Next Steps:
Advanced Collaborative Strategies to Create Communities of Inquiry

Collaborative Learning

Dr. Laurie C. Williams
williamsL001@uindy.edu

CL for the 21st Century

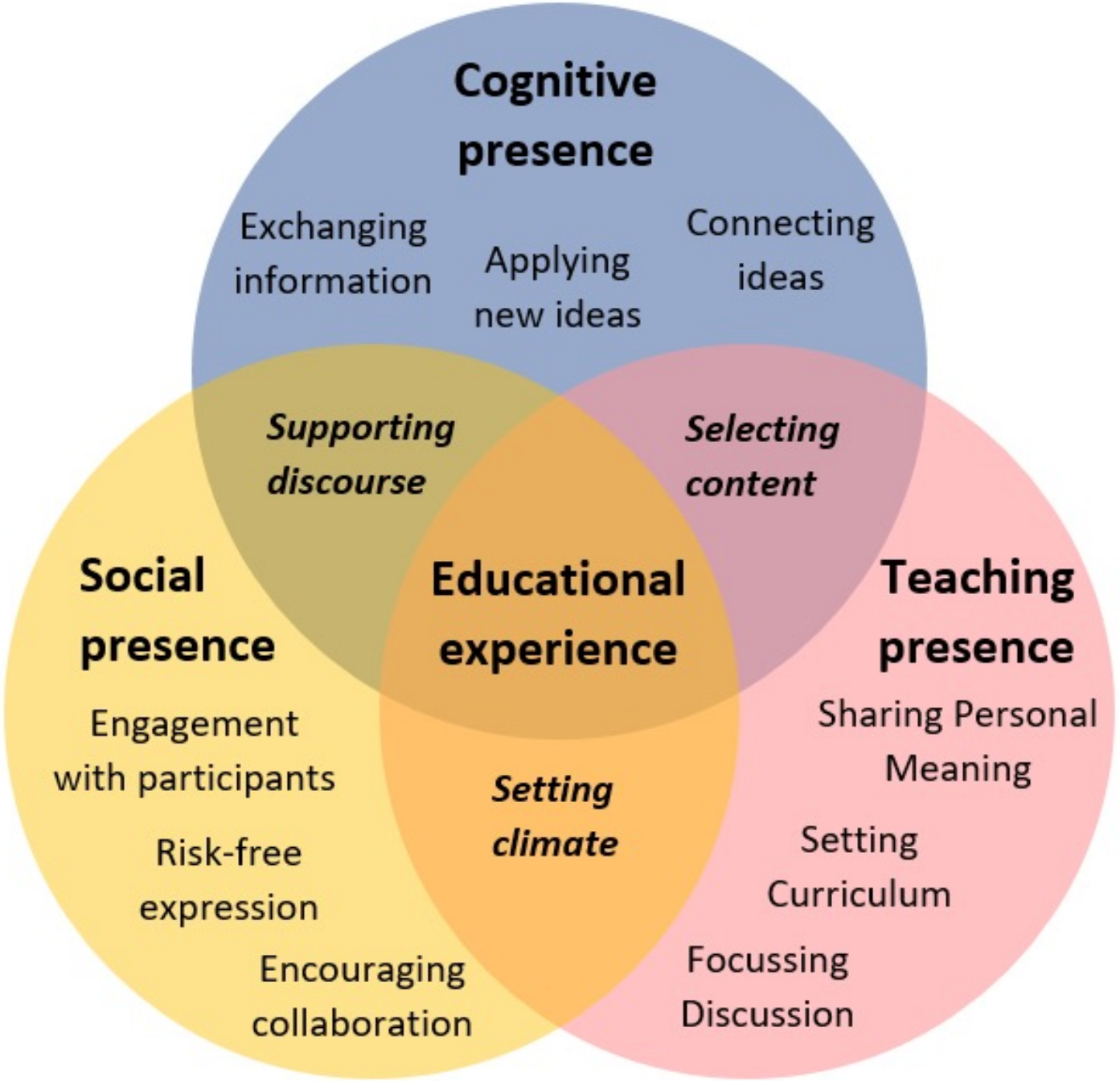
This session will cover:

- Creating Communities of Inquiry
- Guided Design (POGIL)
- Problem Centered Instruction (PBL)
- Case Studies/Simulations
- Peer Teaching/Seminars
- Assessments
- End Goal: to provide concrete methods for enhancing instruction through CL projects.

