San José State University
College of Science, Science Education Program
SCED 220, Theories and Practices in Science Education, Section 01, Fall 2020

Course and Contact Information

Instructor:	Dr. Elizabeth Walsh
Office Location:	DH 618A
Email:	elizabeth.walsh@sjsu.edu
Office Hours:	T 10:00 AM to 11:00 AM and by appointment
Class Days/Time:	Monday 4:00PM to 7:00PM
Classroom:	N/A

Course Format

Technology Intensive

This class will be held entirely online via synchronous Zoom sessions and the Canvas learning management system. You will need access to a computer with Internet to complete assignments and attend Zoom classes. All out-of-class communication with you will be through Canvas. Course materials such as greensheet, handouts, notes, assignment instructions, etc. can be found on the Canvas website: sjsu.instructure.com. If you are an Open University student, see us for access to the site. During class, you are expected to participate in activities and discussions. This includes being prepared for class by completing assignments prior to attending as well as contributing to the classroom discourse. The course is a graduate level course; therefore, the expectation is that you are motivated to learn and apply what you learn to the best of your ability.

Course Description

Analysis of current trends in science curriculum and instruction. Orientation for the philosophy and scope of the program. Emphasis on development of a theory of instruction and curriculum in science with implications for practice. Misc/Lab: Lecture/seminar 3 hours. Notes: Teaching experience preferred. Must be taken during first year in program. This course satisfies graduate-level GWAR in this master's program.

Course Goals
Program Learning Outcomes (PLO)

This course can be taken to fulfill some of the credit hours required for a master's degree in Science Education. Therefore, this course (in addition to others) will help students make progress towards the following program learning outcomes:

1 – To enhance student's depth and breadth of understanding of selected topics in science education.

PLO 1.1 Students will be able to synthesize primary literature from science education research and apply how it fits to their project.

PLO 1.2 Students will demonstrate knowledge of at least two areas (e.g. inquiry based instruction, learning theory, assessment) that are related to, or supportive of research for their project.

2– To enhance communication skills, both written and oral, in science education discourse.

PLO 2.1 Students will present science and science education content in the form of graduate seminars or in the oral defense of their project (also known as the culminating experience).

PLO 2.2 Students will organize and write the results of their project in a manner consistent with standards in professional science education publications.

Course Learning Outcomes (CLO)

This course is meant as a general introduction to research in science education.

Upon successful completion of this course, students will be able to:

CLO 1 Use citation software (Refworks/CiteUlike/Mendeley) to collect and organize 25 sources of literature related to education or science education topics to create an annotated bibliography.

CLO 2 Communicate ideas about primary literature through writing, presentation, discussion and critique.

CLO 3 Identify a topic of interest for further investigation for deeper investigation through primary sources of literature.

CLO 4 Represent big ideas in science education theory and practice both visually, orally and through writing.

CLO 5 Synthesize a minimum of 15 sources from primary literature in the form of a literature review about a selected topic of interest.

Required Texts/Readings

Readings will be assigned to match the in-class discussions. These readings will be posted on the Canvas website under the sidebar menu titles 'files' and 'readings.' Readings are included in the schedule in this green sheet, but these readings are subject to change with notification.

Course Requirements and Assignments

Weekly assignments will usually be comprised of both a writing and a reading component. Students are required to come prepared to discuss the readings assigned each week.

Canvas Discussion. Online discussions will be used to build a collaborative learning community, this on-going assignment involves posting and responding to comments, thoughts, insights or reflections online with respect to the weekly readings and your own related educational experiences. Use this virtual space to connect with other classmates to help you think through the concepts we are learning in the course. As everyone's continuous participation is essential in creating this virtual community, a minimum of 3 posts per week is required—you must create an initial, original post in response to the discussion prompt and two responses to peer posts.

Writing Assignments. The writing assignments will help students make progress towards writing a literature review on a topic of interest in science education. Assignments will include annotations of papers, syntheses of ideas and drafts of the final literature review product.

Literature Review. The culminating project for this course is a literature review on a topic of interest to the student. Students should choose an area of interest and thoroughly investigate the relevant literature pertaining to their topic. The aim of this is to become thoroughly grounded in the literature in preparation for crafting a Masters project. Per SJSU writing requirements, the literature review should be at least 3000 words (~12 pages) in length and will be completed individually. Sources should be cited appropriately in APA format.

Final Examination or Evaluation

The literature review and presentation serves as the culminating experience for this course.

Grading Information
Students will be graded on the quality of their written assignments, the extent of their participation, and the thoughtfulness, effort and coherence of their final project. Points will be allocated as such:

In class participation 33%
Weekly assignments 33%
Final Project (Literature Review and Presentation) 34%

There is no extra credit for this course. This is final and there are no exceptions.

