Integrating Technology into the Classroom using *Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement* by Robert J. Marzano, Debra J. Pickering, Jane E. Pollock

For updated information go to: http://t4.jordan.k12.ut.us/t4/content/view/189/38/

The authors have examined decades of research to determine what teaching strategies have positive effects on student learning. These strategies are not new, but when teachers use these strategies effectively with their students, the outcome is a measurable difference in student achievement. Each of these strategies can be used by any teacher at any time, using either traditional teaching tools or using technology. This site provides ideas for using technology.

Note: Templates are in Microsoft Word and require StuffIt.

Identifying Similarities and Differences

1. Presenting students with explicit guidance in identifying similarities and differences
2. Asking students to independently identify similarities and differences.
3. Representing similarities and differences in graphic or symbolic form enhances students' understanding of and ability to use knowledge.

Technology Applications

- Inspiration and Kidspiration.
- Word processing program "call-out" shapes such as Microsoft Word's "speak shape" or "thought shape."
- Presentation software to fade back and forth (teacher presentation).
- Students graph numerical data with spreadsheet or graphing calculator emulator. The Graph Club
- Core curriculum—compare animal similarities.
- Bar graph of similar traits.
- Fingerprint graph—how many have swirls, etc.
- Table creation in Microsoft Word for comparison.
- Telecollaborative projects.
    - Templates:
        - Venn Diagram (p.18)
        - Comparison Matrix (p.19)

- Categories (p.22)
- Metaphors (p.25)
- Analogies (p.28)

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Summarizing and Note Taking

1. Summarizing and Note Taking
    1. Students must delete some information, substitute some information, and keep some information.
    2. To effectively to this, students must analyze the information at a fairly deep level.
    3. Knowledge of the form or structure a piece of information will take is an aid, i.e., typical science chapter organization.
2. Note Taking
    1. Verbatim note taking is the least effective way to take notes.
    2. Notes should be considered a work in progress.
    3. Notes should be used as study guides for tests.
    4. The more notes that are taken, the better.

Technology Applications

- Webbing.
- Graphic organizers.
- Inspiration—brainstorming, then use Outline option.
- Kidspiration—brainstorming, then use Outline option.
- Outlining in Microsoft Word, AppleWorks, or Corel WordPerfect
- Handheld computers (Palm.).
- World Book (online)—notepad
- Put PowerPoints online for student access.
    - Templates
        - Student Notes: Combination Technique (p.48)

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Reinforcing Effort and Providing Recognition

1. Effort—Keep track of effort and achievement.
2. Recognition
    1. Personalize recognition.

2. Pause, prompt, and praise.
3. Concrete symbolic recognition.

Technology Applications

- Certificate templates using word processors.
- Posters or Other Projects
- Create rubrics.
- Tracking charts using Tables in word processor or spreadsheet.
- Create a book.
- Web page sharing student work.
- Online portfolios.
- Burn CD of portfolio.
- Email to student.
- Email to student's home.
- Multimedia presentation.
- SIS
- Desktop wallpaper—insert pictures for birthdays.
- Use iMovie to create student presentation for recognition.
- Create a student-produced newscast of notable events.
    - Templates
        - Effort Rubric (p.52)
        - Achievement Rubric (p.53)

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Homework and Practice

1. Establish and communicate a homework policy.
2. Design homework assignments that clearly articulate the purpose and outcome.
3. Vary the approaches to providing feedback.

Technology Applications

- Teacher webpages.
- Multimedia presentations.
- Rubrics.
- Email completed assignments to teachers.
- TIPS.
- Use UEN Lesson Plan Tool to give or upload homework files.
- Games—PowerPoint Jeopardy.
- Use My Edesk and speed dial folders with hotlinks and file.
- SIS.
    - Template:
        - Homework Assignment Form (p.65)

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Nonlinguistic Representations

The "dual-coding" theory of information storage postulates that knowledge is stored in two forms—

linguistic (words) and imagery (mental pictures).

