A Group of ATEEC Fellows Discusses Six CTL Strategies

1. CTL is Problem-Based Learning

- A problem is a simulated or real question, issue, challenge, or difficulty in need of a solution
- Is relevant and worthwhile to students' lives – their families, school experiences, workplaces, and communities
- Promotes critical thinking
- Encourages a systematic approach to addressing the problem
- Integrates disciplines

Action Planning Goals:

What you should see in the Action Plan:

- The action plan is based on a simply stated overarching problem. That problem:
    o Is historically important;
    o Has no obvious right answer;
    o Requires higher order thinking skills;
    o Is continually revisited throughout a course of study;
    o Is framed to provoke and sustain student interest;
    o Is linked to other problems.
- The student work is organized around a set of sub-problems, which all will require higher order thinking skills.

What you should see in the learners:

- All three features of substantive conversation occur, with at least one example of sustained conversation. Sustained conversation is extended long enough to build an improved and shared understanding of ideas. Substantive conversation:
    o Is reciprocal, which means that the student and teacher question, state opinions, and provide ideas/information from their perspective.
    o Includes higher order thinking, which means the student shows evidence of evaluating, synthesizing, applying ideas and information to current, past, or future situations or concepts.
    o builds coherently on participants' ideas and promotes a collective understanding of the theme or topic of the action plan.

The Challenge:

Find a problem that relates to your subject area and your students. Pick a topic you already cover and ask yourself, "Can I make this problem-based?" Narrow down your topics so that they don't bog down. Don't be afraid to start small so you can experience success. Problems could range from one class to an entire unit or course. Use what you already do in your course.

For example, students may have formerly read about a concept (such as methods of water quality testing, writing a set of instructions, working with ratios, etc.), watched a film, listened to a lecture, or completed a worksheet. A contextual approach would be to have students bring in water samples from various sources in the community, and use a test kit to evaluate the water for bacterial contamination. This would be followed up by a class presentation and discussion. This could be a springboard to further independent studies. Is there a problem? How could it be solved?

As you work with the national or local standards (math, science, etc.), you can either start with a standard and determine a related problem, or start with problems of interest and then identify the applicable standards being addressed.

Examples:

The problem can be extensive, requiring research.

- o Scott CC team was concerned about the declining air quality in the community.
- o North Scott HS was concerned about the water quality in their community as a result of urban sprawl.
- o CHS ...about the effect of lead contamination in a local marsh on aquatic life and migratory birds.
- o CW .... how do agricultural chemicals affect the watershed?
- o How does a community find use for abandoned properties that are contaminated or perceived to be contaminated?
- o Strategic placement and management of hog confinement operations

Problems may be presented as smaller, more manageable or limited:

- o Students can test home or school water samples for bacteria, air quality (rate of exchange) of a classroom, sound levels in proximity to band instruments. Which is louder, the auto technology shop or the band room?
- o What goes into managing a client relationship?
- o Should you use antibacterial soap?
- o How do you dispose of potentially hazardous products?
- o Is paper recycling feasible?
- o How environmentally friendly is a classroom or school?

Reflection:

Contextual teaching is NOT a change of curriculum, it is just a different way of presenting the material.

2. CTL Uses Multiple Contexts

- Students learn in the real world where the knowledge would be applied – school (both the classroom and school "life"), workplaces, home, the local community, and sometimes, places beyond that community.
- Simulation of a situation or place can provide a satisfactory context, if the real world context is unavailable or poses a hazard.

Action Planning Goals:

What you should see in the Action Plan:

- Purposeful contexts, in and outside the classroom, that will enhance student learning experiences.
- Three or more purposeful activities that will promote community connections.

What you should see in the learners:

- Students apply content knowledge in the school, community, workplace, and/or family context in order to complete aspects of the action plan. During research, students are observed using one or more resource systems and primary resource materials.

The Challenge:

Using multiple contexts outside the classroom may be limited by time, money, and resources. The challenge is to look at what you are already teaching and to incorporate different avenues to explore the concept. Look for ways to gain administrative, colleague, and community support. When you come up with a good teaching project, share it with others.

