

**GEORGE MASON UNIVERSITY**  
**COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT**  
**OFFICE OF EDUCATION SERVICES**

**EDPD 505 6D2: Teaching Self-Regulated Learning in Scientific Research Setting**  
**Spring/2018**

**Day/Time: Wednesday, 5:00 – 7:50**

**Dates: January 24 – May 9**

**High School at LCPS**

**Instructor:** *Dr. Stephen Burton*

**Office Hours:** By Appointment

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**COURSE DESCRIPTION:**

Incorporates professional development on and the analysis of providing an experience of teaching student developing a literature review as rational for posing a scientific question. Implements understanding of self-regulated learning in undertaking research in science classroom, particularly in forming a problem statement based on prior research. Builds fundamental knowledge of:

- 1) How to teach students to develop a literature review and connect the literature review with a sophisticated research question
- 2) Measurement, analysis and instruction for student self-regulated learning strategies in synthesizing prior research into a rationale for new scientific investigations
- 3) Materials used to support self-regulated learning and cognitive apprenticeships in the classroom for science research, particularly in writing a literature review.

**COURSE PURPOSE AND INTENDED AUDIENCE:**

The purpose of this course is to give secondary science teachers experiences in teaching students how to conduct background research to develop a literature review for the purposes of proposing a sophisticated research question in science. Once mastered, the secondary teachers will then compile support materials for teaching self-regulated learning processes used in developing the literature review with a cognitive apprenticeship model.

**COURSE FORMAT:**

The course format can be segmented into four types of activities:

- Planning lessons for conducting research for developing a literature review
- Developing measures for analysis of processes required for developing problem statement from prior research
- Analysis of student self-regulated learning strategies for developing problem statement, literature, review and research question for a scientific investigation proposal
- Analysis of processes involved in a cognitive apprenticeship, self-regulated learning, and scientific research in their classroom and peer classrooms

### **STUDENT OUTCOMES:**

The goal of this course is to provide secondary teachers with the knowledge and skills necessary to teach students to conduct scientific research to compose a sophisticated research question and identify the conceptual framework of self-regulated learning and cognitive apprenticeships. To that end, the course objectives are to:

- Develop classroom approaches used to connect the literature review with a sophisticated research question
- Identify self-regulated learning strategies and cognitive apprenticeship strategies that can be used solve a particular task associated with research question development in the classroom
- Develop classroom approaches for students to produce a sophisticated research question with supporting argumentation and a reflection of how the self-regulated learning was helpful in accomplishing the task

### **PROFESSIONAL STANDARDS :**

National Board for Professional Teaching Standard, Core Proposition 2

INTASC Standards 1-10

NSTA Standards: Research, Safety, Inquiry

### **REQUIRED/SUPPLEMENTAL/RECOMMENDED TEXTS AND/OR READINGS:**

Required Texts: Articles used for each personalized investigation proposal

Supplemental Readings:

- Peters-Burton, E. E. (2012). Using metacognition to develop understanding of the role of evidence in science. *Science Scope*, 35(9), 14-19.
- Peters-Burton, E. E. (2015). Outcomes of a self-regulatory curriculum model: Network analysis of middle school students' views of nature of science. *Science & Education*, 24, 855-885. DOI: 10.1007/s11191-015-9769-3

- Peters, E.E. (2012). Developing content knowledge in students through explicit teaching of the nature of science: Influences of goal setting and self-monitoring. *Science & Education*, 21(6), 881-898. doi 10.1007/s11191-009-9219-1
- Peters-Burton, E. E. (2013). Self-regulated learning as a method to develop scientific thinking. In I. M. Saleh and M. S. Khine (Eds.), *Approaches and Strategies in Next Generation Science Learning* (pp. 1-26). Hershey, PA: IGI Global.
- Peters-Burton, E. E., Merz, S. A., Ramirez, E. M., & Saroughi, M. (2015). The effect of cognitive apprenticeship-based professional development on teacher self-efficacy of science teaching, motivation, knowledge calibration, and perceptions of inquiry teaching. *Journal of Science Teacher Education*, 26(6), 525-548.

