

# Educational Psychology

## *Introduction to Learning Sciences I*

**Course Info**    **Instructor**  
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**Course Overview**    This is the first of a two-semester graduate course sequence that establishes the intellectual foundations for research in the learning sciences. The learning sciences are mainly concerned with the questions: How do people learn? How can we help people learn? Learning sciences research studies these questions in context (not only in laboratories), empirically (not simply philosophically), and to design and apply new knowledge about learning to improve learning outcomes (not only to generate theory). The learning sciences combine two major perspectives: the focus on the individual learner and the focus on learning in context. Each perspective takes a different view about how learning happens, how to investigate learning, and how to help students learn. Yet, these perspectives are complementary in the sense that we need to study learning from both perspectives. The goal of 795 is to provide students with a strong foundation in current and past theories, research findings, and research practices in the Learning Sciences. We will come to understand that, as learning scientists, we need to combine the two perspectives. In a capstone project, students will use these theoretical frameworks to derive testable hypotheses or predictions for their own research projects. Students will learn to design realistic and feasible research projects as part of which they will analyze and interpret empirical data. In a final paper and final presentation, students will learn to effectively communicate these findings to Learning Sciences audiences.

**Expectations**    If you are enrolled in this course for credit you are expected to complete all of the required readings, postings, class presentations, major and minor assignments, as well as attend and participate in each class. Absences require a notification, preferably by e-mail, prior to class. Late assignments must be discussed with the instructor before they are due.

### **Required Preparation Materials**

All readings and videos for the course are listed in this document. Dates for completing reading assignments are listed in the Class Schedule, attached. These plans are not set in stone and may be changed if circumstances warrant. For your convenience, articles may be downloaded from the Moodle Course Site: <https://ay16-17.moodle.wisc.edu/prod/course/view.php?id=121>

### **Class Participation in Discussions**

Each week, you should prepare one question you would like to discuss in class. In addition, you should come to class prepared to participate in class discussions. You should study each reading and be able to share critical analyses in class. While we can expect a healthy debate on some issues, you must demonstrate respect for others with whom you disagree. We also ask that you monitor your own level of class contribution and allow space for others to contribute to the class discourse. We will actively monitor this as well and may ask those who tend to speak often to refrain from dominating and allow others to contribute.

### **File Formats for Assignments**

All assignments are due in PDF format by email to [marau@wisc.edu](mailto:marau@wisc.edu). Use Times New Roman, 12pt, single space, margins 1" on all sides. Include figures and tables in line with text. For all other specifications, refer to the APA style manual: <http://www.apastyle.org/manual/>

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## Assignments Extensions

If you need an extension due to unforeseeable circumstances, you need to negotiate with the instructor **at least 48h prior to** the due date.

### Weekly Assignments

#### Summary and discussion questions

By Mondays, 11:59pm, you have to post a brief summary of the required resources (250 words max), plus a discussion question (100 words max) about the required readings of the given week. The summary should describe your own take-away from the reading. The discussion question should suggest interesting points of discussion; it should not be a factual question. For example, discussion questions may ask about how one of the readings relates to something you have read before in class or outside of class, it may propose examples from your own experiences in the world for topics discussed in the readings, it may ask about differences in viewpoints expressed by the readings, among others.

### Capstone Project

#### Assignment 1

*Description:* Carry out a pilot-study from a cognitive perspective in a domain of choice, collect and analyze pilot data from 2-3 students (can be expert-novice study, think-aloud study, etc.). Select one theoretical perspective that seems to be a good fit for your data. Retrospectively “fit” a research question and hypothesis based on this perspective. Write up a paper that presents a coherent story of how prior research from your theoretical perspective leaves open a research question that your study addresses. Discuss the theoretical and practical contributions your study makes to prior research as well as limitations of your study.

*Learning goals:* Understand the cognitive perspective by applying it to your own research project; delve into a method that considers learning from the perspective of the individual; reflect on pros and cons of this perspective on learning.

*Due dates:*

Wednesday, 9/21: Discuss ideas for assignment in class

Wednesday, 10/19: Paper is due

#### Assignment 2

*Description:* Carry out a pilot-study from a socio-cultural perspective in a domain of choice, collect and analyze pilot data from 2-3 students. Select one theoretical perspective that seems to be a good fit for your data. Retrospectively “fit” a research question and hypothesis based on this perspective. Write up a paper that presents a coherent story of how prior research from your theoretical perspective leaves open a research question that your study addresses. Discuss the theoretical and practical contributions your study makes to prior research as well as limitations of your study.

