

# EDEP 6114: COGNITIVE PROCESSES & EDUCATIONAL PRACTICE

TUESDAYS • 7:00 PM – 9:50 PM • 1750 KRAFT DRIVE, RM 2080 • CRN 14718

**Instructor:** Peter Doolittle  
**Office:** 150 Kraft Drive (Rm 2039)  
**Office Hours:** By Appointment

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(Canvas LMS is not used for this class)

## PURPOSE

The purpose of this course is to answer three fundamental questions:  
*How do we think and learn? What evidence do we have? How should we design and teach?*

## Course Description

Cognitive psychology addresses the processes of how people learn, remember, and think about knowledge, information, and experiences. As such, the cognitive psychology field is broad and encompasses an array of concepts, approaches, frameworks, and theories. The *Cognitive Processes and Educational Practice*'s course is an advanced and focused course on a subset of these elements and areas. Specifically, the course engages in the relationship between learning, memory, and cognition, with special attention paid to their involvement in educational practice. Beyond these key elements, specific cognitive psychology topics, that arise from student interests, provide a second major focus of the course. Ultimately, the course focuses on the relationship between state-of-the-art thinking with regards to learning, memory, and cognition and the teaching and learning process.

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**Course Prerequisites:** Graduate status.

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## Learning Goals and Outcomes:

LG1: Students will understand the essential concepts of learning, memory, and cognition.

LO1: Students will be able to *explain* critical cognitive psychology concepts related to learning and instruction.

LO2: Students will be able to *describe* the interdependent nature of learning, memory, and cognition.

LG2: Students will understand the role that cognitive processing plays in learning, memory, and cognition.

LO1: Students will be able to *explain* the role of cognitive processing and memory to learning and instruction.

LO2: Students will be able to *analyze* learning and instruction for the roles that processing and memory play.

LG3: Students will understand specific cognitive psychology topics related to learning, memory, and cognition.

LO1: Students will be able to *explain* advanced cognitive psychology topics related to learning and instruction.

LO2: Students will be able to *integrate* advanced cognitive psychology topics into learning and instruction.

LG4: Students will understand the relationship between cognitive tenets and the design of effective instruction.

LO2: Students will be able to *create* instructional strategies by applying cognitive psychology tenets.

LO7: Students will be able to *create* instructional design that leverages cognitive psychology tenets.

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## Evaluations

Student performance will be evaluated in three ways: the completion of a series of Reading Responses, the completion of a series of In-Class Daily Primings, and Daily Class Evaluations. The Reading Responses provide an opportunity for students to analyze scholarly writings based on standard research components: research questions, methods, results, findings, and applications. The In-Class Daily Primings provide an opportunity for students to activate and review core ideas from the reading at the beginning of each class in the form of multiple-choice questions. The Daily Class Evaluations allow students the opportunity to reflect on their learning and provide feedback to the instructor on the conduct of the course. The assignments are delineated in the *Reading Responses*, *Daily Primings*, and *Daily Class Evaluations* handouts.

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<b>Grading</b>	Reading Responses	(14 x 100 points)	1400 pts
	In-Class Daily Priming	(28 x 10 points)	280 pts
	Daily Class Evaluations	(14 x 20 points)	280 pts

A	1960-1842	100-94 %	B+	1763-1705	89-87%	C+	1567-1509	79-77%	F	< 1176
A-	1841-1764	93-90	B	1704-1646	86-84	C	1508-1450	76-74		
			B-	1645-1568	83-80	C-	1549-1372	73-70		

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## Course Readings

*Cognitive Process and Education's* pedagogical approach focuses on Reading • Discussing • Exploring • Applying. Readings – articles and chapters – are an essential aspect of the class. To support this process, all articles and chapters are available online once you have logged-in. A list of all readings is below on the Course Readings page.

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## Attendance Policy, Late Policy, and Dropping of the Course

Submitting an assignment late will result in a grade of 0 points, unless the late submission was cleared by the instructor in advance of the due date. If you find it necessary to withdraw from this course, for any reason, you must withdraw by May 3, 2023. All students are expected to attend class regularly and promptly, and to come prepared to class by having read the day's readings and contemplated the reading's meaning and application.

