relevant now, because so many young post-doctoral researchers are foreign-trained and come with widely different religious and cultural backgrounds. [NIH, Biomedical Research Workforce Work Group, 2012, p. 20]

Moreover, as I've observed in my own experience coalescing scientist-bioethicist teams, some scientists find normative ways of thinking inscrutable and even frightening, because bioethical analyses represent uncharted territory and appear to have no easily understood method of

inquiry. For scientists who have been trained to state and test hypotheses, normative ways of thinking can appear vague and too subjective. As a result, some scientists, like many other Americans, express strong forms of ethical relativism, believing that in the moral domain, it is impossible to critically analyze or distinguish "better" from "worse" decisions. Scientists, like other professional groups, may also think of bioethics as the "moral police," standing ready to detect fraud or misconduct, rather than a field of study that can help them become better citizen-scientists and more fully professional.

It doesn't have to be this way. Scientists are in an ideal position to anticipate the uses to which their new knowledge may be put and to join with others – including philosophers, religious leaders, bioethicists and ordinary citizens from across our diverse populace – to consider how best to reap the benefits of those new technologies, while minimizing potential harms.

Yet, neither senior faculty nor scientists-in-training have sufficient opportunities to build the necessary critical reasoning skills or even to cultivate a desire to examine normative questions.

For all these reasons, bioethical ways of thinking, habits of mind, and analytic skills need to be cultivated. But for whom? And with what expectations?

Setting the Audience and the Expectations: Transformational Learning at Two Levels

<u>Who Are the Learners? What Should We Expect of Them?</u>

In my view, we should not expect all scientists to be able to achieve an equally high level of expertise in normative analysis. Consider an analogy to statistical expertise. Although nearly all research requires statisticians, we don't expect all scientists to be statisticians, but we do expect scientists to understand the basics of research design and how statistical analysis affects their work. I therefore propose the following.

(1) PhD training programs should commit to providing a base level of bioethics literacy for their faculty, their PhD students, and post-doctoral fellows;
(2) There should be additional opportunities for the most interested scientists and scientists-in-training to develop deeper expertise in bioethics, on the way to becoming scientist-ethicists, in the way that in medical ethics, we now have physician-ethicists and nurse-ethicists; many of the strategies I suggest in the third section of this presentation will create opportunities for this deeper learning;
(3) We should design learning experiences that team scientists with bioethicists, so both kinds of experts can learn from one another.

Regarding the third point, bioethicists cannot do their work without an accurate understanding of the research and technologies they are examining. In fact, without good knowledge of the science, bioethicists can easily over-react, seeing harms or wrongs, where there may be none, or

conversely miss problems. In short, bioethicists need deep engagement with scientists. Likewise, scientists cannot be expected to develop normative analytic skills or experience a desire for such skills without deep engagement with bioethicists. In the final section of my remarks, I propose a number of ways to encourage deeper engagement between bioethicists and scientists.

Transformational Learning as the Goal

I am using the word "transformational" to signal that I am imagining a type of learning that will go well beyond cognitive learning and critical analytic skills to include *habits of mind, attitudes and dispositions.* Learning is transformational when it is not only about acquiring bioethics content knowledge and technical analytic skills, though content knowledge and technical skills are essential. To be transformational, learning experiences should change the learner in a profound way. Ideally, in my view, we should be designing learning experiences likely to result in scientists who are more fully engaged as reflective, thoughtful and deliberative persons, citizens and professionals.

I'm using the word "learning" and purposefully avoiding the word "training," because training implies that there is something rote going on. The habits of mind, attitudes and dispositions that bioethics cultivates are not capacities that can be trained into people, although I do believe they can be cultivated. I have also avoided the term "education." I am more interested in "designing for learning" than in educating. Educating is too uni-directional, it implies that someone is doing something to someone else. It assumes an expert operating on a novice, a subject operating on an object.

Learning is far more active, learning is something one does for oneself. Of course, learning involves reaching out to experts and availing oneself of human and other resources with greater knowledge and skills. But ultimately learning happens when the learner identifies with the need for learning and has an internalized desire to learn. Learning, not training, is what we should be aiming for. And that means creating the necessary conditions, the right social signals, that will help people develop and internalize a desire for learning.