*Learning goals:* Understand the socio-cultural perspective by applying it to your own research project; delve into a method that considers learning from the perspective of learning in context; reflect on pros and cons of this perspective on learning

*Due dates:*

Wednesday, 10/26: Discuss ideas for assignment in class

Wednesday, 11/16: Paper is due

#### Assignment 3

*Description:* Reflect on how the two perspectives in Assignments 1 and 2 provided complementary insights into how learning occurs.

*Learning goals:* Understand the complementary nature of these two perspectives on what insights they offer on learning; experience yourself as a learning scientist who combines multiple theoretical perspectives in a multi-methods approach.

*Due dates:*

Wednesday, 12/7: Final paper is due

Wednesday, 12/14: In-class presentations

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## Grading

A detailed rubric will be posted on Moodle. Course grades will be based on student performance in the following areas:

Class participation:	20%
Summary / discussion questions:	20%
Assignment 1:	20%
Assignment 2:	20%
Assignment 3:	20%

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## Policies and Resources

### **Class Cancellation**

Occasionally, severe weather, illness, or other circumstances may require cancellation of a class meeting. If this is so, we will send out an email to the class email list. It is the responsibility of each class member to be alert for and check email from the instructor or TA.

### **Accommodation**

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity.

The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility.

Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

### **Religious Reasonable Accommodation**

Every effort shall be made to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance, provided advance notification of the conflict is given. Whenever possible, students should notify the instructor during the first two weeks of the semester to request special accommodation.

### **Student Honesty and Rules of Conduct**

Academic honesty requires that the course work (drafts, reports, examinations, papers) a student presents to an instructor honestly and accurately indicates the student's own academic efforts. These policies are available at <http://www.studentaffairs.wisc.edu/>

UWS 14 is the chapter of the University of Wisconsin System Administrative code that regulates academic misconduct. UW-Madison implements the rules defined in UWS 14 through our own "Student Academic Misconduct Campus Procedures." UWS 14.03 defines academic misconduct as follows:

"Academic misconduct is an act in which a student: (a) seeks to claim credit for the work or efforts of another without authorization or citation; (b) uses unauthorized materials or fabricated data in any academic exercise; (c) forges or falsifies academic documents or records; (d) intentionally impedes or damages the academic work of others; (e) engages in conduct aimed at making false representation of a student's academic performance; (f) assists other students in any of these acts."

If you are accused of misconduct, you may have questions and concerns about the process. If so, you should feel free to call Student Advocacy & Judicial Affairs (SAJA) in the Offices of the Dean of Students at 263-5700 or send an e-mail to [dos@bascom.wisc.edu](mailto:dos@bascom.wisc.edu).

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## Class Schedule

Theme	Date	Topic & Readings	Assignments
<i>Introduction</i>	9/7	<b><i>Week 1: Overview of the learning sciences</i></b>  <i>Required preparation resources:</i> Nathan & Sawyer (2014) ISLS Webinar Chris Hoadley  <i>Learning goals:</i> <ul style="list-style-type: none"><li>• Learning about each others' backgrounds</li><li>• Learning about each others' learning goals</li><li>• Reflect on what learning is</li><li>• Reflect on how we might study learning</li><li>• Introduction into the course topic</li></ul> <i>Recommended resources:</i> Hoadley & Van Haneghan (2011)	<ul style="list-style-type: none"><li>• none</li></ul>
<i>Focus on the individual</i>	9/14	<b><i>Week 2: What is knowledge? I: Schema theory</i></b>  <i>Required preparation resources:</i> Thorndyke (1984) Reed (1993)  <i>Learning goals:</i> <ul style="list-style-type: none"><li>• Understand distinction between declarative and procedural knowledge</li><li>• Understand declarative knowledge</li><li>• Reflect on advantages and disadvantages of this conceptualization of learning</li></ul>	<ul style="list-style-type: none"><li>• Summary and discussion question</li></ul>
	9/21	<b><i>Week 3: What is knowledge? II: Production rule systems</i></b>  <i>Required preparation resources:</i> Anderson (1996) Koedinger, Corbett, & Perfetti (2012)  <i>Learning goals:</i> <ul style="list-style-type: none"><li>• Understand the distinction between declarative and procedural knowledge</li><li>• Understand procedural knowledge</li><li>• Reflect on advantages and disadvantages of this conceptualization of learning</li></ul> <i>Recommended resources:</i> Anderson (1983) Anderson (2005) Taatgen & Anderson (2008)	<ul style="list-style-type: none"><li>• Summary and discussion question</li><li>• Be prepared to discuss ideas for Assignment 1 in class</li></ul>

