

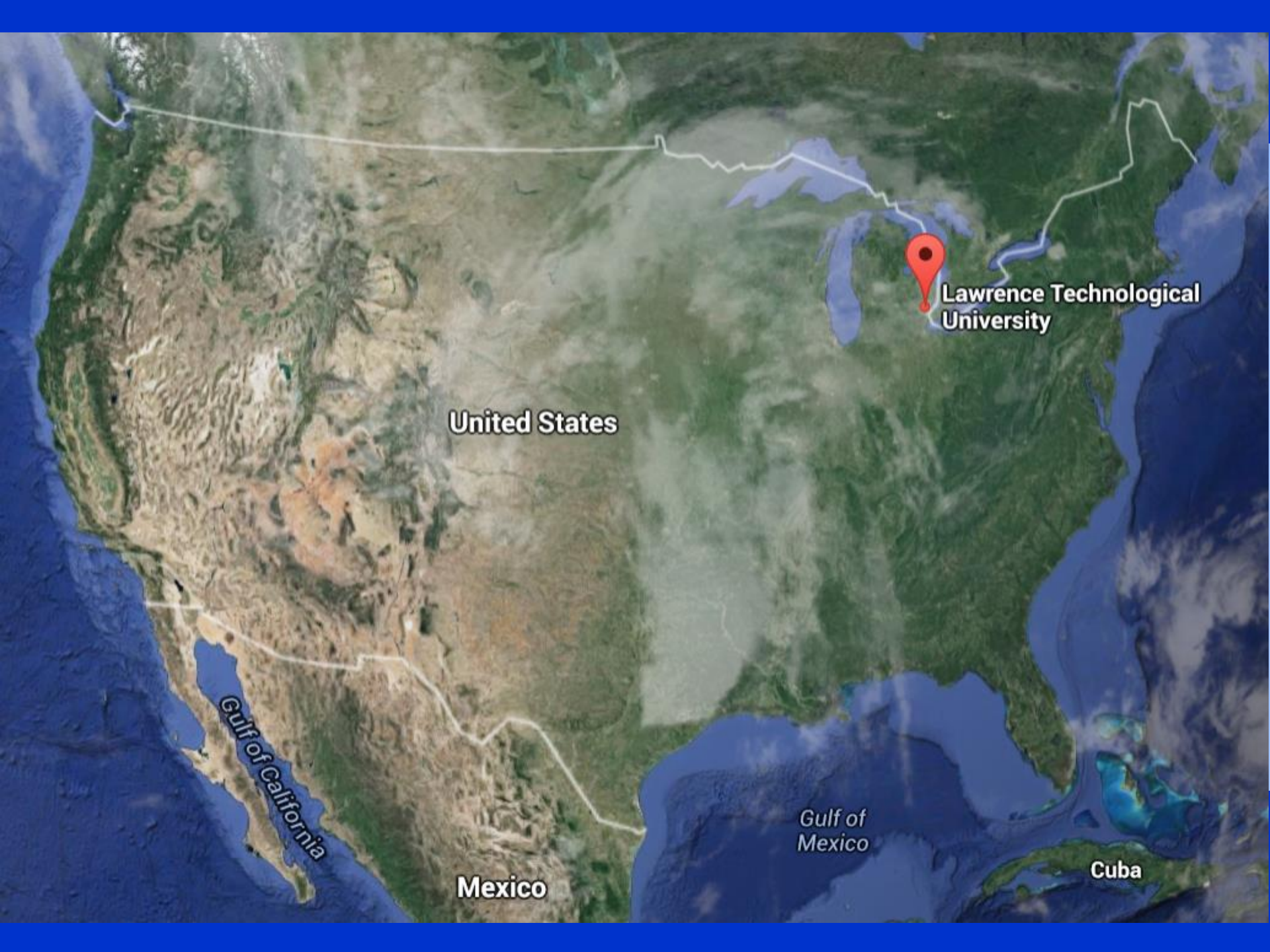
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# **INTRODUCTION TO CLASSIFYING ACTIVE COLLABORATIVE LEARNING WITH EXAMPLES OF HIGHER LEVEL ACL**

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Lawrence Technological University,  
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United States