Adult learners learn by being in control of their own learning – reflecting on their own experience, identifying the questions they find worthy of pursuit, gathering information critical to the planned examination, deliberating (ideally together with others in their peer group), deciding on a course of action or crafting a policy or simply finding a means to express their conclusions (however temporary those conclusions may be), then ultimately reflecting again. These steps are the major phases in a virtuous cycle of continuous learning, in which learners are empowered by being in charge of their own learning. And, if authentically committed to this process and open to the discoveries it makes visible, active learners are not only empowered, but can be regularly transformed by their own discoveries.

This cycle of active learning is a form of "learning by doing" and is particularly characteristic of the self-monitoring that defines, and is expected of professionals. By definition, professionals are workers who consider the ends to which their labor is devoted. Thinking about the purpose of their work and its impact in the world – that's a major aspect of what distinguishes professionals from technicians [Schon, 1990]. For this reason alone, graduate education in the sciences should include cultivation of basic bioethics literacy.

Transformational learning is self-directed but it is also shaped unconsciously, as early career professionals are socialized to the norms of their profession [Solomon, 1999]. So if we want to produce scientists with bioethics skills and sensibilities, we have to pay attention to the formal and informal norms in the scientific community and build effective reward systems, incentives and accountabilities.

Many of the features I am about to propose in the final section of my remarks are meant to provide those incentives and accountabilities. I propose them, because I think they will signal that bioethics learning matters, that bioethics expertise and sensibilities are expected, and will be rewarded, by one's mentors, colleagues, and funders and therefore should be sought both for the intrinsic value of ensuring responsible science and because involvement in these activities will be in learners' own interests as members of a specific, professional cohort.

Designing Transformational Bioethics Learning into Brain Science (and the BRAIN Initiative)

The National Institutes of Health (NIH), the Defense Advanced Research Projects Agency (DARPA), the National Science Foundation (NSF), and private collaborating foundations may wish take steps to integrate bioethics scholarship and bioethics learning experiences into brain science in general and/or specifically into the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative. Here are some ideas to consider for both a basic bioethics literacy campaign for PhD students and post-docs and for the deeper development of a subset of students, post-docs and faculty who wish to cultivate more sophisticated knowledge and skills in the ethical analysis of brain science and neurotechnologies.

Building Basic Bioethics Literacy into Graduate and Post-graduate Programs in the Disciplines that Prepare Brain Scientists

1. Harness Department and Scientific Society Leadership. Convene leaders, with a stated interest in bioethics, from both university departments and relevant scientific societies and ask them to work with bioethicists to operationalize this recommendation. The group's charge would be to figure out where and how such learning experiences would fit within graduate and post-graduate training (a course shared across universities, within university seminar series, integrative seminar? In the first year of a doctoral program? Later? Periodically?).

2. Identify Learning Objectives. Engage the major relevant scientific societies most engaged with brain science as well as bioethicists and others, such as historians of medicine, to develop educational content and learning objectives collaboratively. These learning objectives should focus on what the understandings and competencies should be for basic bioethics literacy. Basic concepts are likely to include over-arching understandings, such as the differences between empirical and normative questions, and historical examples of what can go wrong when scientists treat persons as mere means, as occurred in the early 20th C. in the worldwide eugenics or in research scandals like Guatamala. Objectives should also include the ability to identify and consider what the specific normative issues raised by brain science are that should be in a basic bioethics literacy initiative for brain scientists, such as familiarity with the issues of cognitive and social enhancement, just distribution of beneficial technologies that may emerge, concerns about the "cost" of conceptualizing humans as simply the sum of mechanistic parts, etc.

Working with the scientific societies of the disciplines most engaged in brain science will not only send the right signal – that bioethics matters to your professional reference group – but will also create a robust set of dissemination pathways for the learning materials that emerge.

Encouraging Deeper Engagement in Bioethics Scholarship in Brain Science: Beyond Basic Bioethics Literacy

Funders, faculty in science departments offering PhDs in relevant disciplines, scientific societies and organizations with a stake in science and in bioethics may wish to consider the following ideas.

1. Develop an ELSI Program for Brain Science. Develop an ELSI funding stream for brain scientists that requires applicants to demonstrate active participation of bioethicists, perhaps requiring co-PIs (one from a brain science discipline and one a bioethicist).

2. Learning Community. Link neuroscientists, brain scientists from other disciplines, and BRAIN awardees from across the nation into a learning community. Learning communities are a way to create positive peer pressure, disseminate best practices, and stimulate learning amongst peers and between peers and experts. Members of a brain science learning community would commit to
sharing ethical questions that have arisen at various locations and to learning together, both from one another and from experts who would address the community through regular periodic learning events, such as video-based Webinars. "Issue of the Month" briefs (ideally authored by brain scientist-bioethicist pairs) could be emailed to members. Working both top down and bottom up, an advisory council could develop a set of topics to be explored, but also solicit topics in an ongoing fashion from community members.