Late work will *only* be accepted *one week after the due date* and receive a deduction of two letter grades at the discretion of the instructor except in the case of a documented medical emergency *with advance notice*. This policy is to promote student success and prevent you from falling behind in assigned work, which is by far the most common reason why students do not pass the class.

Letter grades are assigned using the following scale: A's are given for percentages of 90 and above, B's are given for 80 to 89, C's are given for 70 to 79, and D's are given for 60 to 69. A letter grade of F is given for a grade percentages below 60% for the course. A +/- system will be used.

An Incomplete grade is given for documented medical emergencies only at the discretion of the instructor and *cannot be used to extend the due date for the final literature review* except in the case of a documented medical emergency. There are no exceptions.

Classroom Protocol

Our class will engage in a variety of small group experiences and large group discussions. A successful class will depend on every member of the group actively collaborating as both learners and teachers. It is my assumption that each of us has valuable perspectives and experiences that will inform our collective, developing knowledge. It is important that you come to class on time. I expect that you will have read the texts carefully and will be prepared to actively participate in our class discussions both during synchronous Zoom sessions and on Canvas. Attendance is essential in order for your success in this course. Often times the success of a classroom activity will depend on the attendance of the entire class. Therefore, it is essential that notify us if you are going to miss class for any reason, as soon as you are able. University excused absences require documentation (i.e., doctor's note).

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the Writing Center website at http://www.sjsu.edu/writingcenter. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to scan this code.)

SCED 220 Theories and Practice in Sci Ed, Fall 2020 Course Schedule

The schedule will serve as a guideline for the order of topics in covered in this class. It is subject to change with reasonable notice. Please see the canvas website for the most up-to-date information.

NOTE THAT ALL DISCUSSION ASSIGNMENTS ARE DUE THE SUNDAY BEFORE CLASS BY 12:00 PM AND RESPONSES TO POSTS ARE DUE BY 4:00 PM ON THE MONDAY OF CLASS. Assignments are due by 4:00PM on the day of class unless otherwise noted on the Canvas site—*make sure to check due dates for all assignments!*

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Aug. 24	**Learning & Knowing I: Scope of Course, Introduction** Introduction to the Graduate Program Course Goals and Introduction to Learning Theory
2	Aug. 31	**Learning & Knowing II: Everyday learning and cognition** *Readings:* Bransford, Derry, Berliner, Hammerness & Beckett (2007). Theories of Learning and Their Role in Teaching. In *Preparing Teachers for a Changing World*. pp 40-87 Cipparone, P. (2016). Does Theory Matter in Learning to Teach? *Huffington Post.* *Due:* Canvas Discussion 1
3	Sept. 7	**No Class – Labor Day**
4	Sept. 14	**Psychological and Social Perspectives I: Behaviorism** *Readings:* Philips & Soltis (2009). Behaviorism. In *Perspectives on Learning,* 5th ed. Skinner, B. F. (1954, Spring). The science of learning and the art of teaching. Harvard Educational Review, 86-97. Goodman, J. (2013). Character Management Organizations and the Regulated Environment: Is it worth the prize? *Educational Researcher,* 42(2), 89-96. *Due:* Paper Annotations 1
5	Sept. 21	**Psychological and Social Perspectives II: Cognition** *Readings* Piaget, J. (1928) Judgment and Reasoning in the Child (Chapter 5). London: Routledge. p. 199-256

Week	Date	Topics, Readings, Assignments, Deadlines
		Siegler, R.S. (2005). Children's Learning. *Am. Psych.* 60 769-778. OPTIONAL: Piaget, J. (1930) Child's Conception of Physical Causality (Chapter 1). London: Routledge. p. 3-31 *Due:* Canvas Discussion 2
6	Sept. 28	**Psychological and Social Perspectives III: Sociocultural Theory** *Readings:* Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes (pp. 1-91). Cambridge, MA: Harvard University Press. *Due:* Canvas Discussion 3, Meeting with Temporary Advisor
7	Oct. 5	**Psychological and Social Perspectives IV: Constructivism** *Readings:* Anderson, R.D. (2002) Reforming Science Teaching: What Research says about Inquiry. *Journal of Research on Science Teaching.* 13(1): 1-12 Driver et al. (1994). Constructing Scientific Knowledge in the Classroom. *Educational Researcher*. 23 (7). P 5-22 diSessa, A. (2006) A History of Conceptual Change Research: Threads and Fault Lines. In *The Cambridge Handbook of the Learning Sciences*. 265- 281 *Due:* Paper Annotations 2, Canvas Discussion 4
8	Oct. 12	**Broad View of Learning I: Critical Theory and Cultural Studies** *Readings:* Banks et al. Learning in In Out of School in Diverse Environments: Life-long, Life-Wide, Life-Deep. The LIFE Center, Center for Multicultural Education. Giroux, H. and Giroux, S. S. (2006). Challenging Neoliberalism's New World Order: The Promise of Critical Pedagogy. *Cultural Studies ⇔⇔ Critical Methodologies*. 6; pp. 21-32. Giroux, H. (2016). Why Teachers Matter in Dark Times (Op-ed) http://www.truth-out.org/opinion/item/35970-why-teachers-matter-in-dark-times Visintainer, T. (2020). "I think at first glance people would not expect me to be interested in science": Exploring the racialized science experiences of high school students of color. Journal of Research in Science Teaching, 57: 393–422. *Due*: Canvas Discussion 5