Examples:

Before: A lesson on writing technical instructions, students read examples and the teacher lectured. Then the teacher gave a list of topics to choose from (e.g., how to change a tire). All this took place in the classroom. After: With the contextual approach, students analyzed tasks performed in a process by outside experts. From the task analysis, students developed a set of instructions that adhered to a template provided by the teacher. The students took the instructions back to the experts setting for evaluation. This was followed up by revisions until the instructions were perfect.

After:

- o Students may go outside of the classroom. An example of this would be the contexts for water quality studies: drinking water plant, wastewater treatment facility (both large and small), wetland habitats, private wells and septic systems, surface water sites (creeks, rivers, lakes...), testing laboratories, and government agencies.
- o Guest experts may be invited into the classroom from private industry, government agencies, special interest and civic groups.
- o Other teachers may lend their expertise to your classroom (such as an English teacher covering journal writing for a science teacher). In the Before and After examples, students went to another teacher's classroom to analyze tasks in a process.
- o Students may experience another context through a simulation. This is especially effective where a context may be dangerous (e.g., hazardous materials spill).

- o Students may create models that relate content to the real world. For example, a model hog confinement area may be constructed and shown as a point source of pollution to a stream using commonly available materials (e.g., food color).
- o When students pursue research, require that primary sources be included, meaning interviews with experts.

Reflection:

The adage "No person is an island" is particularly applicable here. Seek and use support.

3. CTL Draws Upon Student Diversity

- Recognizes that learning is influenced and enhanced by the student's individuality – ethnicity, personality, social group, attitudes and values, habits, health status, skills and talents already acquired, genetic predispositions, background and experiences, interests, and learning style preferences or intelligences (e.g., mathematical, verbal, natural, musical, spatial).

Action Planning Goals:

Students evaluate (e.g., discuss, write, and/or display) how and why their norms, communication patterns, and/or beliefs have developed as the result of differences and similarities that exist among them and individuals different from them.

The Challenge:

The challenge is to look at your student group and their differences and then to utilize those differences to create a rich learning environment. The teacher needs to create a climate of openness and recognition of students' diversity. The goal is to have students evaluate how diversity enhances learning.

Examples:

Before and After Example:

Before, we were focused on teaching the curriculum; after, we became focused on teaching the students. We recognize that students come into our classrooms with different backgrounds, beliefs, skills, talents, and interests.

Strategies and Additional Examples:

- o Students are given the opportunity to focus on areas of interest within the larger topic of study. For example, in studying water pollution, a student may choose the subtopic of well water if he/she lives in a rural setting.
- o Students select methods of presentation. For example, a student who avoids speaking in front of groups may choose to do a model, video, PowerPoint presentation, etc.
- o Self-contained special education students went on several field trips with science classes and were involved with videotaping during the trips.
- o A class of mildly disabled students made all the arrangements for transportation and scheduling of field trips.
- o On field trips, students chose tasks for data collection based on individual interest, such as testing water, collecting samples, writing qualitative observations, taking photos, measuring, and recording data.
- o Student learning communities have been comprised of students with different talents and skills.
- o Role plays, such as town meetings and mock trials, allowed students to bring their backgrounds and viewpoints to bear.

Reflection:

CTL experiences should build upon student diversity and respect for our diverse world.

4. CTL Supports Self-Regulated Learning

- Inspires the goal of lifelong learning, which implies that learners are able to seek out, analyze, and use information with limited or no supervision.
- Educators help students grow in their abilities to research, produce evidence of their learning, use their time well, learn from mistakes, and reflect on how they learned.

Action Planning Goals:

What you should see in the Action Plan:

- Coherence through a clearly communicated set of learning objectives and activities to be presented to students.
- Opportunities for students to set many of their own learning goals.

What you should see in the learners:

- During their activities, students increasingly self-direct their learning until they become mostly self-regulated.

