Seminar in Human Development and Education: The Changeable Brain

Winter Term 2015
Period 3A
Mondays 3:00 to 4:50 pm, Thursdays 4:00 to 5:50
X-period: Mondays 5:00 to 5:50 pm
Moore 110

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“A balanced view is likely to emerge from the synthesis of results from neuroscience, the behavioral sciences, and educational research. We are presently at the beginning of an exciting period in developmental neurobiology that will continue for many decades into the twenty-first century, and that is likely to have considerable impact on our approach to education....”

Peter R. Huttenlocher

Course Description

In education and psychology, it is generally agreed that human development and learning involve change over time and occur throughout a lifetime. In the neurosciences, it is generally agreed that the brain is plastic and can change throughout a lifetime. Here we approach human development and education from these multiple perspectives showing that the brain changes in interaction with learning environments. What can these various perspectives contribute to an evidence-based understanding of learning and development across domains? How might integrating these multiple perspectives affect traditional educational processes and practices — including both learning and teaching — and educational policies? What research remains to be done to make meaningful connections within our knowledge of human development, education, and the changeable brain?

This course is a seminar designed to serve as an optional capstone course for the minor in Education. The course offers many opportunities to build on and integrate with previous knowledge and experiences, and each student is encouraged to make connections with materials and ideas from the Education courses that he or she has taken. Seminars are most successful when everyone actively participates, contributes, and is engaged. As a class, we are responsible for this course, the direction that it takes, the quality of our discussions, and what we take away from each session. The basic ground rules are that everyone talks, everyone listens, and everyone is fair, honest, and respectful; the rest we create in the process.
 Goals and Objectives
The goals of the course are to encourage students to (1) think about human development and education, broadly defined, from an integrative and interdisciplinary, evidence-based perspective; (2) further develop the analytical and critical thinking, reading, writing, and presentation skills essential to understanding and undertaking scientific educational research; (3) become an expert in a specific domain, across disciplinary boundaries, and be able to demonstrate that expertise in written and oral form; and (4) realize that research, practice, and policy in education are inextricably intertwined – and why.

 Rationale for Design of the Course
This course is designed to provide the opportunity to be an educational researcher for a term. As such, it draws on skills and knowledge that you have developed in your previous Education courses. This is your chance to begin to shift from being a student of the field to becoming a participant in the field. You will be asked to do what educational researchers do: decide on a topic of interest; critically review and synthesize the relevant literature across disciplines; develop a research question; determine the appropriate research design and methods to address that question; present information, both orally and in written form, according to the conventions of the field; and engage collaboratively with your colleagues to design the strongest research proposal that you can. Of course, many of the underlying skills involved are also directly relevant to teaching and other disciplines. Indeed, students in the TEP can use their proposals in this course as the basis for their action research projects in the practica.

 Required Reading
All readings for the seminar are available through Electronic Course Reserves, which is linked through the Canvas site for the course. In addition to the articles listed below for each class, student leaders for each class session will choose one or two articles that will be posted on the Canvas site at least one week in advance of the class. All posted readings are required reading for the course. Readings for each session should be brought to class (electronically or on paper) for easy reference.

 General Requirements
1. All students are expected to read the materials posted on Electronic Course Reserves and the Canvas site for each class before class and be prepared to discuss that material in class. The success of the seminar depends on participants coming to class prepared and ready to discuss the material.
2. No late assignments will be accepted.
3. All students are expected to attend class regularly, on time, and each student is responsible for all material presented and discussed in every class. If you must miss a class, it is your responsibility to borrow the notes from another student, acquire any materials that were handed out, and learn if changes have been made to the syllabus. If you miss a student presentation, it would be a courtesy to meet with that student and offer informal feedback on his or her proposed project outside of class, as that student will provide feedback to you about your project. Absences from class will negatively affect the portion of the grade related to attendance and class participation.
4. All students are expected to uphold all aspects of the Academic Honor Principle (refer to http://www.dartmouth.edu/~uja/honor). Your work should be your own and should be prepared specifically for this class. Whenever you make use of outside sources for
findings, facts, language, or ideas (including web sites, books, articles, roommates, etc.) you must acknowledge them in formal APA citations (see below for information on APA style). Failure to do so constitutes plagiarism, a serious academic offense that typically involves suspension from the College. If you have questions about how or when to cite, please ask before handing in your assignments.

5. I recognize that some students may wish to take part in religious observances that occur during this academic term. Should you have a religious observance that conflicts with your participation in the course, please speak with me early in the term to discuss appropriate accommodations.