**Additional Resources:**

- Will be provided electronically by the instructor on the course web site.
- Because this course is flexible to the needs of the teachers, other articles/handouts than the ones indicated on this syllabus may be distributed in class or posted on-line at the course website.
- It is expected that the readings assigned for the class will be completed before the class meeting.

**COURSE REQUIREMENTS, PERFORMANCE-BASED ASSESSMENTS, EVALUATION CRITERIA, AND GRADING SCALE:**

Due to the interactive nature of this course, attendance is required at all sessions. If an emergency situation occurs (e.g., accident, illness), please contact the instructor as soon as possible to discuss possible make-up work. Repeated absences will result in loss of course credit.

Course grades will be based equally on participation in class activities (discussions, labs, etc.) and two inquiry-based lesson plan (with iterative feedback from the instructor and peers) that participants present on the last days of class. See the assignment rubrics for more information.

**GRADING SCALE:**

- A = 93-100%
- A- = 90-92%
- B+ = 88-89%
- B = 80-87%
- C = 70-79%
- F = Below 70%

**COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT STATEMENT OF EXPECTATIONS:**

The Graduate School of Education (GSE) expects that all students abide by the following:

Students are expected to exhibit professional behavior and dispositions. See <https://cehd.gmu.edu/students/policies-procedures/> for a listing of these dispositions.

### *Policies*

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/> ).
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <http://ods.gmu.edu/>).
- Students must follow the university policy stating that all sound emitting devices shall be silenced during class unless otherwise authorized by the instructor.

### *Campus Resources*

- Support for submission of assignments to Tk20 should be directed to [tk20help@gmu.edu](mailto:tk20help@gmu.edu) or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursessupport.gmu.edu/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

**For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/> .**

### **PROPOSED CLASS SCHEDULE:**

**Class sessions, readings and assignments may change according to the needs of the class**

<b>Date</b>	<b>Topic/Learning Experiences</b>	<b>Readings/Assignments</b>
<b>January 24</b>	<ul style="list-style-type: none"> <li>• Syllabus</li> <li>• Research on student understanding of conducting scientific research</li> <li>• Learning progressions</li> </ul>	Forethought Form SRL inventory Literature review experiences
<b>January 31</b>	<ul style="list-style-type: none"> <li>• Theories of SRL</li> <li>• How are your students self-regulated learners?</li> <li>• How might you support self-regulated learning</li> <li>• How might you measure self-regulated learning</li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials on SRL</li> </ul>
<b>February 7</b>	<ul style="list-style-type: none"> <li>• Cognitive apprenticeships</li> <li>• In what ways do you do cognitive apprenticeships?</li> <li>• How can you improve the cognitive apprenticeship processes in your class?</li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting cognitive apprenticeships</li> </ul>
<b>February 14</b>	<ul style="list-style-type: none"> <li>• Teaching students to:                             <ul style="list-style-type: none"> <li>○ Identify a topic</li> <li>○ Find articles and resources</li> <li>○ Evaluate reliable resources</li> <li>○ Ensure saturation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>February 21</b>	<ul style="list-style-type: none"> <li>• Self-regulated learning strategies and cognitive apprenticeship strategies for                             <ul style="list-style-type: none"> <li>○ Identifying a topic</li> <li>○ Finding articles and resources</li> <li>○ Evaluating reliable resources</li> <li>○ Ensuring saturation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>February 28</b>	<ul style="list-style-type: none"> <li>• Teaching students to analyze the literature                             <ul style="list-style-type: none"> <li>○ Overview</li> <li>○ Grouping</li> <li>○ Organizing groups</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Report of implementation of SRL processes in classroom</li> <li>• Lesson materials supporting student</li> </ul>