The Challenge:

Most students have been spoon-fed and told what to learn and when to learn it. The attitude is often "You're the teacher. You tell us what to do." Educators cannot presume simply to turn students loose and expect them to be immediately self-regulated. The challenge is to develop strategies that move students closer and closer to becoming individuals who can learn with little to no supervision.

Examples:

Before and After:

Before, in a science class, students were given cook-book instructions for a lab to be completed during class. After, students were given limited instructions. It was their task to design an investigation that would find a solution to a real-world problem.

Examples and Strategies:

- Students were told the real story of engines being damaged in air shipping. Teachers created and wrote up a case study about the situation. Students from English, social studies, math, automotive, and science were provided the case study, which required them to collaborate on a solution for safely shipping the parts from Seattle to Japan. They needed to understand the foundations, economics, and history of shipping; develop and test models and prototypes; and present the solution to school and community members.
- A student interested in video technology was given the opportunity to film class activities in order to document them. He took full responsibility for filming, editing, adding graphics, and providing narration. In essence, the teacher of the class activities became the student's client.
- A science student created a video-lab on the dissection of a cat. The video is to be made available to other students as a training resource.
- The math department became a client of an honors student who created a departmental web site. The student ran a comprehensive needs assessment and then set out to satisfy

those needs, such as hours for math lab, chapter reviews, actual math problem examples, references and resources.

- Students who have a client relationship with someone (a teacher or a community member) must submit projects for review and revision before making them final. This allows the student to correct mistakes.
- Students in an English class use journaling to write their expectations of the class, themselves, and the teacher. They turn in two copies, one for them to keep and one for the teacher. At mid-term the students receive back their writing and are asked to reflect on whether they have met their own expectations. They also need to determine a strategy for self-improvement in meeting those expectations.
- Students in an auto technology class know that as a final evaluation their engines will be evaluated by a panel of experts from the community and that the engine performance will have to be perfect (100%!). If the engines are not perfect, they have a chance to correct their performance. The grade becomes a B, because this drives home the need for attention to detail and the fact that doing things twice costs the employer money.

Reflection:

Teachers should expect as much out of themselves as they do of their students. They should be willing to learn from their mistakes and to improve their teaching. They should be reflective, looking for ways the classroom can model the real world.

5. CTL Uses Interdependent Learning Groups

- Based on learning communities, where students and teachers share knowledge, focus on goals, and allow all to teach and learn from each other.
- Two or more groups connect in that knowledge-sharing, goal-focus, and teaching-learning with each other.
- These connections enhance interpersonal skills as participants work in teams.
- The creative process is magnified when people solve problems together.

Action Planning Goals:

What you should see in the Action Plan:

- The action plan clearly provides opportunities for groups of students to engage in all of the elements required for interdependent learning.

What you should see in the learners:

- All members of the learning groups share responsibility, knowledge, goals, and allow all to teach and learn from each other.
- Student groups are engaged in five or more of the elements of the highest level of the group process. The highest level of the group process occurs when members:
  - o give and receive feedback
  - o invite excluded members to become more active
  - o recognize, discuss, and often resolve conflict
  - o use one another as resources
  - o show interest in one another
  - o use clear group norms to attain the group goals.

The Challenge:

Social skills need to be built in preparation for working together. Teachers need to teach group process. The teacher needs to create an open environment where students can teach and learn from each other. The teacher and students must expect all group members to participate, sharing equally in responsibilities.

Examples:

Before and After:

Before, the teacher directed the groups, their goals, and how they would be accomplished. Now, the teacher provides the groups with an evaluative rubric. Students know what to expect and have the opportunity to set their own learning goals.

Examples and Strategies:

- Students in six science classes took different field trips (e.g., a wastewater facility in their community). Based on their field trip, small groups from each class built models of facilities they had seen. Then they presented the models and explanations to the other science classes.