Week	Date	Topics, Readings, Assignments, Deadlines
9	Oct. 19	**Broad View of Learning II: Attitudes & Engagement** *Readings:* Osborne, J. (2003). Attitudes towards science: a review of the literature and its implications. *Int J Sci Ed*. 25 (9), 1049-1079. Sinatra, G., Heddy, B., & Lombardi, D. (2015). The challenges of defining and measuring student engagement in science. *Ed. Psych.* 50:1, 1-13. *Due:* Paper Annotations 3, Second Meeting with Advisor
10	Oct. 26	**Broad View of Learning III: Identity** *Readings:* Gee, J. P. (2001). Identity as an analytic lens for research in education. In W. G. Secada (Ed.), Review of research in education (pp. 99-126). Washington, DC: AERA. Lemke, J. (2000). Across the Scales of Time: Artifacts, Activities, and Meanings in Ecosocial Systems. *Mind, Culture & Activity*, 7(4), 273-290. Wenger (1998). Identities in Practice. In *Communities of Practice: Learning, Meaning and Identity*. New York: Cambridge University Press. *Due:* Canvas Discussion 6, Lit Review Outline
11	Nov. 2	**Synthesis: Comparing Theories** *Readings:* Hay, K. E. & Barab, S. A. (2001). Constructivism in practice: A comparison and contrast of apprenticeship and constructionist learning environments. *The Journal of the Learning Sciences,* 10(3), 281-322. Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher,* 26(2), 4-13. *Due:* Paper Annotations 4, Peer Feedback on Lit Review Outline
12	Nov. 9	**Bridging to Practice I: Situated Learning and Communities of Practice** *Readings:* Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18, 32-42. Lave, J. & Wenger, E. (1991). Situated learning: Legitimate peripheral participation (Chapters 1, 2 & 4 p. 27-54, 89-113). Cambridge: Cambridge University Press. *Due*: The Literature Review (first draft), Canvas Discussion 7

Week	Date	Topics, Readings, Assignments, Deadlines
13	Nov. 16	**Bridging to Practice II: Authentic Practice in the Classroom** *Readings:* National Research Council (2012). Part I: A Vision for K-12 Science Education and Part II Ch 1 & 2 Dimension 1: Scientific and Engineering Practices and Dimension 2: Cross-Cutting Concepts. *A Framework for K- 12 Science Education: Practices, Cross-Cutting Concepts and Core Ideas*. NAP: Washington DC. (p. 7-102). National Research Council (2007). *Ready, Set Science!* Chapters 5 & 6, NAP: Washington DC. pp. 87-125 *Due:* Peer review of literature review, Canvas Discussion 8
14	Nov. 23	**Bridging to Practice III: "Nature of Science" and What is Science?** *Readings:* Lederman, Abd-El-Khalick, Bell & Schwartz (2002). Views of Nature of Science Questionnaire: Toward Valid and Meaningful Assessment of Learners' Conceptions of Nature of Science. *J Research Sci Teach* 39 (6), p. 497-521 Medin, D. L. and Bang, M. (2014). Ch 1 Introduction: Who's Asking? And Ch 2: Unsettling Science. In *Who's Asking?* The MIT Press: Cambridge Massachusetts, pp 1-31. *Due:* Canvas Discussion 9
15	Nov. 30	**Bridging to Practice IV: Learning Communities in the classroom** *Readings:* Bielaczyc, Kapur & Collins. (2013). Ch 13: Cultivating a Community of Learners in K-12 Classrooms. *International Handbook of Collaborative Learning*. P. 577-615. Bransford, J.D., Brown, A.L., & Cocking, R.R. (2000). Design of learning environments, Chapter 6 (pp. 131-154). In *How people learn: Brain, mind, experience, and school.* Washington, D.C.: National Academy Press. *Due*: Canvas Discussion 10
16	Dec. 7	**FINAL PRESENTATIONS** Attendance on this date is mandatory to receive credit for the final presentation.
Final Exam Date	Dec. 14th	**Final Literature Review and Annotated Bibliography Due by 11:59 PM**