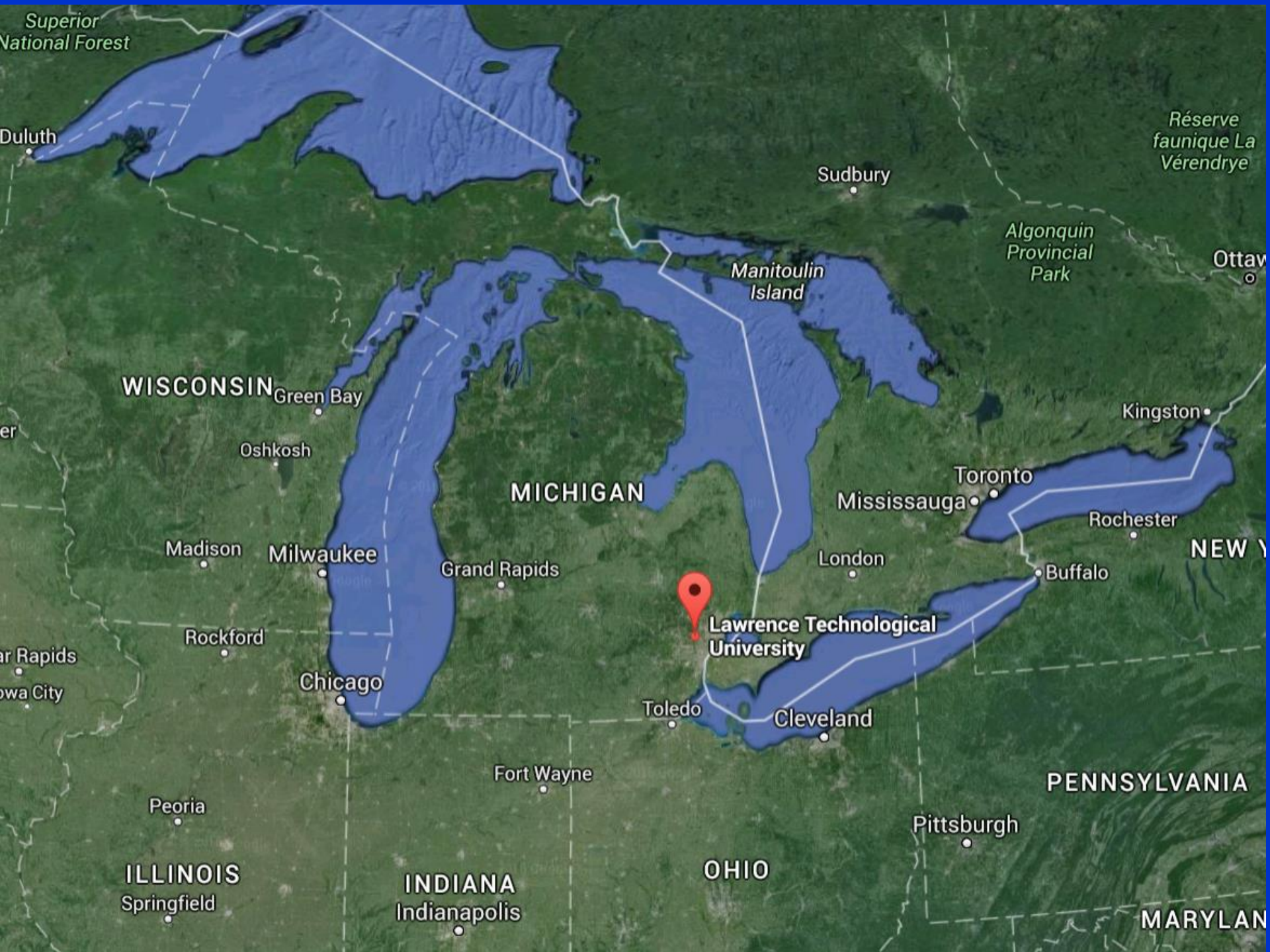
Lawrence Technological University

Gulf of California

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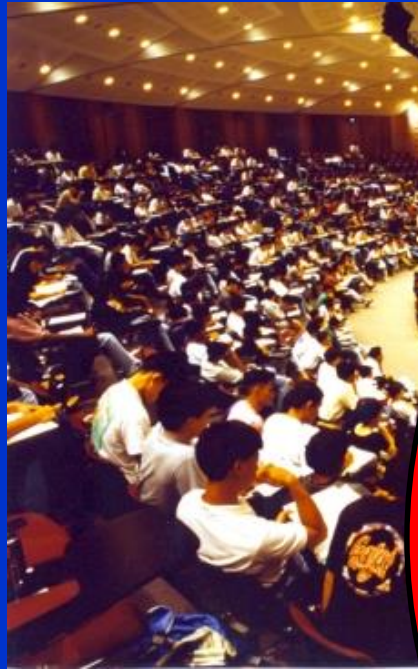
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# What is a singular goal of this workshop?