What is a Community of Inquiry?

- a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding.
  http://www.thecommunityofinquiry.org/coi

- The Community of Inquiry theoretical framework represents a process of creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements – social, cognitive, and teaching presence.


Cognitive presence
Exchanging information
Applying new ideas
Connecting ideas
Supporting discourse
Selecting content
Social presence
Engagement with participants
Risk-free expression
Encouraging collaboration
Educational experience
Setting climate
Teaching presence
Sharing Personal Meaning
Setting Curriculum
Focussing Discussion

The Community of Inquiry Framework Involves

Collaborating to form understanding

Reflection upon learning

Allowing for meaningful critical dialogue

Process Oriented Guided Inquiry Learning (POGIL)

Student teams use carefully designed activities that follow a learning cycle paradigm. These activities have three key characteristics:

- Teams are self-managed; the instructor is a facilitator of learning rather than a source of information.
- Students are guided through an exploration of concepts to construct understanding.
- Discipline content is used to facilitate the development of important process skills, including higher-order cognitive engagement and the application of knowledge in new contexts.

Key Information for POGIL

The Learning Cycle

- Exploration through questions
- Concept Development
- Application of concept in new contexts.

https://pogil.org/about-pogil/what-is-pogil

https://pogil.org/implementing-pogil

Process Skills

- Oral and Written Communication
- Teamwork
- Problem Solving
- Critical Thinking
- Management
- Information Processing
- Assessment (Self-Assessment and Metacognition)

Example POGIL Activities & Resources

- Computer Science – Intro to Search Algorithms
- Exercise Physiology – Cardiovascular System
- Psychology – Experimental Factorial Design
- Education (Science) – Exploring Science Standards

- Brief Step-by-Step Design Guide - https://www.rit.edu/academicaffairs/tls/sites/rit.edu.academicaffairs.tls/files/images/te-pogil-materials.pdf
- Detailed Journal Article – https://files.eric.ed.gov/fulltext/EJ1251897.pdf

Group Member Names: _____

Instructions: Each student will work in a group of three. Each group member will contribute to this activity, but will each also hold a unique role. One member should be the "Manager" and make sure that the group stays on task, finishes on time, and that all members of the group are being heard and participating in the activity. The second member should be the "Recorder" and write down the answers on the worksheet to be submitted to the professor. The third member will be the "Reporter" and should be prepared to share the groups' responses with the members of another group upon completion of the exercise to check for accuracy.

Experimental Workshop: Factorial Designs

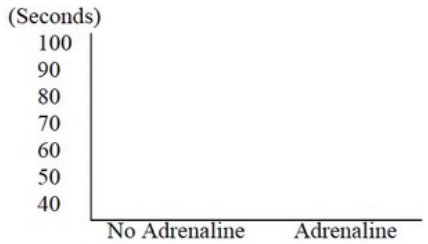
Background: 60 participants are given either a shot of adrenaline or an inert shot. Then, people from each group participate in either an easy obstacle course or a more challenging obstacle course. They are timed to see how many seconds it takes them to complete the courses. The resulting data are in the table below:

	Course Difficulty		
	Easy	Hard	Row Average (Mean)
No Adrenaline	50	90	_____
Adrenaline	80	60	_____
Column Average (Mean)	_____	_____	

1. Fill in the column and row average values.

The three variables in this study include **course difficulty**, **drug administration**, and **course time**. Both course difficulty and drug administration are **independent variables** and course time is the **dependent variable**. Each independent variable has two levels (there were two groups), thus, this is a 2x2 factorial design.

2. Graph the four original data points (not the averages; use a dotted line to connect the "easy" scores and a solid line to connect the "hard" scores).



