Course Description

The primary goal of the course is for students to become familiar with the theory and methods of cognitive psychology as they apply to learning and instruction. It is a core, survey course, so we will not go that deeply into any specific topic, but I hope that you will leave it familiar with the major issues in the field and how researchers address them. There is a definite Michigan slant to this course - with an emphasis on how issues related to learning play out in complex contexts such as classrooms.

The second goal of the course is for you to learn to critically read and discuss articles in the field of cognition and instruction. You will practice presenting empirical and theoretical articles, identifying important issues, and critically evaluating conclusions.

Finally, I hope that you get to know one another, learn from one another and come to appreciate the different disciplines and perspectives that are represented in the class. I look forward to getting to know you!

Class Format

This is a discussion-oriented seminar, and everyone will be expected to read the articles assigned before the class period and to actively participate in class discussion. The seminar will also include some brief lectures and student presentations at the end of the term.

Requirements & due dates

Reaction Papers (15% of grade)

In order to facilitate discussion, you should turn in a brief (equivalent of one page or less) set of comments on the reading as well as questions you would like to discuss in class, if any. The reactions and questions should be posted to the Canvas site by 9 p.m. every Sunday before the weekly meeting.
Reaction papers will be graded on a simple scale of 1-3, where “2” is a perfectly acceptable reaction paper, “3” is exceptional, and “1” represents something that could use improvement. Because there are only 14 weeks in the term (and 13 where you will be submitting a reaction paper) you will get 1 point each time you turn in a reaction paper, and if you have any that get a “3” at any point in the semester you will receive 2 bonus points. If there are any that I think are deficient (i.e., where you get a “1” I’ll explain why and work with you on this).

The reaction papers are useful to me in that they can help me get a sense of where the class is confused or might have misconceptions, what topics are important to you, and generally get a sense of the sense you made of the readings.

Get out of jail free card - If you get busy with other work, you may skip one (and only one) reaction paper without impact on your course grade, but please still come to class.

Midterm exam. (30% of grade)

The course also includes one take-home midterm covering the core material in the first part of the course. The midterm will consist of a choice of 2 out of 4 short essay questions for you to respond to based on the readings and class discussions.

PLEX: Personal Learning Experiment. (15% of grade).

Sometime during the semester you should experiment with some kind of non-traditional learning opportunity. This could be a Coursera course, a Linkedin Learning, DataCamp, CourseKata, etc., or almost anything else (you may want to check in with me on what it is). Then you should post a discussion (probably about 2-3 pages unless you feel inspired) arranged around these three questions: 1) What did you decide to do and why did you pick it? 2) How did you go about learning and what did and didn’t work for you? 3) What ideas in the course and or cognitive psychology generally help you interpret your experience?

You will also give a short presentation/demonstration of your PLEX in the meeting where we present research proposals.

Research Proposal (30% of grade)

You will team up with another person who comes from a different program or who has a different background/interests than you and identify a researchable topic or question of interest to you both. You will then write a research proposal, with an introduction, hypothesis, and describe a study that would address this question, as well as the kind of data you might collect and the significance of the study. Your team will turn in one paper.

Research Proposal Presentation (10% of grade)

Your team will present your proposal to the class and get feedback on the project.

Important dates

This table lists the due dates for the various grade activities.
Course Policies

Academic Dishonesty Policy

I encourage you to work together with your colleagues and discuss your ideas both in and out of class. But it’s important that you be clear where your ideas from. Failing to cite ideas, words, and phrases that come from other sources is something the University and the broader academic community take seriously, so please let me know if you have any questions and, when in doubt, cite.

Disabilities Policy

The University of Michigan is committed to providing equal opportunity for participation in all programs, services and activities, and I am committed to this, too. There is a formal process for getting accommodations that I encourage you to follow if it would be useful to you. Request for accommodations by persons with disabilities may be made by contacting the Services for Students with Disabilities (SSD) Office located at G664 Haven Hall. The SSD phone number is 734-763-3000. Once your eligibility for accommodation has been determined, you will be issued a verified individual services accommodation (VISA) form. Please present this form to me at the beginning of the term, or at least two weeks prior to needing the accommodation (test, project, etc…).

Please also read the next two sections…

Student Mental Health and Wellbeing

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and https://caps.umich.edu/ during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see https://www.uhs.umich.edu/aodresources.

Additional resources include:

- The UM Department of Psychiatry outpatient clinic (734) 764-0231
- The UM Psychiatric crisis emergency services (734) 936-5900.
- The UM Psychological clinic (734) 764-3471.
- The UM Addiction Treatment Services (800) 525-5188.
- Wolverine Support Network (student-led) www.umichwsn.org
- A more comprehensive list of resources can be found at this website:
  https://lsa.umich.edu/psych/undergraduates/student-resources.html

For a complete listing of other mental health resources available on and off-campus, visit http://umich.edu/~mhealth/.