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## Disabilities

Virginia Tech welcomes students with disabilities into the University's educational programs. The University promotes efforts to provide equal access and a culture of inclusion without altering the essential elements of coursework. If you anticipate or experience academic barriers that may be due to disability, including but not limited to ADHD, chronic or temporary medical conditions, deaf or hard of hearing, learning disability, mental health, or vision impairment, please contact the Services for Students with Disabilities (SSD) office (540-231-3788, [ssd@vt.edu](mailto:ssd@vt.edu), or visit [ssd.vt.edu](http://ssd.vt.edu)). If you have an SSD accommodation letter, please meet with me privately during office hours as early in the semester as possible to deliver your letter and discuss your accommodations. You must give me reasonable notice to implement your accommodations, which is generally 5 business days and 10 business days for final exams.

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## Mental Health and Well-Being

Supporting the mental health and well-being of students in my class is of high priority to me and Virginia Tech. If you are feeling overwhelmed academically, having trouble functioning, or are worried about a friend, please reach out to any of the following offices:

### *Cook Counseling*

- Schedule an appointment and/or 24/7 crisis support: 540-231-6557
- **ucc.vt.edu** for more information

### *Dean of Students Office*

- General advice: 540 231-3787
- After-hours crisis: 540-231-6411
- **dos.vt.edu** for more information

### *Hokie Wellness*

- **hokiewellness.vt.edu** for more information about health and wellness workshops and consultations
- Virginia Tech Recovery Community: **hokiewellness.vt.edu/students/recovery.html**

### *Services for Students with Disabilities (SSD)*

- Accommodations and other disability-related supports: 540-231-3788
- **ssd.vt.edu** for more information

See a full listing of campus resources on **well-being.vt.edu**

Please also feel free to speak with me. I will make an effort to work with you; I care about your well-being and success.

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## Essential Needs

For any student who has difficulty affording groceries, accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and if you believe this may affect your performance in this course, you are urged to contact the Dean of Students office for support at 540-231-3787 or complete an interest form to participate in The Market at Virginia Tech ([https://cm.maxient.com/reportingform.php?VirginiaTech&layout\\_id=15](https://cm.maxient.com/reportingform.php?VirginiaTech&layout_id=15)).

The Dean of Students, through The Market at Virginia Tech, offers food options and other resources. There is also a Student Emergency Fund program (<https://dos.vt.edu/emergencyfund.html>). If you are comfortable in doing so, please notify your professor or departmental advisor of your situation. This will enable them to provide any resources they have access to.

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## Principles of Community

Virginia Tech is a public land-grant university, committed to teaching and learning, research, and outreach to the Commonwealth of Virginia, the nation, and the world community. Learning from the experiences that shape Virginia Tech as an institution, we acknowledge those aspects of our legacy that reflected bias and exclusion. Therefore, we adopt and practice the following principles as fundamental to our on-going efforts to increase access and inclusion and to create a community that nurtures learning and growth for all of its members:

- *We affirm* the inherent dignity and value of every person and strive to maintain a climate for work and learning based on mutual respect and understanding.
- *We affirm* the right of each person to express thoughts and opinions freely. We encourage open expression within a climate of civility, sensitivity, and mutual respect.
- *We affirm* the value of human diversity because it enriches our lives and the University. We acknowledge and respect our differences while affirming our common humanity.
- *We reject* all forms of prejudice and discrimination, including those based on age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, and veteran status. We take individual and collective responsibility for helping to eliminate bias and discrimination and for increasing our own understanding of these issues through education, training, and interaction with others.
- *We pledge* our collective commitment to these principles in the spirit of the Virginia Tech motto of Ut Prosim (*That I May Serve*).

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## Mobile Technologies

Mobile technologies, such as cell phones, tablets, and laptop computers may only be used in class for class related purposes. Please respect your fellow students and the professor by turning off cell phones before class begins and refraining from using computers and tablets during class to check email or social media. There will be time during class breaks to check email and social media.

*Cell Phones:* Cell phones should be turned off during all classes. It is understood that there may be occasions when you will need to leave your cell phone *on* to receive a phone call of extreme importance. In these extreme cases, please notify the instructor prior to the beginning of the class, have your cell phone set to vibrate.