9/28	<p><b><i>Week 4: What is the result of learning? Expertise</i></b></p> <p><i>Required preparation resources:</i> Chi, Feltovitch, &amp; Glaser (1981) Dreyfus &amp; Dreyfus (1986)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand expertise as highly skilled practice that involves highly chunked knowledge structures, automated skills and efficient perception</li> <li>• Understand what characterizes differences between experts and novices</li> <li>• Understand process models of how expertise is attained</li> <li>• Reflect on pros and cons of this perspective</li> </ul> <p><i>Recommended resources:</i> Baroody (2003) Kellman &amp; Massey (2013) ISLS Webinar Ravit Duncan</p>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> </ul>
10/5	<p><b><i>Week 5: Where do these knowledge structures come from? Embodied cognition</i></b></p> <p><i>Required preparation resources:</i> ISLS Webinar Dor Abrahamson Glenberg et al. (2014)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand that symbol systems accounts cannot explain where symbols come from</li> <li>• Understand the perspective of symbols emerging from bodily actions</li> <li>• Reflect on pros and cons of this perspective</li> </ul> <p><i>Recommended resources:</i> Abrahamson &amp; Lindgren (2014) Antle, Corness, &amp; Droumeva (2009) Lakoff, &amp; Johnson (1980) Nunez, Edwards, &amp; Matos (1999) Wilson (2002) ISLS Webinar Martha Alibali</p>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> </ul>
10/12	<p><b><i>Week 6: How does personal experience relate to cognition? Narration and dialogue</i></b></p> <p><i>Required preparation resources:</i> Nelson (1996) Bruner (1996)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand that cognition is not isolated from experiences with others</li> <li>• Understand that another mechanism by which we acquire cognition is through interactions and experiences</li> <li>• Understand how our personal experience, through narratives and dialogues with others, shapes the way we think</li> </ul>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> </ul>

<i>Learning in context</i> 10/19	<p><b>Week 7: How does the cultural setting relate to cognition? Socio-cultural theories</b></p> <p><i>Required preparation resources:</i> Vygotsky, L. S. (1978), Chapters 4 &amp; 6 Wertsch (1997)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand that the cultural setting shapes learning and knowledge</li> <li>• Understand the ZPD</li> <li>• Understand what Vygotsky means by internalization</li> <li>• Reflect on pros and cons of this perspective</li> </ul> <p><i>Recommended resources:</i> Wertsch &amp; Kazak (2011)</p>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> <li>• Assignment 1: Paper is due</li> </ul>
10/26	<p><b>Week 8: How does communication affect learning? Discourse and speech genres</b></p> <p><i>Required preparation resources:</i> Todorov, T. (1984) Airey &amp; Linder (2009)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand what speech genres are</li> <li>• Understand how interpersonal communication is shaped by culture and how dialogical interaction shapes our thinking and learning</li> <li>• Reflect on pros and cons of this perspective</li> </ul> <p><i>Recommended resources:</i> Emerson, C. (1983) Scott, Mortimer, &amp; Aguiar, (2006) Bakhtin (1986)</p>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> <li>• Be prepared to discuss ideas for Assignment 2 in class</li> </ul>
11/2	<p><b>Week 9: How do others relate to learning? Distributed cognition</b></p> <p><i>Required preparation resources:</i> Hutchins (1993) Pea (1997)</p> <p><i>Learning goals:</i></p> <ul style="list-style-type: none"> <li>• Understand the idea of knowledge and practices being distributed between people and artifacts</li> <li>• Understand distributed cognition as a way in which culture shapes our learning and thinking</li> <li>• Reflect on the pros and cons of this perspective</li> </ul> <p><i>Recommended resources:</i> Dede (1996) Martin &amp; Schwartz (2005) Sharples &amp; Pea (2014)</p>	<ul style="list-style-type: none"> <li>• Summary and discussion question</li> </ul>