Let me know if problems arise

In addition to the formal disabilities and wellbeing policies, I recognize that the demands of life and graduate school are challenging to everyone. So if anything comes up that might interfere with your ability to perform assignments or get the most from this class, please let me know. Many of us want to solve problems on our own, and I respect that, but the University has a great deal of resources that can help when problems come up, and it’s always easier the earlier you start.

Week 01, 09/09: Setting the context

This is a fascinating time to be thinking about the cognitive processes that make teaching and learning possible. Societal and technological changes both offer new ways of presenting information while also presenting challenges for the sustained attention that learning requires. My goal for this course is that you will leave with a set of ideas and analytical frameworks that will help you to think about thinking and learning in the domains that you’re already interested in, and be able to contribute to ensuring that new ways of teaching and learning actually lead to more effective learning.

In today’s class, we will consider three related topics.

- **How do you think the contexts of teaching and learning will change between your own experience and that of students now starting elementary school? What implications do these changes have for both the challenges students will face and the opportunities they have to become well-educated?**
- **What is the nature of cognitive science research?**
- **What kinds of problems can we solve through cognitive science research? How? This simple question is both more contentious and more interesting than it might appear.**

We will be discussing the ideas in these papers as part of this discussion:


- **What is the contribution you intend to make in your career?**

We will discuss this in class, but I’d also like you to post as your first posting for this class a short discussion of what as of now you hope to contribute in your career and how you might go about doing so.

Before posting, I’d like you to read the 4 papers which we will discuss in class, which may help you in thinking about this admittedly big question.

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**Week 02, 09/16: Attention in an Age of Distractions**

This week we will discuss working memory and attention, which are two of the most important concepts that cognitive psychology has to contribute to understanding teaching and learning. We will also discuss a very specific and current challenge teachers and students face - the diffusion of attention made possible by the proliferation of laptops and cellphones - and consider the implications of these technologies for teaching and learning.

- **To help ground the discussion, we will begin with a very specific issue - the way in which mobile technology affects what goes on in classrooms. I will ask you to read a web posting and two articles that focus on the deleterious effects of laptops on learning. This is not to argue that the effects of such devices are only or even mostly deleterious, but rather that these effects need to be considered.**


- **Next we will discuss some theoretical papers that will give you some background for thinking about the broader question of how working memory and attention affect teaching and learning.**


- **After reading these papers, please include any questions you would like us to be sure to discuss in class in your reaction post.**
Week 03, 09/23: Expertise & deliberate practice

One area where cognitive psychology has had perhaps the most impact on education is in thinking about the nature of expertise and how it develops. The “10,000 hour rule” of expertise was popularized by Malcolm Gladwell and remains both popular and controversial. The concept of deliberate practice is often misused in teacher education circles, but it remains a fundamental idea. This has been an important area of research for more than 30 years now, so it’s worth considering what if anything has changed across that period.

- We will begin by reading three papers that lay out basic ideas about what expertise is and how it develops


- Then we’ll read a recent paper that questions the sufficiency of practice for the development of expertise, and a response to this critique.


- Finally, we’ll apply these ideas to teachers and teaching.


Week 04, 09/30: The role of cognitive psychology in education

This week we look at different aspects or perspectives on the relation between cognitive psychology and education. After you go through the set of readings, I would like to know what your
stance is on what cognitive psychology has to contribute to education, and what consideration of educational questions has to contribute to psychology.

- We begin with a good historical overview on how educational concerns have been viewed by psychologists, which I think provides a good perspective on considering where this relationship is now, and where it ought to be:


- Next we will read some excerpts from Vygotsky, who provides a specific and very influential perspective on these questions:


- Then we will read 4 papers that provide in my view some of the best examples of what cognitive thinking about education and development can be:


Siegler, R. S. (2016). Continuity and change in the field of cognitive development and in the perspectives of one cognitive developmentalist. Child Development Perspectives, 10(2), 128-133.


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**Week 05, 10/07: Some controversies about learning**

This week we get into some of the major questions about how people learn that have characterized education and psychology, particularly what ideas about the constructive nature of learning imply about the best ways to go about teaching and what knowledge and beliefs about the brain can tell us about how to teach and learn.

- We’ll begin with a discussion of urban legends in education. How many of these do you recognize, or believe?


- Then we’ll shift to what’s been characterized as “neuromyths” - ideas about learning that are attributed to the brain, beginning with a paper that’s 20 years old and that started some of the critical look at the brain and education.


- The final topic will be learning styles and/or personalized learning, which has become very popular with those who'd like to use technology to promote education


Week 06, 10/14: Fall Break – No class today

Week 07, 10/21: Memory & Testing

Everyone hates testing, but there is pretty good evidence that it promotes learning. This week we will look at what we know about how to promote student learning, with a focus on learning information (as opposed to skills, attitudes, etc.)

