



International Neuroethics Education Online: The Development of a Web-Based Curriculum

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Introduction

We are developing freely accessible neuroethics education materials to orient users to research and clinical challenges at the intersection of neuroscience, ethics and society, with a particular focus on the developing world and the movement in global health neuroethics (Illes and Lombera, 2008). The resources are hosted by Health Science Online (HSO).

Health Science Online (HSO)

HSO is a virtual resource center that provides free, online access to a comprehensive collection of top-quality courses and references in medicine, public health, pharmacy, dentistry, nursing, basic sciences, and other health science disciplines (www.hso.info). It was launched in September 2008 and now hosts more than 50,000 resources on a wide range of topics in basic and clinical sciences including medical, public health, bio- and neuro-ethics. The materials available on the website are selected by experts and are from accredited educational sources including universities and programs, federal agencies and professional societies.



Phase I: Neuroethics

Four course modules building on Mapping the Field (Marcus, 2002):

- brain science and the self
- brain science and social policy,
- ethics and practice of brain science
- brain science and public discourse

The material for each module was developed from existing neuroethics syllabi available online ($N=10$) and priority areas for the international community identified in the peer-reviewed literature (Illes et al., 2005).

Course materials were tailored to take into account current data on global burden of neurologic and psychiatric disease (Hyman et al., 2006 and Chandra et al., 2006; Lombera and Illes, 2008).

Each module contained introductory text, selected peer-reviewed papers, and a series of test questions to assess the user's understanding of the content material.

Results

We presented the completed introductory module and plan for subsequent modules to an expert panel from Canada, the United States, the United Kingdom and Venezuela. Results are shown in Tables 1 and 2:

Observations	Strengths	Recommended actions
Hosting material on a searchable web-based portal maximizes global reach and access.	Course will use existing infrastructure (HSO webpage) to target international audience.	Continue to develop, test and refine.
International focus of the course is timely.	Existing material for the developing world is currently limited; efforts to increase access to relevant resources in neuroethics are meritorious.	Develop material with special attention to the needs and interests of the international community including those classified as developing countries by the International Monetary Fund (IMF).
Neuroethics course and/or resources will be fully integrated with other existing training material for health science professionals.	Providing ethics resources with other materials allows for natural integration of ethics into health science training.	Ensure that material developed is appropriate for target audience.

Table 1

Observations	Targets for restructuring	Recommended actions
Diverse concepts of ethics will affect how neuroethics is understood.	Without some common background in ethics, neuroethics training goals will not be met.	Cast a wider content net by including basic training in bioethics.
Lack of consensus defining "landmark papers", especially for relevance to the developing world.	Despite input from experts, course will not be representative of all work in neuroethics.	Move away from the course model and instead offer neuroethics resources.
Access to full text articles is limited.	Publisher control of full-text articles may compromise quality of a full-scale course.	Continue to work with HSO staff to overcome access barriers either by altering format or content.
Certification for course completion is premature at the present time.	Certification distracts from the pedagogical goals.	Defer certification.
Materials are English-only.	Limited English-proficient users.	Explore multilingual capabilities.

Table 2

Phase II: Neuroethics

Responding to results from Phase I we will:

- Provide an original introduction to neuroethics including basic readings in neuroethics and, as available, full-text versions of selected articles.
- Translate introductory material into French, Spanish and Russian.
- Develop a suggested reading list in neuroethics to include topics of interest identified during Phase I of the project.
- Base the reading list on existing syllabi supplemented by in-house expertise and update it monthly to ensure relevance and completeness.

Conclusions

Our goal is to develop an online course in neuroethics with a particular focus on the developing world to complement online resources available today (e.g., Fischbach, 2008; Miller, 2008).

- This process is best informed by past educational efforts (Zardetto-Smith et al., 2006), is iterative, and is advanced in collaboration with multinational community of representatives from the field (e.g., Fukushi, 2006).
- At the present time, up to date reference resources are more suitable to the goals than curriculum materials.
- Where possible, narrative materials should be made available in languages in addition to English.
- A needs assessment study of the international community will further shape the development of these resources.

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