6. Students with disabilities enrolled in this course who may need disability-related academic adjustments and services are encouraged to see me privately as early as possible in the term. Students requiring disability-related accommodations must consult the Student Accessibility Services (SAS) office (205 Collis Student Center, 603.646.9900, Student.Accessibility.Services@Dartmouth.edu). Once SAS has authorized services, please show me the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

7. If you do not understand something, or are struggling with something in the course, please come talk with me.

Class Sessions
Each class session will follow the same general format (with the exception of the introductory classes). The first half of the class will begin with an interdisciplinary review of relevant background material (~ 15 minutes); followed by a close, critical reading of one of the primary source, peer-reviewed research articles assigned for the day (~ 15 minutes); followed by a question and discussion period centered on the concepts and issues raised by the literature review and readings (~ 15 minutes). After a 5-minute break, there will be a presentation of a research proposal (~ 20 minutes), a peer review and feedback session (~ 30 minutes), and a general discussion, including specific discussion of policy implications (~ 10 minutes).

Assignments
1. Leading a Class Session
Each seminar participant will lead one class session as an expert in a given area. As a session leader, each student is responsible for electronically providing me with one or two key research articles in his or her chosen field of interest to post on the Canvas site at least one week before the class that he or she will lead. I expect you to meet with me at least once - and likely more - before choosing your article(s) and leading your class session.

Session leaders are also responsible for structuring and managing the class (see Class Sessions above), including:
(a). interdisciplinary literature review: presenting a concise, coherent, thorough, and critical summary of relevant research and findings from various disciplines and literatures (well beyond class readings for the day)
(b). close reading: leading a close, analytical, critical reading of one key empirical research article (usually one of the articles provided by the session leader)
(c). question and discussion period: responding to questions and guiding discussion about issues raised in your literature review and close reading, as well as in the general class readings (in part, use the homework questions)

(d). research proposal presentation: presenting a detailed research proposal of your own design, based on the literature that you have reviewed

(e). peer review and feedback session: responding to questions about your proposal, clarifying and modifying based on feedback; this is an opportunity for collaborative learning, as we work together as a class to design a strong research proposal (classmates fill out peer review forms during this period)

(f). general discussion: guiding discussion about issues raised throughout, including discussion about impact, future directions, and policy implications (in part, use the policy implications homework)

Within the framework of the course, each class should include presentation and discussion of material from education, psychology, and neuroscience (i.e., multiple disciplines), illustrating how different methods and approaches can or cannot be integrated to address a specific issue. See the Grading Criteria sheet on Canvas for further details.

2. Research Proposal

Each seminar participant will propose a quality, realistic research project that follows logically from the literature review (e.g., filling a gap in the literature or taking the next step in a series of studies). Each participant will develop a research proposal, present the proposal to the class, respond to peer review comments verbally in class and then incorporate peer feedback into the written research proposal. See the Grading Criteria sheet on Canvas for further details.

(a). The research proposal will include most of the typical elements of a research report: an introduction and thorough, critical literature review including statement of the research question, hypotheses, rationale, and purpose; a methods section with details regarding participants, stimuli, procedures, and analysis plans; and a discussion summarizing and justifying the expected findings, commenting on the possibility of unexpected findings, and considering the scientific and educational significance of the proposed research, including possible policy implications, any limitations of the proposed research, and future directions for continued research. Within the framework of the course, proposals should include material from (at least) education, psychology, and neuroscience, illustrating how different methods and approaches can or cannot be integrated to address a specific issue. The relevance of the proposed research to the broader field of human development and education should also be addressed.

(b). In-text citations should be in APA style and a reference list in APA style should be included. For details about APA style, refer to the APA Style Summary Sheet for the course (available on the Canvas site) or directly to The Publication Manual of the American Psychological Association, 6th Ed. (2010).

(c). A copy of the first page, including abstract, of any referenced article should be turned in with the research proposal. Please turn in the first page of the actual article, not the results of a database search. To save paper, you can send me a compilation of the first pages of all of your articles, alphabetized as in your reference list, as a single pdf file (this can be done in Preview).
(d). Proposals will be graded based on both content (engagement with the material, demonstrated understanding of the material, appropriate use of research materials, etc.) and style (spelling, grammar, organization, etc.). Please proofread your assignments carefully before turning them in. For details about grading for the proposals, refer to the Grading Criteria document available on the Canvas site.