*Tablets and Laptop Computers:* Tablets and laptop computers should only be used for legitimate class related purposes (e.g., taking notes, reviewing readings, searching the web for class-based concepts). Please refrain from using these technologies for entertainment purposes during class (e.g., email, movies, music, social media).

*Zoom Interface:* Zoom may be used to conduct the class synchronously online in the case of snow or pandemic. It is requested that you attend class with their Zoom cameras (video) on and your Zoom profile display name set your preferred name (e.g., Peter Doolittle). This is a request only. The rationale is to more easily build community within the class.

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## Honor Code

The tenets of the Virginia Tech Graduate Honor Code will be strictly enforced in this course, and all assignments shall be subject to the stipulations of the Graduate Honor Code. For more information on the Graduate Honor Code, please refer to the GHS Constitution (<https://graduateschool.vt.edu/academics/expectations/graduate-honor-system.html>).

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## Religious and Ethnic Holidays

From the VT website (<https://www.registrar.vt.edu/dates-deadlines/religious-ethnic-holidays.html>):

As a publicly funded institution of higher education, Virginia Tech does not officially recognize religious holidays and celebrations. However, as an institution we recognize the importance of such events in the lives of our community members. In the spirit of inclusive excellence and our Principles of Community, faculty, staff, and students are encouraged to be cognizant of major religious and cultural observances when planning courses and campus events and to be sensitive to potential conflicts.

When conflicts do occur, students should notify their instructors in accordance with university policy stated as follows:

Consistent with the university's tradition of religious tolerance, faculty and staff are encouraged to be sensitive to students who wish to observe religious and ethnic holidays. It is the students' responsibility to request and provide justification for a religious accommodation, preferably during the first two weeks of classes or as soon as the student becomes aware of the need for an accommodation. Faculty should inform students of their willingness to make accommodations for reasonable requests. Faculty members are not required to compromise the academic integrity of the course to accommodate religious practices. Thus, accommodations for religious practices will be determined by the faculty and will be consistent with their attendance policy. The Dean of Students office does not verify absences related to religious and ethnic holidays. For information on university policy please see University Policies for Student Life (UPSL), or the Faculty Handbook.

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## Inclement Weather

In the presence of inclement weather, there are three guidelines related to class cancellation:

1. *University Cancels Class:* VT campus closings due to inclement weather may be obtained by calling the Weather Hotline, (540) 231-6668; tuning to WVTF-FM 89.1 or 91.9; accessing the VT Twitter feed, [twitter.com/vtalerts](https://twitter.com/vtalerts); or, viewing the VT home page, <http://www.vt.edu> or University State page, <https://vt.edu/status.html>. If the university is closed, then we do not have class and I will send the class an email to that effect.
  2. *Instructor Cancels Class:* If the weather is potentially hazardous, and the university is not closed, then I may cancel class myself. If I cancel class, then I will send an email to the class indicating the cancellation no later than 4 pm (although I will try for 12:00 pm) the day of class with the final word regarding whether class will be held.
  3. *Student Misses Class:* If you determine that traveling to campus during inclement weather might be hazardous, then please send me an email indicating that you will not be attending class. Please use your best judgment in making this type of decision – be safe! If you decide not to come to class, based on inclement weather, you are still responsible for any work missed. You can participate in class using Zoom if travel is not an option.
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## Course Zoom

There may be a time when you simply cannot make class in person and, thus, must attend class via Zoom. If so, here's the course's Zoom link. That said, you **should not** think of this Zoom link as an option. That is, if you are sitting at home on your couch at 6 pm on a Thursday, with your dog or cat or favorite child, and think "do I want to go to class or should I just Zoom into class," your next thought should be "No!" or "Nein!" or "Немає!" or "Nej!" or "¡No!" or "Het!" or "Não!" or "Geen!" or "不 !" or "Non!" or "Όχι!" or "नहीं!" or "Níl!" or "ないえ !" or "아니요!" or "Minime!" or "لا!" or رقم

<https://virginiatech.zoom.us/my/doolittle/>

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## Communicating with the Instructor

All students are welcomed and encouraged to communicate with the instructor on issues relating to the course, grading, and special issues. The best way to contact me is in person: before, during, or after class. The second-best way to contact me is via email at pdoo@vt.edu. If you use email and you do not get a response from me in 48 hours, please email me again (I appreciate the reminders!).