3. Look at the chart and graph. Without paying attention to the scores for those who have and have not had an adrenaline shot, would you say that there were differences in how quickly the participants completed the easy and hard obstacle course? Describe what you see.

4. Look at the chart and graph. Without paying attention to the scores for the easy versus hard obstacle course, would you say that there were differences in the scores for those who had and did not have an adrenaline shot? Describe what you see.

Information:
In factorial designs, we are both interested in main effects and interactions. A **main effect** is when one of the independent variables single-handedly influences the dependent variable – irrespective of the influence of other independent variables. Without using inferential statistics, we can estimate a main effect by using the row or column averages. If the averages are different (by more than a couple of seconds), there is a main effect. If they are not different, there is not a main effect of that variable.

5. Based on the information above and your answer to question 3, would you say that there is a main effect of "course difficulty"? Why? Explain what this finding means in sentence format.

6. Based on the information above and your answer to question 4, would you say that there is a main effect of drug administration? Why? Explain what this finding means in sentence format.

Information:
In factorial design, we are also interested in how the two independent variables interact with each other. This means that the effect of one of the independent variables is dependent on the other independent variable. In other words, whether one independent variable increases or decreases the scores depends on what is happening with the second variable. One way to tell if there is an interaction is if the lines of the graphed results are not parallel.

7. Using the graph above, do you think there is an interaction? Why?

8. Using the chart and the graph above, describe the interaction between these two variables. In other words, how does one independent variable depend on the other?

Information:
Now that you have a better understanding of factorial research designs and how to write about research results from these studies, let us **apply** your new knowledge to additional research scenarios. Imagine a researcher conducts an experiment investigating the effects of 10-weeks of cognitive-behavioral therapy (complete or incomplete) and the effects of taking a moderate dosage of anti-depressant medication (taken or not taken) on participants' depressive symptoms.

9. Given the above research scenario, identify the three variables involved and describe hypothesized results for: a) a main effect of variable 1; b) a main effect of variable 2; and c) an interaction between the two variables.

   Independent Variable 1:

   Independent Variable 2:

   Dependent Variable:

   a)

   b)

c)

10. Come up with another research question example that makes use of a factorial design. List each variable and provide your hypotheses for: a) a main effect of variable 1; b) a main effect of variable 2; and c) an interaction between the two variables.

    Independent Variable 1:

    Independent Variable 2:

    Dependent Variable:

    a)

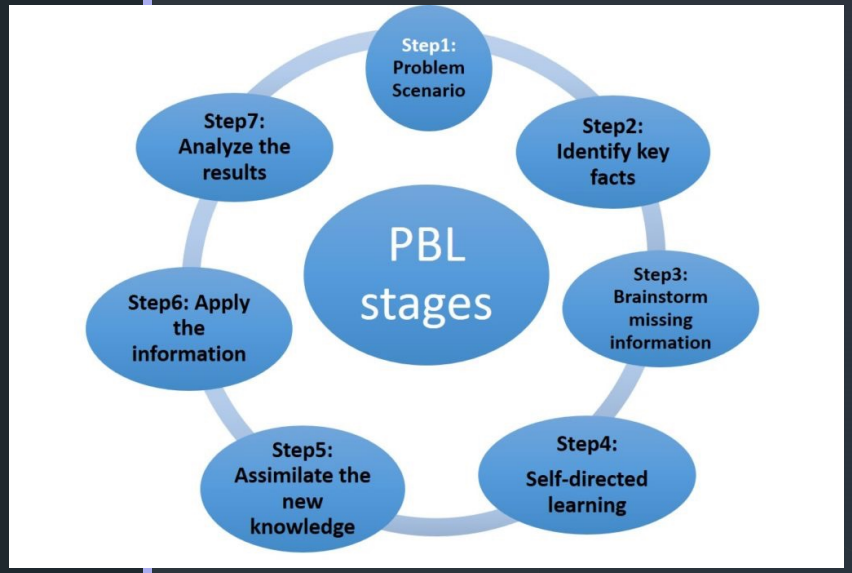
    b)

    c)

Instructions: Through reviewing the questions above, discuss as a group both what you have learned and what is still unclear about the following terms and concepts: factorial design, main effects, and interactions.

