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Integrating Reading in a Technical Curriculum

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Introduction
Mr. Gary Landis, 2005 President, TEAP-CL

Mr. Lacivita was invited by me and Dr. Erwin to the 2005 TEAP-Council for Leadership (CL) Forum to share with Technology Education teachers an example of how the Temple University Reading Model is used to integrate reading strategies into a lab-based, hands-on curriculum. Although Career and Technical Education (CTE) and Technology Education have different roles and goals, I feel we share some of the same challenges in helping our students meet NCLB mandates.

Integrating Reading
The need for career and technical education (CTE) to integrate academics has been a constant mantra from school administrators and PDE. Ask any CTE instructor and they will instinctively tell you they integrate academics on a daily basis. In fact, when you walk into a CTE lab, it is impossible to not witness integration on some level. However, the type of integration that has historically been offered and what PDE now mandates are two entirely different things. Under the revised PDE Chapter 339 Vocational Education Standards, evidence of aligning academic standards with technical competencies is now the law. I have seen many integration models, but none have worked except for the Temple University Reading, Writing, Speaking and Listening model, which was developed through a PDE grant in 2001. Today, educators in over 100 schools use the Temple Reading Model (TRM). My colleagues and I were introduced to TRM in 2002. At that time, only three of my 28 seniors were able to complete an outline or paper of their senior project. I'm not here to argue or debate why a high school senior cannot prepare an outline, write a research paper, or make a 5-minute presentation to classmates My intent is to explain how technical instructors can adjust their teaching practices so students can become better learners.

Pilot Program
The original intent of TRM was to have CTE students increase their academic achievement in the classroom and on PSSA tests. For this to happen, students would have to increase their reading comprehension, retain what was read, and then apply what they had learned, gaining a better understanding of any new con-

cepts. Studies have identified these five most common reading and writing challenges:
- Troublesome vocabulary
- Failure to locate main ideas
- Difficulty in sequencing steps in a process
- Difficulty learning essential trade-related/technical terminology
- Lack of comprehension after reading an assigned selection

TRM training helped instructors to integrate and align academic standards with technical competencies through contextual learning to make learning relevant to students' career interests.

TRM Reading Strategies
Three reading strategies; Reciprocal Teaching, Scaffolding, and Journaling, are essential teaching tools. An important tool to ensure success in using strategies is modeling. If you don't teach your students how to use the strategies, it's like throwing a drowning person the book, "Learning How to Swim".

Reciprocal Teaching is done before, during, and after reading activities. It is accomplished by predicting what the material may be about (reviewing the objects at the beginning of a new chapter, looking at headlines or bolded words); then clarifying through discussion, writing, or questioning; summarizing the material by locating the main idea; then supporting the main idea with three or more specific facts or examples. During reading, my class "chunks" the material down into small, easier to understand pieces by asking who, what, when, where, why, and how something happens. For example, in my auto tech class we "chunk" a car down into its individual systems (engine), its assemblies (engine block), components (piston), and individual parts (piston rings).

Scaffolding is temporary short-term learning aid to help the student grow in independence. Once the skill is mastered, the scaffold should be withdrawn. Scaffolding makes the student think about what the author is talking about by predicting. For example, the class can preview a new chapter by asking questions like the following: What are the heading and subheading topics? Can I interpret graphs, charts, tables, and maps? Are there any margin notes?

Is there a passage overview and summary? Key questioning in the following forms also provides students with scaffolds: "Right There" questions (a question that can be answered 'right there' inside the material being read, or the class textbook); "Think and Search" questions (questions answered from sources other than the material being read (i.e., the Internet, reference book, dictionary, etc.); and "Inference" questions (questions with no real answers or that generate other questions, i.e., "The safest thing to do if you get a flat tire is to change it on level ground. But what if you're on a hill and can't get to level ground?").

Journaling is a writing-to-learn strategy that integrates structured activities into the classroom. It helps the instructor monitor students' learning, comprehension, and understanding of reading passages; whether it's a service manual detailing a repair process or procedure, or an assignment on purchasing auto insurance. Readers collect data, reread, and analyze their findings in order to discover what they mean or how they can be used. Journaling helps students apply their observations through writing. Journaling can take many forms. For example, process logs help students explain how they completed a procedure using technical vocabulary. Utilizing writing prompts and reflection journals, students can add detailed information on a topic or process they just completed. To replicate industry, my students complete daily time cards telling me what tasks they completed. This must be in complete sentences and include as much detail as possible. In other words, if you don't write what you did, then you didn't do it!