- **Investigate best classroom techniques which instill deeper learning, retention of information, and reinforce students' ability to apply critical thinking.**
  - **student-centered learning**
  - **team-based learning**
  - **active-collaborative learning (ACL) and/or problem-based learning (PBL) techniques**
- **Incidentally, these techniques strengthen the highly sought skill of solving ambiguous problems in a team setting.**

# Instructor-Centered Learning



# Instructor-Centered Learning



# A problem

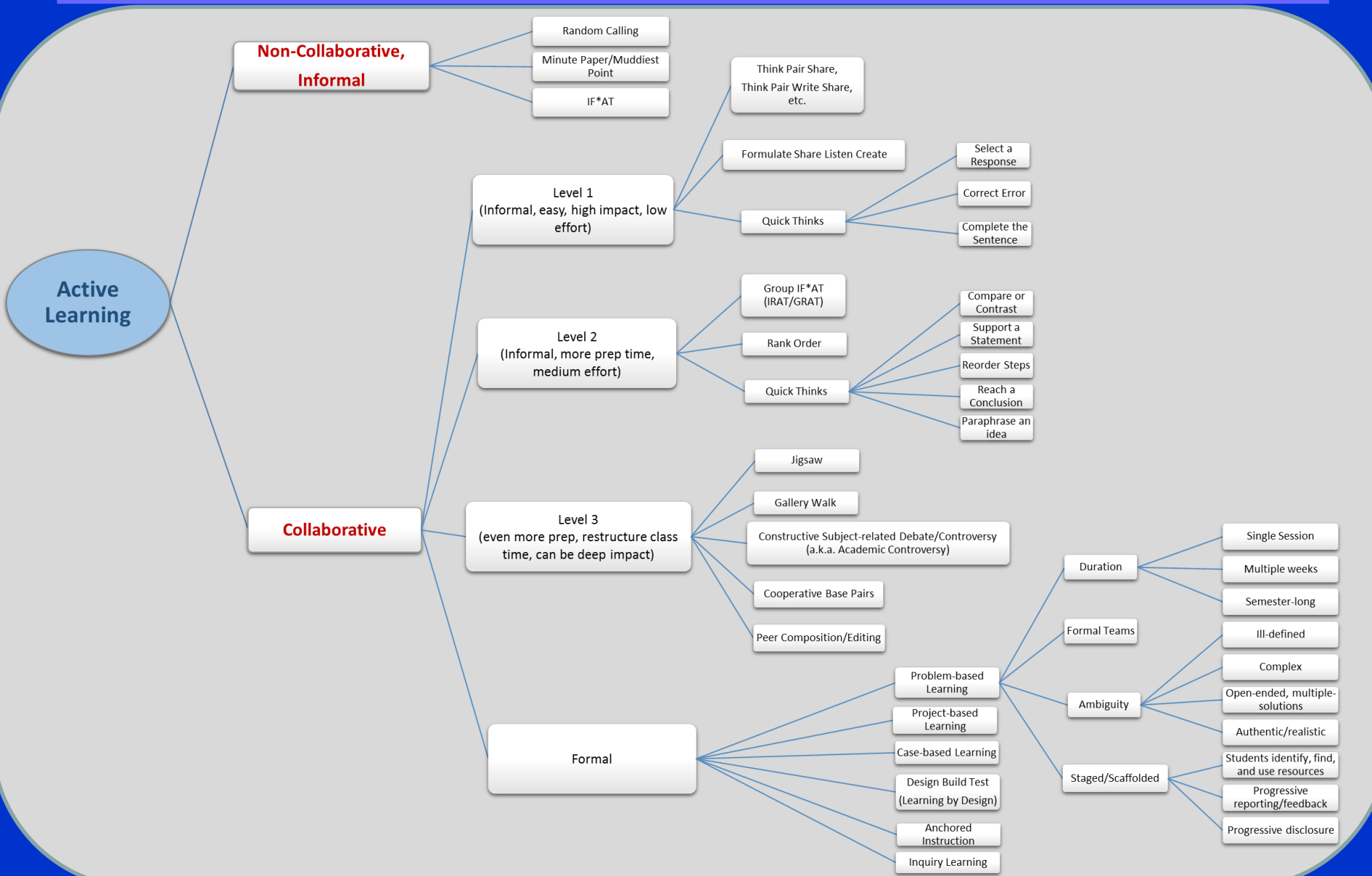
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Are the students retaining the important concepts learned 1 year later, 5 years later .. ?