		practices
<b>March 7 Online class</b>	<ul style="list-style-type: none"> <li>• SRL and cognitive apprenticeship strategies for analyzing the literature <ul style="list-style-type: none"> <li>○ Overview</li> <li>○ Grouping</li> <li>○ Organizing groups</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>March 14</b>	<ul style="list-style-type: none"> <li>• No Class</li> </ul>	
<b>March 21</b>	<ul style="list-style-type: none"> <li>• Teaching students to summarize literature <ul style="list-style-type: none"> <li>○ Table</li> <li>○ Concept maps</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Report of implementation of SRL processes in classroom</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>March 28</b>	<ul style="list-style-type: none"> <li>• SRL and cognitive apprenticeship strategies for summarizing literature <ul style="list-style-type: none"> <li>○ Table</li> <li>○ Concept maps</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Report of implementation of SRL processes in classroom</li> <li>• Lesson materials supporting student practices</li> <li>•</li> </ul>
<b>April 4</b>	<ul style="list-style-type: none"> <li>• Teaching students to write the literature review <ul style="list-style-type: none"> <li>○ Table</li> <li>○ Concept maps</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>April 11</b>	<ul style="list-style-type: none"> <li>• Teaching students to write the literature review <ul style="list-style-type: none"> <li>○ Table</li> <li>○ Concept maps</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> <li>• Journal reflection</li> <li>• Lesson materials supporting student practices</li> </ul>
<b>April 18</b>	<ul style="list-style-type: none"> <li>• SRL strategies and cognitive</li> </ul>	<ul style="list-style-type: none"> <li>• Readings on website</li> </ul>

	<p>apprentice strategies for writing the literature review</p> <ul style="list-style-type: none"> <li>○ Table</li> <li>○ Concept maps</li> </ul>	<ul style="list-style-type: none"> <li>● Journal reflection</li> <li>● Report of implementation of SRL processes in classroom</li> <li>● Lesson materials supporting student practices</li> </ul>
<b>April 25</b>	<ul style="list-style-type: none"> <li>● Summarizing teaching experiences and learning experiences</li> </ul>	<ul style="list-style-type: none"> <li>● Readings on website</li> <li>● Journal reflection</li> <li>● Presentation of results of implementation of SRL strategies and cognitive apprentice models</li> </ul>
<b>May 2</b>	<ul style="list-style-type: none"> <li>● Summarizing teaching experiences and learning experiences</li> <li>● Other motivation strategies <ul style="list-style-type: none"> <li>○ Humanistic</li> <li>○ Social</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Readings on website</li> <li>● Journal reflection</li> <li>● Presentation of results of implementation of SRL strategies and cognitive apprentice models</li> </ul>

**Example Rubric for Report on Teaching Activities  
(TENTATIVE \_ WE WILL BE REVISING IN CLASS)**

	Rating				Score
	4	3	2	1	
<b>ASSIGNMENT BASICS</b>					
<b>Articles</b>	Information is gathered from multiple, research-based sources.	Information is gathered from multiple sources.	Information is gathered from a limited number of sources.	Information is gathered from a single source.	
<b>SUMMARY</b>					
<b>Theme</b>	Well organized, demonstrates logical sequencing and structure.	Well organized, but demonstrates illogical sequencing or structure.	Weakly organized with no logical sequencing or structure.	No organization, sequencing, or structure.	
<b>Background/ Foundation</b>	Detailed conclusions are reached from the evidence offered.	Conclusions are reached from the evidence offered.	There is some indication of conclusions from the evidence offered.	No conclusions are made from the evidence offered.	
<b>Research Question</b>	Research question(s) are formed through the literature review and clearly stated.	Research question(s) are formed through the literature review.	Research question(s) were not formed but could be formed through the literature review.	Research question(s) were not formed and are not apparent from the literature review.	
<b>Reference Sheet</b>	Information is cited properly and in APA format.	Information is cited properly.	Information is cited, but has errors.	Information is not cited or is cited incorrectly.	
<b>PRESENTATION</b>					
<b>Format</b>	Font, spacing, and APA format are correct.	Font and spacing, font and APA, or spacing and APA are correct.	Font, spacing, or APA format is correct.	Font, spacing, and APAP format are incorrect.	
<b>Grammar</b>	There is 1 or less grammatical error.	There are 2 grammatical errors.	There are 3 grammatical errors.	There are 4 or more grammatical errors.	
<b>TOTAL POINTS</b>					