3. Participating in Class Sessions
   (a). If not leading the session, each seminar participant will be required to come to each class (with the exception of the introductory classes) with a list of three (3) questions related to the readings for that class. Questions should consist of thoughtful, critical, analytical inquiries that demonstrate your engagement with the reading material; show me that you have done the readings and thought about them. Use APA style throughout. Questions overall will be graded 0, ½, or 1 for each class.
   (b). If not leading the session, each seminar participant will be required to come to each class (with the exception of the introductory classes) with a brief comment regarding possible policy implications of the materials read for that class. Make explicit connections to the readings in your policy discussion, but do not provide a simple summary of the readings. Use APA style throughout. Each policy commentary overall will be graded 0, ½, or 1 for each class.
   (c). If not leading the session, each seminar participant will review the research project proposed by the session leader. As peer reviewers, students should pay close attention to presentations and subsequently engage in a supportive and thorough critique and analysis of the presented research proposal, commenting on strengths and weaknesses at both the conceptual and methodological levels. This is an opportunity for collaborative learning and meaningful discussion. The goal is to work together to build the strongest research proposal that we can during each class; this requires engagement and thoughtfulness. A form with guidelines for peer review is posted on the Canvas site. Peer review forms will be collected at the end of each class and will be graded 0, 1, or 2. Ungraded copies will be forwarded to the session leader for incorporation into the final written research proposal.

4. Presenting Your Research Proposal
   At the end of the term, each seminar participant will present his or her research proposal to an interested audience of Department members, the public, and selected friends (you may invite anyone you like). Presentations will be very brief: each seminar participant will have about 5 minutes to share his or her work for the term. This is an informal, low-stress way of sharing what we have discovered and created with learners beyond students enrolled in the course. See the Grading Criteria sheet on Canvas for further details.

Written Assignments: Mechanics
1. Each written assignment should be typed in a conventional 12-point font (like Times or Times New Roman) and double-spaced, with one inch margins on all sides. APA style should be used throughout (refer to the APA Style Summary Sheet on the Canvas site for the course). For assignments with more than one page, pages should be numbered and
stapled together. Refer to the Grading Criteria sheet available on the Canvas site for the course for further details about assignments.

2. Note that, essentially, you have one main assignment for the term; plan accordingly and begin working on aspects of your research proposal from week one. There are no interim due dates: You are responsible for budgeting your time and research and writing strategies. Students who have taken this course previously have offered consistent advice: Do not wait until the end of the term to start writing up your proposal.

Canvas (https://canvas.dartmouth.edu/)
Numerous class resources can be found on the Canvas site for the course, including a copy of the Syllabus, links to readings through Electronic Course Reserves, readings chosen by session leaders (posted each week), the APA Style Summary Sheet, the peer review form, and the Grading Criteria for both presentations and the written proposal.

Course Grade
Grades for the course are based on class attendance and participation (16%); grades on questions (6%), policy commentaries (6%), and peer reviews (12%) for classes for which one is not a session leader; the grade as a session leader (25%); the grade on the final research proposal (25%); and the grade on the public presentation (10%). Grading is consistent with the ORC description of scholarship ratings (available at http://www.dartmouth.edu/~reg/transcript/grade_descriptions.html).

THE CHANGEABLE BRAIN:
CLASS TOPICS AND READING LIST

Note: One or two articles chosen by the session leader will be added to the reading list for each class session (not including the introductory classes) at least one week in advance of the class. These articles are also required reading and will be posted to the Canvas site; they will be directly relevant to the session leader’s research proposal. The articles listed below will provide a more general background, so that we can approach each research proposal with a shared, broad knowledge base.

Week One

Monday, 5 January – Introduction to the Course: Education and Neuroscience
What are the connections between education and neuroscience? Why are there connections between these fields? Can findings from educational research; developmental, cognitive, social, and affective psychology research; and neuroscientific research be combined and integrated to inform a science of learning, education, and development beyond the popular “brain-based education” movement? Readings for today provide broad background information and re-introduce some foundational concepts with which you should be familiar from your previous
Education courses. Although some of the readings may seem redundant, read for the main ideas and to identify themes.


Thursday, 8 January – Introduction to the Course: Methods, Brain Development, and Plasticity
We continue with our review of issues in mind, brain, and education. Readings for today provide a review of brain development and plasticity, neuroscience methods, and experimental design, and will set the stage for future discussions.

Follow up with another short, printed interview: Lehrer, J. (2009, 4 August). *From 2-D to 3-D sight: how one scientist learned to see.* http://www.scientificamerican.com/article.cfm?id=seeing-in-3-d


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**Week Two**

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**Monday, 12 January – Introduction to the Course: Research Proposals**

The readings for today were chosen to help you think about research in education, how to review the literature relevant to your topic, how to choose a research question for your proposal, and the peer review process. I fully realize that you are not writing a dissertation, but most of the useful literature on writing research proposals is related to dissertation writing. So read these articles to find ideas that will help you as you work on your project, and be assured that the overall scope for your project is much smaller than a dissertation.