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## Syllabus Change

The syllabus is subject to change by the instructor in the event of extenuating circumstances. All changes will be announced in class and provided to students in writing.

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## Tentative Course Calendar

Date	Topic	Reading for Class	Weekly Assignment
1/17 1	Introduction, Who We Are, Syllabus	None	Daily Class Evaluation
1/24 2	Encoding & Retrieval What we process we learn	<ul style="list-style-type: none"> <li>• Craik &amp; Tulving (1975)</li> <li>• Agarwal (2018)</li> <li>• Marian &amp; Fausey (2006)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
1/31 3	Working & Long-Term Memory Cognitive Load Dual Coding Theory	<ul style="list-style-type: none"> <li>• Miller (1956)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
2/7 4	Retrieval Effect	<ul style="list-style-type: none"> <li>• Roediger &amp; Karpicke (2006)</li> <li>• Agarwal (2018)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
2/14 5	Generate Effect Systematic Reviews	<ul style="list-style-type: none"> <li>• McCurdy et al. (2020)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
2/21 6	Spacing Effect Interleaving Effect	<ul style="list-style-type: none"> <li>• Lyle et al. (2020)</li> <li>• Yan &amp; Sana (2021)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
4/28 7	Production/Distinctiveness Effect Incidental/Intentional Learning	<ul style="list-style-type: none"> <li>• MacLeod &amp; Bodner (2017)</li> <li>• Zormpa et al. (2019)</li> <li>• Hyde &amp; Jenkins (1973)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
3/7 8	Spring Break		
3/14 9	Neuroscience, Emotions, Brain	<ul style="list-style-type: none"> <li>• Immordino-Yang (2007)</li> <li>• Cavanaugh (2019)</li> </ul> (subject to change)	Reading Response In-Class Priming Daily Class Evaluation
3/21 10	Active Learning I	<ul style="list-style-type: none"> <li>• Lombardi et al. (2021)</li> <li>• Bernstein (2018)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
3/28 11	Active Learning II	<ul style="list-style-type: none"> <li>• Freeman et al. (2014)</li> <li>• Theobald et al. (2020)</li> <li>• Deswburg et al. (2022)</li> </ul>	Reading Response In-Class Priming Daily Class Evaluation
4/4 12	Active Learning III	TBD	Reading Response In-Class Priming Daily Class Evaluation
4/11 13	TBD 1	TBD	Reading Response In-Class Priming Daily Class Evaluation
4/18 14	TBD 2	TBD	Reading Response In-Class Priming Daily Class Evaluation
4/25 15	Instructional Strategies 1	TBA	Reading Response In-Class Priming Daily Class Evaluation
5/2 16	Instructional Strategies 2	TBA	Reading Response In-Class Priming Daily Class Evaluation

## Course Readings

### Reading Response Notes:

- ▣ The Reading Response for articles with this symbol should answer the four research questions.
- ❖ The Reading Response for articles with this symbol is a one paragraph summary not to exceed 300 words

### Introduction and Syllabus

No Readings

### Encoding & Retrieval

- ▣ Craik, F., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, 104(3), 268-294. **[Reading Response and Priming on Experiment 1 only; read pp. 268-279 through Discussion of Experiments 1-4]**
- ▣ Agarwal, P. (2019). Retrieval practice & Bloom's taxonomy: Do students need fact knowledge before higher learning? *Journal of Educational Psychology*, 111(2), 189-209. **[Reading Response and Priming on Experiment 1 only, and read pp. 189-196 through the end of Experiment 1]**
- ▣ Marian, V., & Fausey, C. (2006). Language-dependent memory in bilingual learning. *Applied Cognitive Psychology*, 20, 1025-1047.

### Working & Long-Term Memory, Cognitive Load Theory, Dual Coding Theory

- ❖ Miller, G. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63(2), 81-97.