Next, discuss as a group what the process was like to: a) use the chart/graph to help understand the results; b) simultaneously consider main effects and interactions with regard to the data; and c) generate written explanations of the results you determined through your analysis of the data.

Now, find another group that has completed the workshop and review your answers with them to check for accuracy and clarity of explanation.



Problem Based Learning

Problem-based learning uses complex, real-world issues as the classroom's subject matter, encouraging students to develop problem-solving skills and learn concepts instead of just absorbing facts. Effective problem based learning projects are:

- Authentic (real-world scenarios)
- Open-ended (more than one solution)
- Appropriately complex (many problems to solve)
- Multifaceted (require multiple levels of thinking)
- Reflective (requiring revisions and conclusions based on learning)

PBL Resources & Ideas

PBL Project Ideas

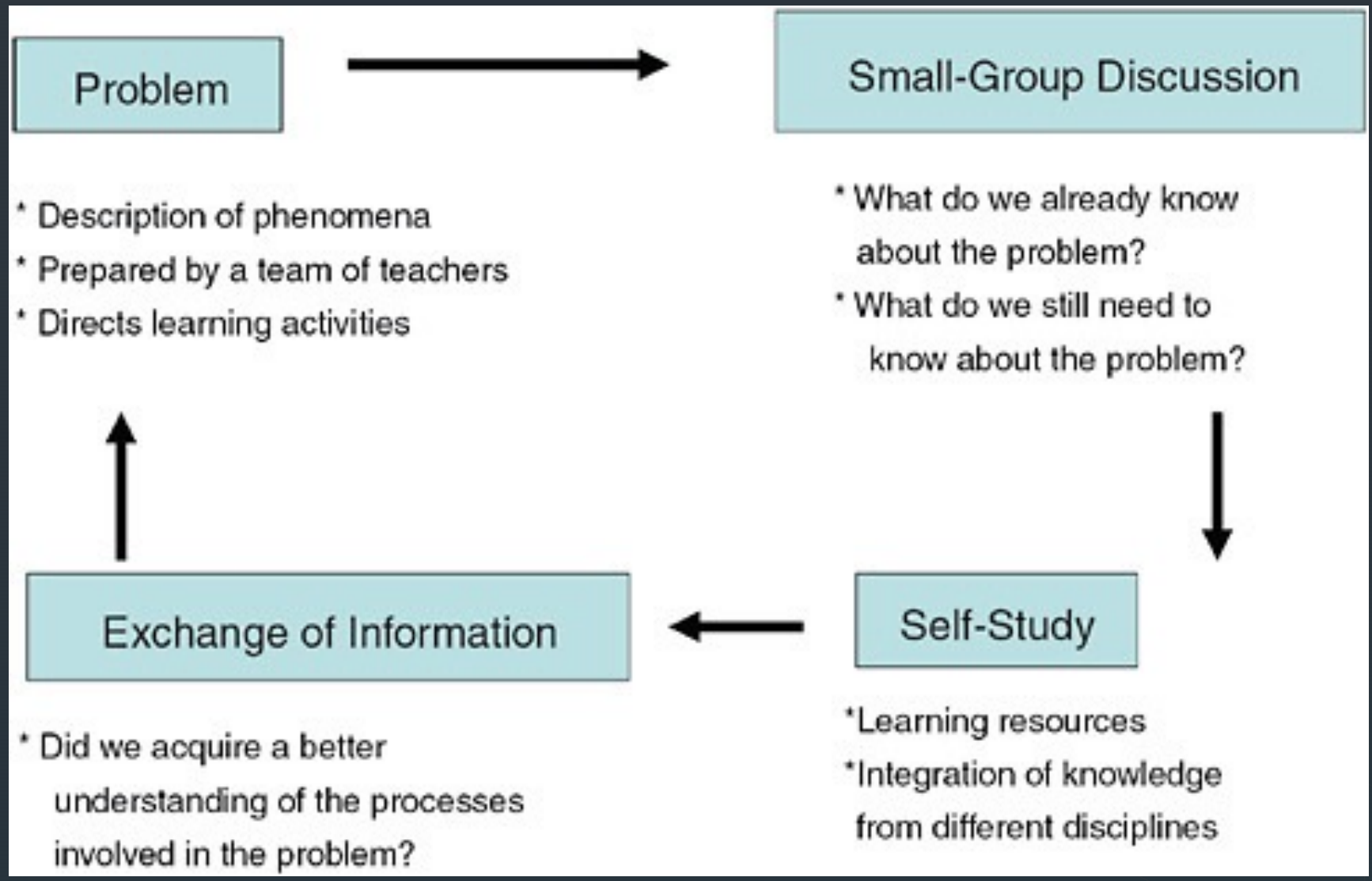
- Design an app for a specific audience/purpose or create a new business to solve a specific problem.
- Devise a solution for excessive screen time, monitor progress, evaluate effect of changes, & identify future research needs.
- Assist a local business with increasing environmental sustainability (reduce waste).
- Identify, analyze, and visualize recurring themes in human history; then contextualize those themes in modern society.
- Make a compelling case for a viewpoint other than your own on any issue.
- Leverage the wisdom of people living in nursing homes.
- Reimagine major coastal cities in light of 6 degrees of warming.
- Analyze the impact of architecture–or lack thereof–on a community.