**Thursday, 15 January – Introduction to the Course: Research Proposals**
By this point in the term, you should be reading deeply in your chosen literature and starting to formulate questions and designs. We will use the class period today to discuss each of your projects, so come prepared to talk about your progress - both triumphs and challenges.

*Week Three*

**Monday, 19 January – No class: Martin Luther King Jr. Day**
Monday class is moved to the 3B time slot this week (Tuesday, 4:00 to 5:50).

**Tuesday, 20 January – Switching Systems: Remediation for Poorly Reading Brains**
A growing number of studies have demonstrated changes in both reading behavior and the brain following teaching or remediation for reading difficulties. What changes with different approaches to teaching reading, behaviorally and neurally? What is the theoretical motivation for these different approaches and interventions? What might underlie this plasticity?

Session leader:


**Thursday, 22 January – Switching Systems: Remediation for Poorly Reading Brains**

Session leader:
Monday, 26 January – Technology, Multimedia, Videogames, and Brains
There are often claims in the media related to how technology affects developing brains. What is the science that supports these claims – what is the evidence that videogames and computers influence brain and behavior development? How might such influence occur and why? What roles do teachers play here?
Session leader:


Thursday, 29 January – Technology, Multimedia, Videogames, and Brains
Session leader:

Week Five

Monday, 2 February – The Sound of Music
There is growing interest in the effects of the arts on the brain, and there are quite a few studies investigating music and the brain. Does learning music change the brain? What would underlie such plasticity and why? Do we have convincing behavioral and neuroscientific evidence regarding the effects of music and arts education?
Session leader:


Mehr, S. A., Schachner, A., Katz, R. C., & Spelke, E. S. (2013). Two randomized trials provide no consistent evidence for nonmusical cognitive benefits of brief preschool music enrichment. *PLoS ONE, 8*(12), e82007. doi:10.1371/journal.pone.0082007


**Thursday, 5 February – The Sound of Music**

Session leader:

**Week Six**

**Monday, 9 February – Almonds and Seahorses: Emotion, Memory, and Learning**
Anecdotally and from personal experience, we know that making an emotional connection to material often seems to make that material easier to learn and remember. What do we know about the behavioral and neural development of emotion in relation to learning and remembering? What do we know about the connection between cognition and emotion in relation to learning?

Session leader:


**Thursday, 13 February – Almonds and Seahorses: Emotion, Memory, and Learning**
Session leader:

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**Week Seven**

**Monday, 16 February – To Sleep, Perchance to Consolidate**
Sleep appears to play a critical role in learning and memory. Why? What is the behavioral and neuroscientific evidence? What do we know about sleep behaviors in schoolchildren and how sleep influences academic performance?
Session leader:


Gillen-O’Neel, C., Huynh, V. W., Fuligni, A. J. (2013). To study or to sleep? The academic costs of extra studying at the expense of sleep. *Child Development, 84*(1), 133-142. doi:10.1111/j.1467-8624.2012.01834.x


**Thursday, 19 February – To Sleep, Perchance to Consolidate**
Session leader:

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**Week Eight**

**Monday, 23 February – Becoming an Expert: Faces, Places, Voices, Dogs, Birds, and Pawns**
Learning something well often involves becoming an expert in a specific area. Do we want our students to be experts - in what? Do we want our teachers to be experts - in what? Are you an expert in your chosen course of study or major? What do we know about expertise at the
behavioral and neuroscientific levels? What might happen with interest and repeated practice? Why?

Session leader:


**Thursday, 26 February – Becoming an Expert: Faces, Places, Voices, Dogs, Birds, and Pawns**

Session leader:

*Week Nine*

**Monday, 2 March – Final Check-in**

Final check-in, with research proposals due in one week. We will also discuss the presentations, which should be about four slides (1: title, 2: interdisciplinary literature review and question, 3: methods and design, 4: expected results and implications/significance) and take no longer than about five minutes (exact time will depend on how many students are in the class). *I will give a one-minute warning and stop you at the time limit.*

**Thursday, 5 March – Brief Public Presentations of Research Proposals**

** The PowerPoint of the final version of your presentation is due to me (via e-mail) by no later than 10:00 am today. Spell check and practice ahead of time to make sure that your presentation is no longer than the time limit. What you send me will be the final version that you will present this afternoon; there will not be time to make changes.

Your brief presentation in class today is your chance to share what you have accomplished this term, and in the Education minor more generally, with a wider audience.

*Week Ten*
Monday, 9 March – Course Conclusion
Final discussion and wrap-up. Your final written proposals are due today at the beginning of class. If you are sending me the first pages of your articles as a pdf file (see above), that file is also due to me at the beginning of class. Clip a self-addressed envelope to your proposal so that I can return your graded paper to you through Hinman mail.

Please note that the Syllabus, like the brain, is subject to change.