1. Create graphic organizers
    1. Descriptive Patterns
    2. Time-Sequence Patterns
    3. Process/Cause-Effect Patterns
    4. Episode Patterns
    5. Generalization/Principle Patterns
    6. Concept Patterns
2. Using other nonlinguistic representations
    1. Making physical models
    2. Generating mental pictures
    3. Drawing pictures and pictographs
    4. Engaging in kinesthetic activity

Technology Applications for graphic organizers

- Tom Snyder TimeLiner
- Multimedia projects using PowerPoint, Corel Presentations, KidPix,
- HyperStudio.
- Web pages.
- Webbing software in Inspiration/Kidspiration. Graphic Organizer templates
- UEN
- Weather Project
- Pond Project
- Swan Project
- Tesselations software.
    - Templates:
        - Time Sequence Pattern Organizer (p.76)
        - Process/Cause-Effect Pattern Organizer (p.76)
        - Generalization/Principle Pattern Organizer (p.77)

Technology Applications for other nonlinguistic representations

- Simulation software models—CAD, bridge building
- Flash
- Any paint program.
- Graphing calculator.
- KidPix.
- Digital cameras/video.
- Inspiration/Kidspiration

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Cooperative Learning

1. Five defining elements

1. Positive interdependence
2. Face-to-face interaction
3. Individual and group accountability
4. Interpersonal and small group skills
5. Group processing

2. Generalizations
    1. Use a variety of criteria for grouping students.
    2. Use a variety of grouping patterns
        1. Informal or ad hoc (last from a few minutes to a class period)
        2. Formal (long enough to complete an academic project—several days to several weeks)
        3. Long term (semester or year—provide students with long-term support)
    3. Keep groups small

Technology Applications

- George Lucas Foundation Instructional Module
  http://www.glef.org/PBL/index.html
- Tom Snyder software.
- WebQuests.
- Project-Based Learning.
- Interactive software.
- Arcview (GIS)
- Adaptations – KidPix.
- Group multimedia projects.
- E-Pals.
- ThinkQuest.
- Progressive stories with word processors.
- Peer editing using Notes function with Microsoft Office.

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Setting Objectives and Providing Feedback

1. Goal setting
    1. Be specific but flexible.
    2. Contracts.
2. Feedback
    1. Corrective—provide a correct answer or an explanation of what is accurate and what is inaccurate.
    2. Timely.
    3. Feedback should be criterion-referenced as opposed to norm-referenced.
    4. Students can provide some of their own feedback.

Technology Applications

- Online rubrics (student/class/teacher –developed)
  UEN RubricTool

Rubistar
- Templates:
  - Components of a General Rubric for Information (p.100)
  - Components of a Generic Rubric for Process and Skills (p.100)
- Advanced organizers.
- Reflective notes with Microsoft Office, etc.
- TIPS.
- Electronic portfolios.
- Inspiration/Kidspiration for brainstorming goals.
- George Lucas Foundation Instructional Module: http://www.glef.org/Assessment/index.html

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Generating and Testing Hypotheses

1. While hypotheses can be approached inductively or deductively, generally speaking deductive approaches reproduce better results.
2. Teachers should ask students to clearly explain their hypotheses and their conclusions.
3. Use a variety of structured tasks to guide students through generating and testing hypotheses.
    1. Systems analysis.
    2. Problem solving.
    3. Historical investigation.
    4. Invention
    5. Decision making

Technology Applications

- Use computer version of "Mastermind."
- Tom Snyder Decisions, Decisions.
- Simulation software.
- Interactive websites.
- Graphs.
- Use PowerPoint or another presentation program to introduce hypothesis.
- UEN science projects: Swans; Ponds; Streams; Weather.
- ARC GIS to work with real data (earthquake, volcano, etc.)
- Template:
  - Decision Making Grid (Worcester,p.62)

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Cues, Questions, and Advanced Organizers

1. Cues (hints) and Questions
    1. Should focus on what is important as opposed to what is unusual.
    2. "Higher level" questions produce deeper learning than "lower level questions."
    3. "Wait time"
    4. Use questions before a learning experience.
2. Advance Organizers

1. Expository
2. Narrative
3. Skimming
4. Graphic advance organizers (see Graphic Organizers, above).

Technology Applications

- With PDAs use Picomap.
- With computers use Inspiration/Kidspiration.
- Higher-level questioning—PowerPoint with images.
- UEN—WWW.Activities to ask questions.
- Post to MyEDesk or to shared site for student access.

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