- 11/9 **Week 10: How does the Context Relate to Cognition? Situative Cognition** • Summary and discussion question

*Required preparation resources:*

Lave & Wenger (1991)  
Greeno, & Engeström (2014)

*Learning goals:*

- Understand the perspective of learning happening in context and knowledge being undivorceable from the context
- Understand Lave's use of constructs of dialectic, arena, setting, and activity
- Understand the constructs of affordances and constraints
- Reflect on the pros and cons of this perspective

*Recommended resources:*

Greeno (2006)  
Kafai & Dede (2014)  
Lave, Murtaugh, & de la Rocha (1984)  
Renkl (2001)  
Jean Lave: <http://vimeo.com/28855105>

- Synthesis** 11/16 **Week 11: Transfer from the perspective of the individual** • Summary and discussion question  
• Assignment 2: Paper is due

*Required preparation resources:*

Bassok & Holyoak (1989)  
Schwartz, Bransford, & Sears (2005)

*Learning goals:*

- Understand transfer as the ability to perform tasks other than the ones already practiced
- Understand the individual perspective on transfer as knowledge that “resides” in the individual
- Understand the role of isomorphic relationships between conditions of the learning situation and the transfer situation
- Understand what internal representations of knowledge mean, and how this relates to transfer
- Reflect on the pros and cons of this perspective

*Recommended resources:*

Bassok (1996)  
Gentner, Loewenstein, & Thompson (2003)  
Gick & Holyoak (1987)  
Perry (1991)  
Reed (1993)

- 11/15 **Thanksgiving break**
- 11/30 **Week 12: Transfer from the perspective of learning in context** • Summary and discussion question
- Required preparation resources:*  
Brown, Collins, & Duguid (1989)  
Carraher & Schliemann (2002)
- Learning goals:*
- Understand the issue from a situative perspective: if knowledge does not reside within the individual, what is transfer?
  - Understand that we can think of knowledge being transformed when we apply it to a new context
  - Contrast the cognitive and situative perspectives at the example of transfer
  - Understand the pros and cons of each perspective
- Recommended resources:*  
Burton, Brown, & Fischer (1984)  
Greeno (1998)  
Greeno (1997a,b)  
Gruber, Lai-Chong, Mandl, Renkl (1996)  
Hutchins (1996)  
Lobato (2006)  
Schliemann & Carraher (2002)
- 12/7 **Week 13: How can we combine different perspectives on learning? The transfer problem** • Summary and discussion question  
• Assignment 3: final paper
- Required preparation resources:*  
Shaffer (2012)  
Bransford et al. (2006)
- Learning goals:*
- Understand that the field of the learning sciences is fundamentally shaped by a combination of perspectives that focus on the individual and on learning in context
  - Understand that both perspectives are complementary, and each offers important insights into how learning occurs
  - Understand that the perspectives differ in terms of what situations they consider worthwhile studying and in what the unit of analysis is in studies of learning
  - Understand ways to combine the two perspectives in new theoretical frameworks
- 12/14 **Week 14: Final presentations** • Assignment 3: final presentations
- Learning goals:*
- Learn about each others' research projects

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## References

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## Videos

- ISLS Webinar Dor Abrahamson – Grounded Cognition / Embodied Cognition: <http://isls-naples.psy.lmu.de/intro/all-webinars/abrahamson/index.html>
- ISLS Webinar Martha Alibali – Gestures in Learning and Teaching: [http://isls-naples.psy.lmu.de/intro/all-webinars/alibali\\_all/index.html](http://isls-naples.psy.lmu.de/intro/all-webinars/alibali_all/index.html)
- ISLS Webinar Ravit Duncan – Learning Progressions: <http://isls-naples.psy.lmu.de/intro/all-webinars/duncan/index.html>
- ISLS Webinar Chris Hoadley – Introduction Session: [http://isls-naples.psy.lmu.de/intro/all-webinars/hoadley\\_video/index.html](http://isls-naples.psy.lmu.de/intro/all-webinars/hoadley_video/index.html)
- Jean Lave - An Apprenticeship in Critical Ethnographic Practice: <http://vimeo.com/28855105>