### Retrieval Effect

- ▣ Roediger, H., & Karpicke, J. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, 17(3), 249-255. **[Reading Response and Priming on Experiment 1 only, but read the entire article]**
- ▣ Agarwal, P. (2019). Retrieval practice & Bloom's taxonomy: Do students need fact knowledge before higher learning? *Journal of Educational Psychology*, 111(2), 189-209. **[Reading Response and Priming on Experiment 2 only; but read the entire article. Note: this is the same article as week #2]**

### Generate Effect & Reviews

- ❖ McCurdy, M., Viechtbauer, W., Sklenar, A., Frankenstein, A., & Leshikar, E. (2020). Theories of the generate effect and the impact of generation contraction: A meta-analytic review. *Psychonomic Bulletin & Review*, 27, 1139-1165. **[Reading Response and Priming on introduction pp. 1139-1143 and Discussion pp. 1155-1159]**

### Spacing Effect and Interleaving Effect

- ▣ Lyle, K., Bego, C., Hopkins, R., Hieb, J., & Ralston, P. (2020). How the amount and spacing of retrieval practice affect the short- and long-term retention of mathematics knowledge. *Educational Psychology Review*, 32, 277-295.
- ▣ Yan, V., & Sana, F. (2021). The robustness of the interleaving benefit. *Journal of Applied Research in Memory and Cognition*, 10, 589-602. **[Reading Response and Priming on Experiment 1 only, but read the entire article]**



## Production Effect and Intentional/Incidental Learning

- ❖ MacLeod, C., & Bodner, G. (2017). The production effect in memory. *Current Directions in Psychological Science*, 26(4), 390-395.
- ▣ Zormpa, E., Brehm, L., Hoedemaker, R., & Meyer, A. (2018). The production effect and the general effect improve memory in picture naming. *Memory*, 27(3), 340-352. **[Reading Response and Priming on Experiment 1 only, but read the entire article]**
- ▣ Hyde, T., & Jenkins, J. (1973). Recall for words as a function of semantic, graphic, and syntactic orienting task. *Journal of Verbal Learning and Verbal Behavior*, 12, 471-480.

## Neuroscience, Emotions, and the Brain

- ❖ Immordino-Yang, M., & Domasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Journal Compilation*, 1(1), 3-10.
- ❖ Cavanagh, S., Langu, J., Birk, J., Fulwiler, C., & Urry, H. (2021). A multicourse, multisection investigation of the impact of cognitive reappraisal and mindfulness instruction on short- and long-term learning in the college classroom. *Scholarship of Teaching and Learning in Psychology*, 7(1), 14-38

## Active Learning I – What is it?

- ❖ Lombardi, D., Shipley, T., Astronomy Team, Biology Team, Chemistry Team, Engineering Team, Geography Team, Geoscience Team, & Physics Team. (2021). The curious construct of active learning. *Psychological Science in the Public Interest*, 22(1), 8-43.
- ❖ Bernstein, B. (2018). Does active learning work? A good question, but not the right one. *Scholarship of Teaching and Learning in Psychology*, 4(4), 290-307.

## Active Learning II – Impact on Students

- ❖ Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderth, M. (2014). Active learning increase student performance in science, engineering, and mathematics. *PNAS*, 111(23), 8410-8415.
- ❖ Theobald, E., Jill, M., Tran, E., Agrawal, S., Arroyo, E., Behling, S., Chambwe, N., Cintron, D., Cooper, J., Dunster, G., Grummer, J., Hennessey, K., Hsiao, J., Iranon, N., Jones II, L., Jordt, H., Keller, M., Lacey, M., Littlefield, C., . . . Freeman, S. (2020). Active learning narrows Achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math, *PNAS*, 117(12), 6476-6483.
- ❖ Deswburg, B., Swanson, H., Moseman-Valtierra, S., & Caultkins, J. (2022). Inclusive and active pedagogies reduce academic outcome gaps and improve long-term performance. *PLOS ONE*, 17(6): e0268620.

## Active Learning III – Student and Teacher Resistance

TBD

### TBD 1

TBD

### TBD 2

TBD

## Instructional Strategies 1

TBD

## Instructional Strategies 2

TBD