- This week we will begin with two articles by the same authors on the role of testing in promoting learning. I thought it might be interesting for you to look at how the same ideas are presented in two different journals.


- Next we’ll consider a more general review of what we know about promoting learning. Pay attention to the criteria used to assess the techniques as well as the results of the review.


- Finally, we will discuss a Practice Guide developed by IES to promote some of the ideas discussed here. Of course it’s much earlier than the Dunlosky et al. review, but, taking that into account, consider the extent to which you judge this to be successful at translating these ideas into versions that would be useful and classrooms and usable by teachers.

Week 08, 10/28: Intelligence & Change over time

This week we’ll consider intelligence - what it is, how it is assessed, how it seems to be changing over time and what this all means for education.

- We’ll begin with a review of the idea and measurement of intelligence, and then a paper discussing what it means for learning.


- Next we will look at a very specific and fascinating phenomenon in this area - the Flynn effect, and discuss what it might mean for education and the future.


Week 09, 11/04: What can large-scale studies tell us about teaching and learning in classrooms?

A very useful and interesting resource for educators is the existence of large-scale cooperative studies comparing the education of students in different countries. We will discuss the major efforts in this area as well as looking at some diverse examples of researchers trying to draw conclusions from this work.

As you read the papers, I hope you will look for examples of both 1) useful insights that come from this enormous effort, and 2) dangerous or potentially dangerous conclusions that flow from this work.

- The first two papers provide an overview of PISA and its uses.


- The next paper provides a particular US-centric perspective on what this means for education, while the fourth paper tries to draw conclusions about teaching from these datasets.


- The Hiebert and Stigler paper looks at ways that some of these comparative data could be used to actually improve classroom practice.


- The last two papers provide an economist’s perspective on why schooling is important, and may spark some discussion of how economists differ from educators and psychologists in the way they think about some of these issues.


For reference only:


Week 10, 11/11: Cultural perspectives

Because education is far too important to leave entirely in the hands of young children, cultures go to great efforts to ensure that children acquire the skills, concepts, and traits believed to be essential for success in school and beyond. In other words, education is a quintessentially cultural activity.

Yet “culture” is used by two groups of researchers in education, who often don’t talk to each other. One group is primarily concerned with variation within a society - how different subgroups approach the idea of socialization differently from each other, and what that means for children’s successful interaction with schools. The other is concerned with differences across countries, and how different values are reflected in different institutions and different educational practices.

We will discuss some of each approach this week, and hope to keep the focus on the processes by which culture is made manifest in children’s lives.

- We will begin with the classic issue of stereotype threat, with a paper that may already be familiar to you:

Next we’ll look at some very interesting recent research that suggests that a standard theory of self-control may be a matter of belief:


Finally, we’ll look at measurement of self regulation among young children, and look at some differences among Chinese and American children:


Week 11, 11/18: Learning to read - from phonemes to narratives

The ability to read is what most clearly makes one an educated person. But reading can mean different things in different contexts and the nature of reading and its acquisition remains surprisingly controversial.

We will begin with a paper that provides a general overview of reading and a cognitive psychological perspective on how to promote it:


Next we’ll look at three papers that focus on how the kind of reading system your culture uses affects the nature of reading acquisition:


• Next, we’ll look at a paper that uses a very interesting approach to separate out developmental from instructional factors:


• Then, we’ll look at some ideas about what this all means for teaching children to read


• Finally, we will begin by considering a very influential model of how we learn from text:


Week 12, 11/25: Mathematics

This week we begin with some general ideas about what mathematics is that children might learn it. Mathematics differs from literacy in the extent to which children are able to figure it out on their own as well as the extent to which it’s emphasized in different cultures.


• Next we look at the specific but important issue of symbolic representations that attempt to communicate mathematical ideas.


12/14
Finally, we look at two studies that look for prediction of achievement in mathematics over time.


Week 13, 12/02: Scientific Reasoning and Science Knowledge

The domain of science is an important one where the interaction of knowledge and general reasoning comes into particular focus. Given enough time and the scientific method, you could in theory generate all of scientific knowledge. Yet this is clearly not how we learned most of what we know about the world. Schools have to make decisions about the relative importance of knowing how to do science and knowing facts about the real world, and this is a conflict that doesn’t have a simple answer.

The first papers look at some features of human reasoning relevant to learning science.


Next I’d like you to watch two videos about efforts to reform science/social science education and consider the differences between them

The first is about Man: A Course of Study (55 minutes): https://www.nfb.ca/film/through_these_eyes/

The second concerns the Big History Project (16 minutes):
https://www.youtube.com/watch?v=wFgDFlwchgk

The next set of papers looks at different approaches to and challenges for improving scientific reasoning.


Week 14, 12/09: Presentations of research proposals