~ 2 %



# Methods to Accomplish this Task





# Active Learning: Cooperation/Collaboration in the Classroom

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- **Informal Cooperative Learning Groups**
- **Formal Cooperative Learning Groups**

# Active and Collaborative Learning (Levels 1-2 informal; Level 3 formal)

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## Level 1 – easy, high-impact, low-effort

- Think Pair Share
- Think Pair Write Share
- Muddiest Point
- Random Calling
- Formulate – Share – Listen – Create
- Minute Paper



## Level 2 – more prep time, medium effort

- IF\*AT (immediate feedback readiness technique)
- IRAT/GRAT (individual/group readiness assessment technique)
- Quick Thinks (can also be Level 1)
- Rank Order

## Level 3 – even more prep, restructuring of class time, can be deep impact

- Jigsaw
- Cooperative Base Pairs
- Gallery Walk
- Constructive Subject-related Debate/Controversy
- Peer composition/editing

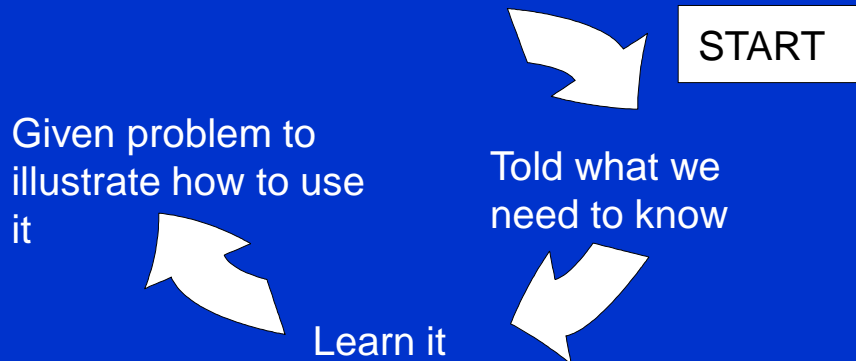
## Challenge-Based Learning

- Problem-based learning 
- Case-based learning
- Project-based learning 
- Learning by design
- Inquiry learning
- Anchored instruction

John Bransford, Nancy Vye and Helen Bateman. Creating High-Quality Learning Environments: Guidelines from Research on How People Learn

# How is ACL Different?

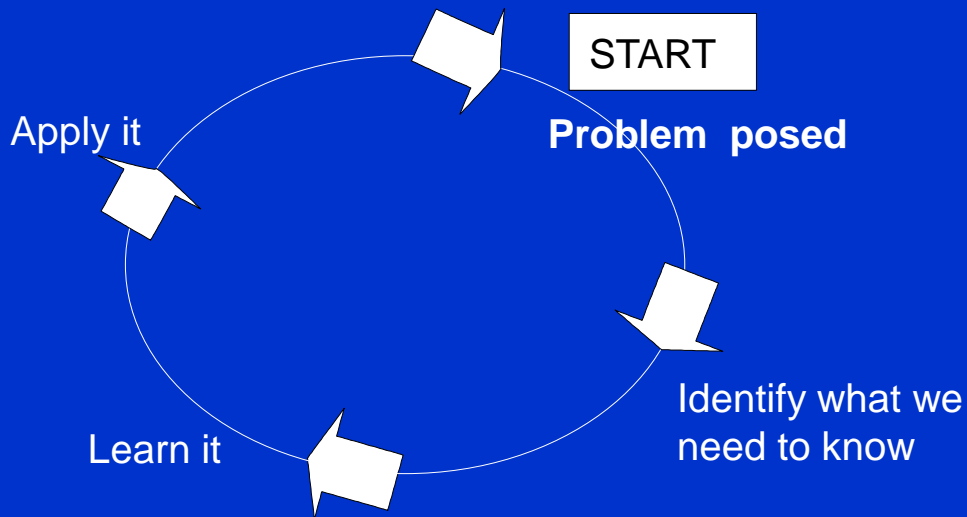
## Subject-Based Learning



## Normative Professional Curriculum:

1. Teach the relevant basic science,
2. Teach the relevant applied science, and
3. Allow for a practicum to connect the science to actual practice.