Helping Conferences
Vital to the success of the TRM are teacher helping conferences. A teacher who has been successfully trained and is utilizing the three reading strategies must meet with teachers just beginning to incorporate TRM. Helping conferences provide a support mechanism for teachers implementing the TRM, thereby reducing frustration and stress. Instructors discuss what strategies are being used and why, successful strategies are examined, and troublesome strategies reviewed. Sometimes all it takes to make a strategy work is turning a worksheet from portrait to landscape, affording added writing space.

Super Mileage Challenge!

Indiana High School students will again be challenged to engineer solutions for our nation's energy needs in the 2007 Super Mileage Challenge. Today, with the increased concern about rising fuel prices along with increasing concerns for the environment, creating solutions to achieve maximum gas mileage continues to be a very important topic. The 2007 IMSTEA Super Mileage Challenge has been tentatively scheduled for April 30, 2007 at Indianapolis Raceway Park. The objective of this event is to challenge students to apply (STEM) science, technology, engineering, and mathematics in a cooperative effort to construct a student-engineered vehicle to obtain the highest calculated miles per gallon. All materials may be downloaded from the Web and photocopied as needed. For more information visit:

www.imstea.org.

Bubble Wrap Competition

The first ever Bubble Wrap Competition is open to students in grades 5-8. Deadline for entries is 6 p.m., December 8, 2006. Challenge your students to demonstrate their creativity by creating an invention that incorporates Bubble Wrap® cushioning. Prizes planned:
Grand Prize – $10,000 Savings Bond
2nd Place – $5,000 Savings Bond
3rd Place – $3,000 Savings Bond
Ten (10) Semi-Finalist Winners Each Receive a $500 Savings Bond
The three top winners also win a trip to New York City on January 27-29 to celebrate Bubble Wrap® Appreciation Day. The Competition is sponsored by Sealed Air Corporation and administered by The National Museum of Education. For more information, visit:

www.nmoe.org/bubblewrap

ITEA Report

Ms. Joanne Trombley, ITEA Affiliate Rep

2007 ITEA Conference

ITEA's 69th Annual Conference will be held in San Antonio in March 2007. The theme is "Technological Literacy: A Global Challenge". If you need help convincing your administrator to approve your attendance, contact me at: *Joanne.Trombley@teap-online.org*

Special Offer

ITEA is so strongly committed to the field of Technology Education that they are bringing you a special offer for NEW Professional memberships (and renewals for former members lapsed more than two years). It will only cost you $35, which is one-half off the price of a regular membership! Join online now at: www.iteaconnect.org. See the Forms section. You can also download, print, and mail a paper application at the web site.

ITEA and NASA Team Up

ITEA is working with NASA to develop educational Design Challenges to coordinate with Space Shuttle Endeavour's STS-8 mission, which is scheduled for June 2007. The six-person crew will include Barbara Morgan, an ITEA member and Educator Astronaut. The Design Challenges will be developed for elementary, middle, and high school students and will focus on greenhouse design in space. For more information, contact Shelli Meade at *smeade@iteaconnect.org.*

Impact

I have seen a remarkable effect on my students' AYES and NATEF Exit Exam (technical trade exams) scores. In 2003-04, 18 students involved in TRM for two or more years passed the assessments at a 70% rate, while students who had not been exposed to TRM passed at a 37% rate. Last spring, 90% of my 11th grade students who took the AYES Exit Exams passed, a 20% increase from the previous year. To measure TRM effective, the STAR Reading Assessment was given to all students in grades 9-11 in June 2005 with a retest in December 2005. There was an average 4% increase in aggregate reading scores for all students, but 14% increase in aggregate reading scores for students with IEPs or identified as being below basic or having an eighth grade or lower reading level before testing.

Final Thoughts

With all of my students prepared in TRM, I can say this model works extremely well. I can't envision integrating academics, let alone teaching my curriculum, any other way. Of course, it was difficult. It took a lot of work for both my students and me to accept this approach. Now my students know what is expected. Implementing this model brought about an unexpected benefit. Classroom management is a breeze! No matter what my students are doing either in the classroom or lab, they are writing. If they are watching a video, they have a worksheet; if there is a class lecture, they have a worksheet to fill out; if they have an assignment and they use the Internet, they have a worksheet to complete.

TRM is not a "magic bullet," nor is it intended to make a CTE instructor an English teacher. It is an enhancement to the technical curriculum and most important, it must be an "add-in" and not an "add-on."