PBL Design Guides

- https://www.facultyfocus.com/articles/course-design-ideas/problem-based-learning-six-steps-to-design-implement-and-assess/
- https://www.facultyfocus.com/articles/course-design-ideas/designing-problems-for-problem-based-learning/

Case Studies/Simulations

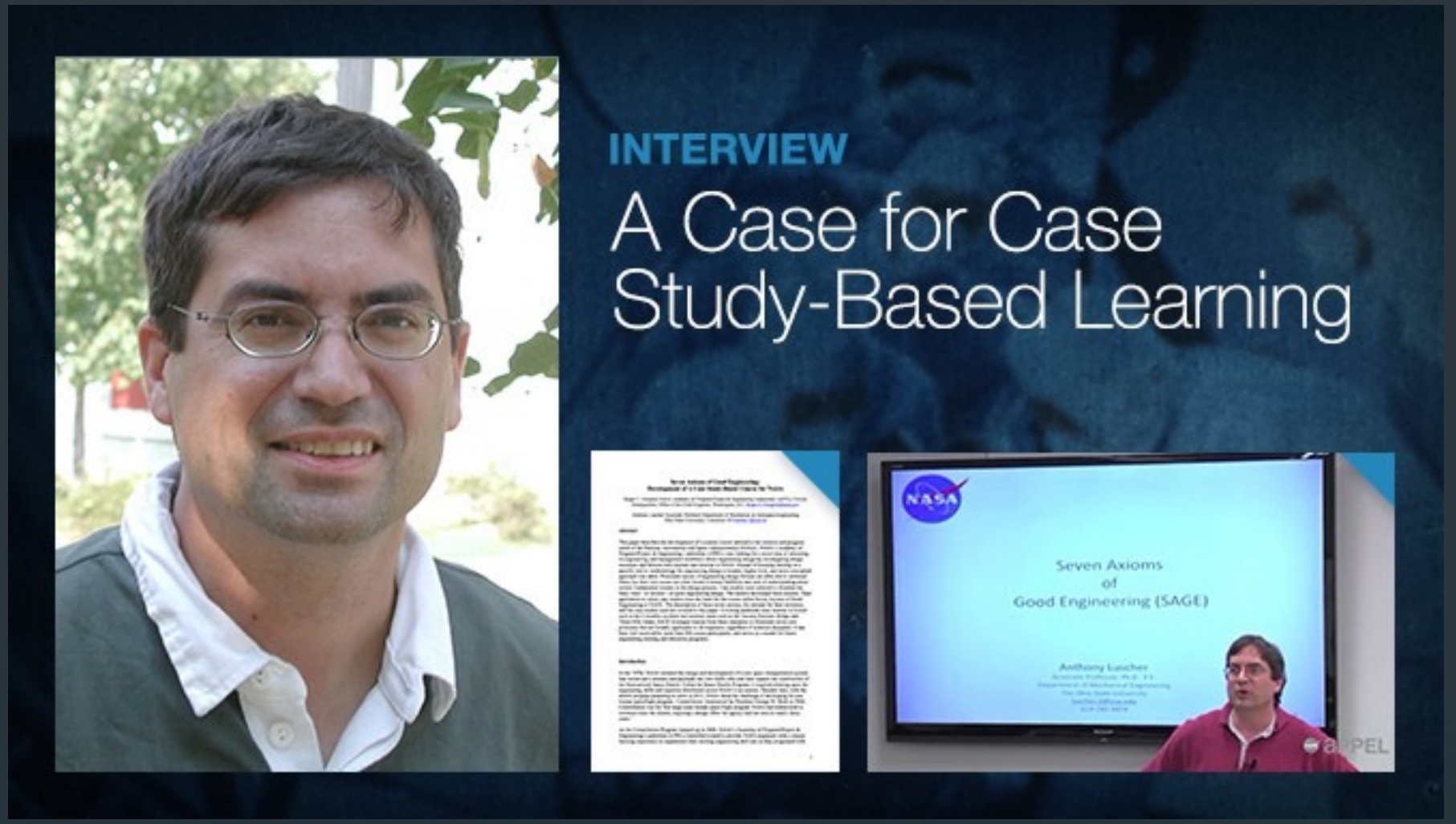
- Case studies/Simulations provide an instructional method in which students are assigned scenarios based on observations, analyses, records, implementation, conclusions, or recommendations. They have a long tradition of use in higher education, particularly in business and law.
- Cases are often based on actual events which adds a sense of urgency or reality. Case studies have elements of simulations, but the students are observers rather than participants. A good case has sufficient detail to necessitate research and to stimulate analysis from a variety of viewpoints or perspectives. They place the learner in the position of problem solver. Students become actively engaged in the materials discovering underlying issues, dilemmas and conflict issues.