## Active Learning



Material adapted with permission from Karl A. Smith. Purdue University and the University of Minnesota  
 ksmith@umn.edu  
<http://www.ce.umn.edu/~smith>

# Teacher's Role in Cooperative Learning

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- 1. Specifying Objectives**
- 2. Making Decisions**
- 3. Explaining Task, Positive Interdependence,  
and Individual Accountability**
- 4. Monitoring and Intervening to Teach Skills**
- 5. Evaluating Students' Achievement and Group  
Effectiveness**

# Decisions, Decisions

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**What type of cooperative learning?**

**Group size?**

**Group selection?**

**Group member roles?**

**How long to leave groups together?**

**Arranging the room?**

**Providing materials?**

**Time allocation?**

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# Level 3 (Formal) Cooperative Learning



# Active and Collaborative Learning (Levels 1-2 informal; Level 3 formal)

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# Structured Academic Controversy (Subject-Related Debate)

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- **Not about controversies within academics.**
- **Student groups are assigned a position or role within a controversial subject.**
- **After each role is researched, the groups debate their side of the controversy.**
- **The goal is not to “win” the debate, but instead to give insight into other perspectives. There is likely not one single correct answer.**
- **SACs “encourage students to think about the complexities and ambiguities that often characterize controversial issues,” while helping “students change their perspectives and enhance content knowledge.”**

# Gallery Walk

## **A discussion or presentation technique for active engagement**

Technique gets students out of their chairs and actively involves them in synthesizing important concepts, in consensus building, in writing, and in public speaking.

- **Questions are posted on charts or just pieces of paper located in different parts of the classroom.**
- **Each chart or "station" has its own question that relates to an important class concept.**
- **Teams rotate around the classroom, composing answers to questions as well as reflecting upon the answers given by other groups.**
- **The technique closes with an oral presentation or "report out" in which each group synthesizes comments to a particular question.**

# Gallery Walk

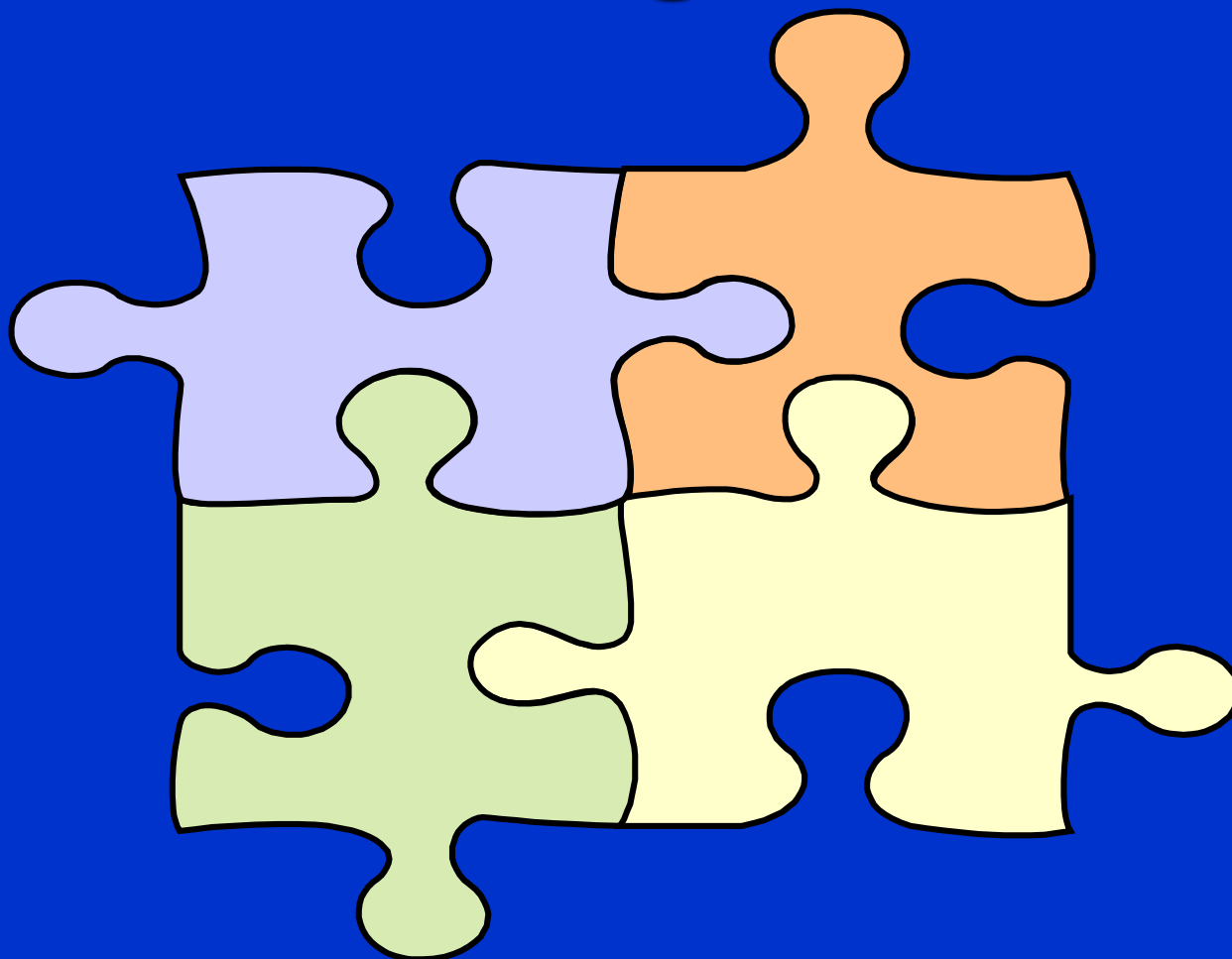
The advantage of the method is its flexibility and the variety of benefits for students and instructor alike.