- A learning disabilities history class did historical primary research on the growth of their community and how the handling of water and wastewater changed through the community's history. The students passed their research findings along to the science classes.
- HVAC students who had researched indoor air quality explained to students in a math class the concept of parts of contaminants per cubic meter (a regulatory standard). The math teacher provided her students with materials to build 1-cubic-meter boxes. A microbiologist in the community measured out and provided a quantity of pseudo-contaminants equivalent to a few parts per million. HVAC students visited the math class to help the math students demonstrate the meaning of parts per million (i.e., 1 ppm = a cubic centimeter in a cubic meter). The math and HVAC students then discussed the concept of risk assessment.
- A class of students went on a field trip to contemplate structures such as bridges and towers. Using straws and paper clips, student groups designed and built structures such as bridges or towers to comprehend the parameters of structural design. They presented and shared with each other what they discovered.
- A chemistry class was divided into groups by task. Tasks included taking water samples, measuring temperature and pH. Although simple, qualitative tests could be performed by students, more expensive water tests were performed by the water pollution control plant. Once data was tabulated, individual groups of students were assigned to analyze and report their conclusions to their own class and to an environmental education class. Students developed presentation materials. The environmental science class used the chemistry class data in developing their roles for a simulated town meeting about what to do regarding the contaminated site.
- A technical writing class divided into groups to develop instructions about real processes. Each group observed students in applied technology classes (auto collision repair, HVAC and auto technology) who were considered "expert workers." After analyzing tasks and drawing the process, the communications students created comprehensive instructions. They went back to the expert workers in the technology classes for review and revision sessions.
- A teacher had a particularly challenging chapter to teach. As a method of forming the groups, the teacher had the students identify the main concepts presented in that chapter. Each student privately chose which concept they most wanted to study. Student study groups were formed. Groups used resource materials to develop the concept and create a visual display for class presentation.

Reflection: In the olden days collaborative learning was called cheating.

6. CTL Employs Authentic Assessment

Authentic assessment:

- Leads and expects students to use higher order thinking skills in addressing a problem, issue, or concept
- Is a meaningful product of the students' new knowledge and skills
- Relates to the central goal of instruction (includes meeting national and local standards)
- Is blended with the teaching and learning process
- Provides students with opportunities and direction for improvement in learning
- Provides educator with opportunities and direction for improvement in teaching

Action Planning Goals:

What you should see in the Action Plan:

- Assessments direct students in activities that require interpreting nuances of a topic, going deeper than surface exposure or familiarity.
- Successful completion of all assessment activities will require students to understand and use the discipline content.

What you should see in the learners:

- Each student or group of students has two or more opportunities to answer specific questions and receive feedback regarding progress during the activity.

Examples:

Before and After:

The auto technology teacher used to give true-false, matching, and multiple guess tests about engines. Now the students must rebuild an engine that meets industry standards.

Examples and Strategies:

- A teacher evaluated a writing assignment or a project against a rubric. The students had the rubric beforehand so that they knew what to aim for.
- Knowing ahead that community experts were invited to evaluate student products, the students put more effort into their work.
- The evaluators were the students' peers. Not wanting to embarrass themselves in front of classmates, they worked to meet the top criteria of an assessment rubric.
- Students were given a checklist of questions that led them to self-reflection. Using that tool, they evaluated their own process and products and became their own worst critics.
- Students create portfolios of their class work. From time to time they reflect upon the entries and select the best items for their final portfolio.
- Students analyzed a data set, compared the findings to regulatory or industry standards, and made recommendations for meeting the standards.
- Students developed an oral presentation to demonstrate their comprehension of a subject.
- Students created demonstrations of concepts studied in the course.

The Challenge:

Compared to using previously prepared objective tests, authentic assessment takes more time for teachers to develop and apply. Also, to know what is really meaningful, the teacher needs to get out into the "real world" to find out how the subject matter is really used, and if it is even necessary. This addresses the age-old student question of "What am I ever going to use this for?"

Reflection:

What does the real world want students to know and be able to do? Sometimes this is different from what teachers want students to know and be able to do. The teacher must go to the real world and ask. This may be done through teacher job shadowing, internships, and advisory councils.

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