Problem
Small-Group Discussion
* Description of phenomena
* Prepared by a team of teachers
* Directs learning activities
* What do we already know about the problem?
* What do we still need to know about the problem?
Exchange of Information
Self-Study
* Did we acquire a better understanding of the processes involved in the problem?
*Learning resources
*Integration of knowledge from different disciplines

Case Study Resources & Ideas

Case Study Ideas

- Design and launch a rocket.
- In cooperation with a law enforcement agency, investigate a ‘cold case’
- Investigate a possible wrongful conviction.
- Using mathematical principals, design a community garden to meet the nutritional needs of a specific community.
- Create a budget and fundraising plan for beginning a new program for a specified community.
- In conjunction with the UIndy Center for Service & Learning, investigate a specific community need.
- Given a set of symptoms, determine possible diagnoses for a patient, medical tests to order, and steps toward treatment.
- Investigate the design failures of a structure, determine and test possible solutions.


INTERVIEW
A Case for Case Study-Based Learning
Seven Axioms
of
Good Engineering (SAGE)

Peer Teaching (tutorials)/Seminars

- A **seminar** is a group meeting (either face-to-face or online) where the students participate at least as actively as the teacher, although the teacher may be responsible for the design of the group experience, such as choosing topics and assigning tasks to individual students. Groups can range in size from six to as many as thirty students.

- CL peer teaching is a small group session between two to four students and an instructor, where the learners are at least as active in discussion and presentation of ideas as the teacher. The 'teacher' may or may not be a peer.

Seminar Formats

- Advance work is assigned for a selected number of students who present their work to the whole group for discussion, criticism and suggestions for improvement. Although there may be time for only two or three student presentations in each seminar, over a complete semester every student gets their turn.
- All students complete a specified reading assignment, followed by teacher questions to generate discussion within the seminar, requiring students to draw on their readings, homework, and personal experiences.
- Peer teaching (tutorials) are a particular kind of seminar that were popularized at Oxford & Cambridge. The session often follows the Socratic method: the student presents their findings and the professor or peer instructor rigorously questions every assumption made by the student while drawing others into the discussion.