- A Gallery Walk can be conducted with computers (a "Computer Run"), with pieces of paper on tables, or with posted chart paper.
- It can be scheduled for fifteen minutes (a "Gallery Run") or for several class periods.

For students it's a chance to share thoughts in a more friendly, supportive setting rather than a larger, anonymous class.

For instructors, it's a chance to gauge the depth of student understanding of particular concepts and to challenge misconceptions.

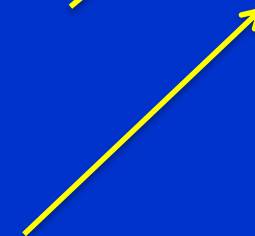
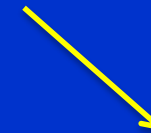
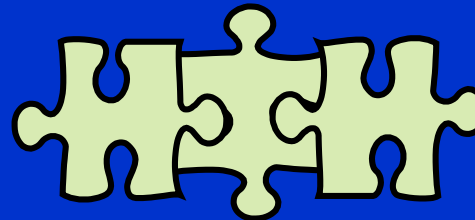
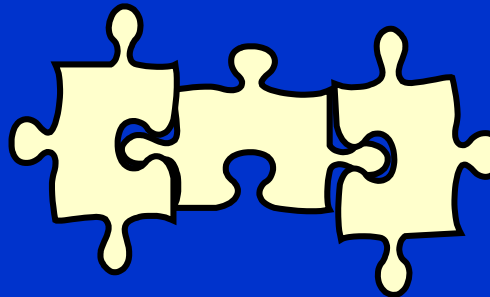
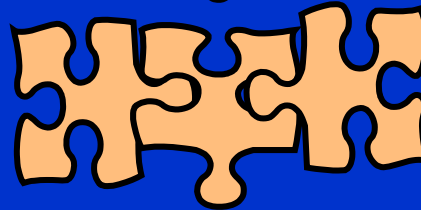
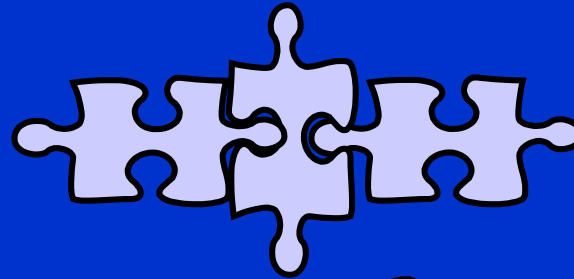
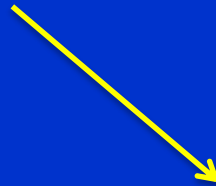
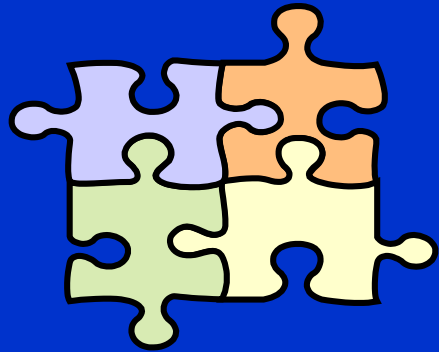
# The Jigsaw