3. Annual Symposium. This annual symposium, held perhaps in conjunction with another already existing annual conference, would focus on ethical issues in brain science, with the agenda co-developed by brain scientists and bioethicists. Publish an annual essay set, based on papers presented at the symposium. There should be prominent, visible involvement in the planning and marketing of the symposium by the key specialty societies for disciplines most involved in brain science.

4. Bioethics Intensive for Brain Scientists. This intensive experience could be held for a week every summer. Only scientists already holding a PhD would be invited to attend; in addition to attending intellectually rigorous lectures and seminars, applicants could be invited to identify a normative question in neuroscience they are interested in researching, which could be "workshopped" during the intensive week, and which attendees would be expected to continue working on, upon return home. Faculty would include pairs of prominent bioethicists with expertise in neuroethics as well as brain scientists from relevant disciplines. The NIH has been sponsoring a similar kind of summer weeklong intensive in the area of implementation science – as a way of cultivating interest in implementation science amongst PhD biomedical and clinical researchers [NIH, TIDIRH]

5. Survey. Sponsor a questionnaire to determine the level of bioethics expertise (and interest in bioethics) among brain scientists. Among other things, the survey should reveal brain scientists' ability to identify normative questions and distinguish them from empirical questions, topics they feel raise important ELSI questions and issues where they do not see societal implication but where there clearly are, issues where they experience moral angst versus where they are comfortable, and their self-reported confidence in their ability to handle a range of research ethics and societal impact issues.

Such an instrument can serve two purposes. Baseline results can be used to inform learning objectives for the PhD and post-doctoral program in basic bioethics literacy, content for the learning community, annual symposium, and bioethics intensive course. If administered pre and post, results can also be used to evaluate progress in respondents' knowledge, attitudes and self-reported abilities before and after learning experiences. I have used surveys in both these ways in the area of clinical ethics education on end-of-life care for physicians, nurses and allied health professionals (see Solomon et al, 1993 and Solomon et al., 2005 and 2010).

6. Encourage (require?) BRAIN awardee institutions to build ethics capacities to address normative questions raised by brain science. Just as the NIH required CTSA sites to build infrastructure to address clinical research ethics issues relevant to translational science, BRAIN grantee institutions could be encouraged (required?) to build the capacity to address ethical issues in brain science. Responsiveness to such a requirement could take the form of a transdisciplinary faculty group within each awardee institution, composed of brain scientists

from many disciplines as well as philosophers, social scientists, lawyers, educators, historians, and bioethicists capable of addressing the range of normative issues brain science engages: ethical conduct of brain research, societal impact of the new technologies, and exploration of the meaning of new brain science knowledge for our conceptions of what it means to be human. The faculty group would be expected to sponsor research and co-author scholarly papers on topics related to the specific brain research going on at their institution or on a national issue. To ensure adequate expertise and a non-insular approach, bioethicists and humanities scholars from outside the institution should be eligible to participate. Funding should be made available for both the university faculty and the external bioethicists and humanities scholars through BRAIN award funds set aside for their involvement. Funds could support both the frequent meeting and shared scholarship initiated by the group, but could also support annual or biannual, small pilot and innovation studies, much as CTSAs do.

These are a few ideas to stoke the imagination. The main message I would like to leave you with is that brain science is a fine place to begin to figure out how to integrate bioethics education into the preparation of scientists. Ethics education in this area will be particularly challenging, and therefore exciting to work on, because brain science requires collaboration across so many disciplines and because it will raise profound questions across all three domains: responsible conduct of research, research ethics, and the societal impact of the knowledge and technologies that emerge. Since existing bioethics education programs have focused much less on this third area of societal impact, and since brain science engages so many questions in that domain, I recommend that there be considerable attention to the ethical and social impact questions, not just to research ethics and RCR. It is also my hope that we will not just train or educate, but that we will commit to designing for learning, and specifically for a kind of learning that is transformational, so that we are preparing not just scientists, but citizen-scientists who are professional in the fullest meaning of the word, aware of the power science holds in society, and capable of secular moral reasoning in our highly pluralistic society.

Thank you.

Citations

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