Designing a Project

Steps for Designing a CL Project

- IDENTIFY OUTCOMES/ASSESSMENTS
- DESIGN THE SCENARIO
  - Send written materials in advance so that students can digest the facts and issues involved. Include an assignment to prepare students.
  - Determine groups (3-5 students) and prepare specific materials for group assignments.
- INTRODUCE THE PROBLEM
  - Direct students to solve the problem within a given time period, providing a timeline for project elements.
- RESEARCH
  - Moderate discussions and research efforts.
  - Help students weigh and test values; separate fact from opinion.
- PRESENTATION
- ASSESSMENT
  - Evaluate student performance multiple times throughout each project OR once on multiple aspects of a project.

Assessing Collaborative Learning

- Have students complete individual work toward the learning objectives before initiating collaborative groups. This can be done without sharing the eventual purpose behind the initial assignment(s).
- Have the students teach each other rather than taking the sole responsibility for instruction.
- Build in peer review opportunities throughout CL activities. Accountability from peers and instructor greatly improves the active participation of all students.
- Provide multiple grades for each individual's contributions to group activities. Use both individual and team grading to determine CL success.

Possible Assessment Points

- Quality of research
- Communication in written and oral material
- Organization and validity of arguments
- Feasibility of solutions presented
- Evidence of consideration of all case factors
- Individual participation
- Intra group dynamics
- Self-Assessment (rubric)

CONNECTED Learning

EQUITABLE, SOCIAL, AND PARTICIPATORY

Connected learning is a model of learning that holds out the possibility of reimagining the experience of education in the information age. It draws on the power of today's technology to fuse young people's interests, friendships, and academic achievement through experiences laced with hands-on production, shared purpose, and open networks.

PRODUCTION CENTERED

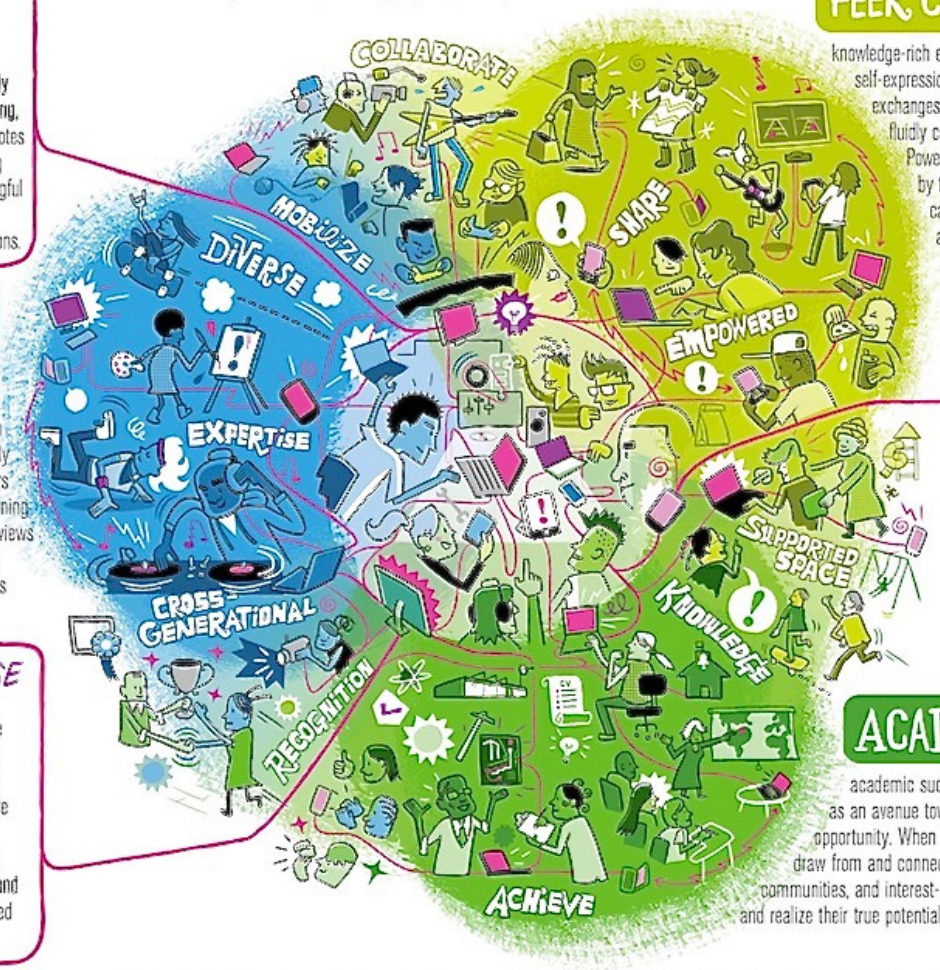
Connected learning prizes the learning that comes from **actively producing, creating, experimenting, and designing**, because it promotes skills and dispositions for lifelong learning, and for making meaningful contributions to today's rapidly changing work and social conditions.