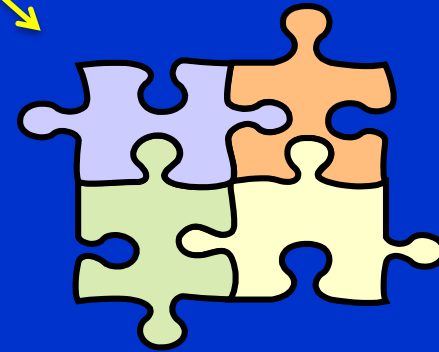
# The Jigsaw

## Expert Groups

Home Group



Home Group



# Jigsaw Procedure

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- **Form Cooperative (Home) Groups**  
Give each member one part of the assignment.
  
- **Break into Expert Groups**  
All Home Group members leave the Home Group and form an Expert Group consisting of all the members in the class with the same part of the assignment. The goal of the Expert Group is:
  - a) Learn and become an expert on their part of the assignment.
  - b) Plan how to teach the material to the other members of their Home Group.

# Jigsaw Procedure

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- **Return to Home Group**

After all members of the Expert Groups have completed their learning/discussion, each member returns to their Home Group to teach the results of their part of the assignment to the other Home Group members.

- **Home Group Report Out**

Once each Home Group member learns all parts of the assignment, the group discusses all the information and ultimately reaches a consensus as to their one final answer to the assignment and provides justification for their answer.



# Experience your own jigsaw

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- **Jigsaw**
  - **Expert Groups**
  - **Home Groups**
- **Structured Academic Controversy (Subject-related debate)**
- **Gallery Walk**

# Your Home Group

- Share your birthdates
  - not necessarily your ages!



# Experience your own “Hybrid” Jigsaw

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- **Jigsaw**
  - **Home Groups**
  - **Expert Groups**
    - Coal
    - Petroleum/Oil
    - Biofuel/Ethanol
    - Wind
    - Solar
    - Nuclear
    - Hydropower

# Expert Groups

Jan 1<sup>st</sup>

Dec 31<sup>st</sup>



Coal

Wind

Solar

Nuclear

# Jigsaw Assignment

The European Science Foundation in partnership with the European Energy Union will soon be distributing a call for proposals. As they look to the future of energy needs, ESF would like to determine which energy conversion technology should be pursued with research and development. They have assembled a blue ribbon panel of scientists/mathematicians/engineers to rank or pick the top choice of the following energy conversion technologies. Prepare a defense of your selection(s). Your panel will be required to submit your recommendation in poster format. (Be creative with your posters.) In addition, one member of your panel will have 60 seconds to explain your recommendation.