INTERESTS

Interests foster the drive to gain knowledge and expertise. Research has repeatedly shown that when the topic is personally interesting and relevant, learners achieve much higher-order learning outcomes. Connected learning views interests and passions that are developed in a social context as essential elements.

SHARED PURPOSE

Today's social media and web-based communities provide unprecedented opportunities for caring adults, teachers, parents, learners, and their peers to share interests and contribute to a common purpose. The potential of **cross-generational learning and connection** unfolds when centered on common goals.



PEER CULTURE

Connected learning thrives in a socially meaningful and knowledge-rich ecology of ongoing participation, self-expression, and recognition. In their everyday exchanges with peers and friends, young people fluidly contribute, share and give feedback. Powered with possibilities made available by today's social media, this peer culture can produce learning that's engaging and powerful.

OPENLY NETWORKED

Connected learning environments **link learning in school, home, and community**, because learners achieve best when their learning is reinforced and supported in multiple settings. Online platforms can make learning resources abundant, accessible, and visible across all learner settings.

ACADEMIC

Connected learning recognizes the importance of academic success for intellectual growth and as an avenue towards economic and political opportunity. When academic studies and institutions draw from and connect to young people's peer culture, communities, and interest-driven pursuits, learners flourish and realize their true potential.

ACTIVE **RELEVANT** REAL-WORLD EFFECTIVE **HANDS-ON**
NETWORKED **INNOVATIVE** PERSONAL TRANSFORMATIVE

Resources

- http://www.thecommunityofinquiry.org/coi
- https://pogil.org/about-pogil/what-is-pogil
- https://pogil.org/implementing-pogil
- https://pogil.org/curricular-materials
- https://www.rit.edu/academicaffairs/tls/sites/rit.edu.academicaffairs.tls/files/images/te-pogil-materials.pdf
- Ruder, S., Brown, P.J.P., & Stanford, C. (2020). Developing POGIL materials: Writing and refining activities for a spectrum of content areas. *Journal on Excellence in College Teaching*, 31(1), 195-228. https://files.eric.ed.gov/fulltext/EJ1251897.pdf
- https://www.facultyfocus.com/articles/course-design-ideas/problem-based-learning-six-steps-to-design-implement-and-assess/
- https://www.facultyfocus.com/articles/course-design-ideas/designing-problems-for-problem-based-learning/
- https://www.hunschool.org/resources/problem-based-learning
- https://www.teachthought.com/project-based-learning/a-better-list-of-ideas-for-project-based-learning/
- http://www.teambasedlearning.org/

Images

- https://www.learningandthebrain.com/blog/whats-best-timing-collaborative-learning/
- https://www.slideshare.net/rneedham91/collaborative-learning-objectives
- https://lx.uts.edu.au/blog/2020/02/18/in-a-nutshell-community-of-inquiry-for-online-subjects
- https://oxford-review.com/why-some-people-learn-better-using-cooperative-learning-techniques/
- https://www.teachinganthropology.org/2019/03/09/how-do-we-prepare-our-students-for-a-realistic-job-market-problem-based-learning/
- https://www.nap.edu/read/13099/chapter/5
- https://appel.nasa.gov/2015/07/22/a-case-for-case-study-based-learning/
- https://clalliance.org/resources/connected-learning-infographic/