1. Coal
2. Wind
3. Solar
4. Nuclear

# Schedule and Jigsaw Assignment

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**9:45 – 10:08**

**Expert Groups research.**

**10:08 – 10:28**

**Home Groups share information and make decision.**

**10:28 – 10:32**

**Complete your poster.**

**10:32 – 10:40**

**Gallery Walk.**

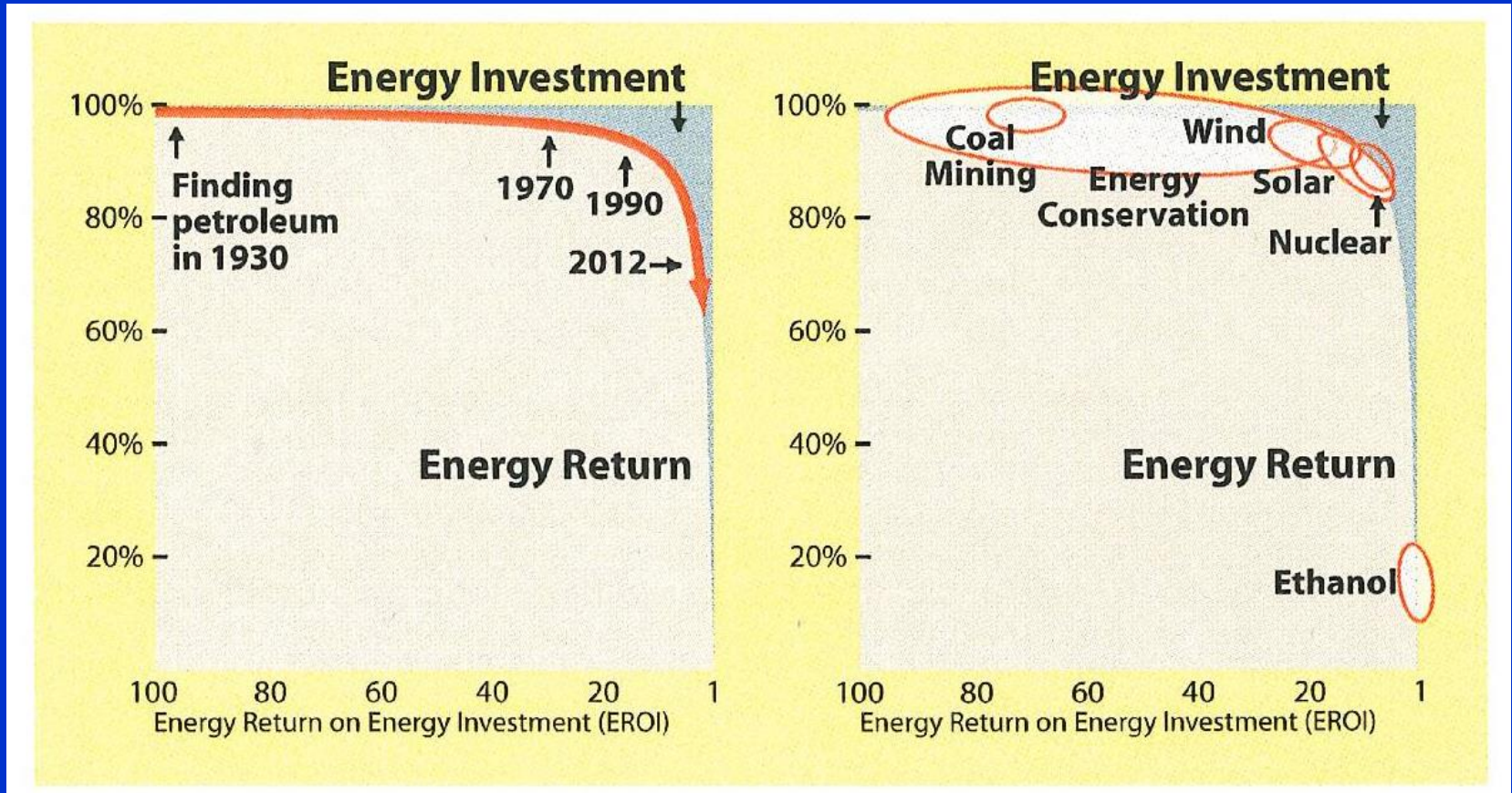
**10:40 – 10:55**

**Poster reports. 60 seconds per speaker.**

**10:55 – 11:00**

**Wrap-up**

# Jigsaw Assignment



# Adapting to your course

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- You cannot have more expert groups than you have number of students in a home group. You can have more students in a home group than you have expert groups – put two students in same expert group.
- Did you notice the “excitement” to learn. It was difficult to turn-off.
- We combined three formal ACLs into a PBL (Jigsaw, Constructive Debate, Gallery Walk). This is not necessary.
- Accountability is strong since each team member must report back findings.
- In class, be careful with time. Everything takes longer than anticipated. Use a timer.
- Students can post questions during gallery walk and during presentation, those questions can be addressed.
- ?? Expert Groups or Home Groups can meet outside of class to allow appropriate level of research.



# Jigsaw

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**Jigsaw learning allows students to be introduced to material and yet maintain a high level of personal responsibility.**

- develop teamwork and cooperative learning skills
- helps develop a depth of knowledge not possible if the students were to try to learn all of the material on their own.
- students are required to present their findings to the home group; Jigsaw learning will often disclose a student's own understanding of a concept as well as reveal any misunderstandings.