

Spotlight on Teaching and Technology

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Students Developing Competency by Kathy Ross

This article is second in a series about the three key findings that emerged from the National Research Council's study which looked at a broad base of research about human learning. The last issue reported on key finding #1, the importance of preconceptions that students bring into the classroom. Here we look at the next key finding.



Key finding #2:

"To develop competence in an area of inquiry, students must: (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application." (National Research Council, 1999, p. 12).

What contributes to expertise?

A rich foundation in the facts of a field is necessary, but not sufficient to build expertise. Instead of maintaining a set of disconnected facts, experts comprehend the relationships between the important concepts in the field. It is this deeper understanding that makes facts more memorable and usable for them. The connection between concepts also contributes to a faster understanding of new information and the ability to apply learning to new situations. Experts are able to recognize patterns or discrepancies that a novice does not.

When experts approach new problems, they can draw on analogies to familiar problems. Their solid foundation of conceptual knowledge allows them to focus on just what is relevant in a new problem. That ability to see what is relevant and dismiss what is irrelevant reduces the complexity of those problems to them (National Research Council, 1999, p. 12-13). So students need opportunities to connect the concepts and facts they learn in order to understand them, remember them, use them, and develop expertise.

What does the research suggest as practical implications for helping develop student competency?

One implication is that time should be devoted to in-depth coverage of topics that are crucial to understanding the key concepts of a discipline. This will mean examining enough cases or examples for students to grasp deeper meanings and connections between concepts. When the goal is to teach students competency, covering broad content quickly should not take precedence over spending the time needed to teach foundational key concepts. New facts can be remembered and used best when they meaningfully connect to a student's structure of knowledge of the field. Not surprisingly, assessment needs to check for deep understanding of the concepts rather than just surface knowledge of the facts. This is a challenging area due to the

trade-off between assessing deep understanding and assessing objectively. Teachers who guide students toward competency need to come prepared with in-depth, organized knowledge of the subject and an awareness of how student conceptual thinking in the field develops (National Research Council, 1999, p. 17).

What instructional methods help students understand relationships between new concepts and what they already know?

Leshin, Pollock and Reigeluth (1992) describe five ways to help students understand relationships between concepts.

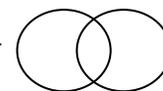
- Describe a known context in which the new concept is used (e.g., classical music includes a particular kind of music called baroque)
- Compare and contrast to similar kinds of known concepts
- Describe already known "parts" or "kinds" of the new concept (e.g., spiders and scorpions are kinds of arachnids)
- Study a familiar case of how the concept can be experienced
- Compare the new concept to a known concept from another field that can serve as a good analogy (p. 206.)

How can visuals show relationships between concepts?

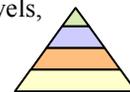
Sometimes a graphic helps students to see the relationships between ideas more clearly.

Examples can include a matrix that shows comparisons and contrasts, a Venn diagram that shows common and unique attributes, a

visual representation of steps of a



process shown as stair steps, a hierarchy of levels, or a web of connected ideas.



These kinds of visuals can be easy to draw quickly on a blackboard or transparency and yet a powerful way to show the relationships between concepts.

Sources

Leshin, C.B., Pollock, J. and Reigeluth, C.M. 1992. *Instructional Design Strategies and Tactics*. Englewood Cliffs, NJ: Educational Technology Publications. p 206.
National Research Council. 1999. *How People Learn: Bridging Research and Practice*. Committee on Learning Research and Educational Practice. Washington, DC: National Academy Press. pp. 12-17.



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Online Resources for Faculty ... Chérie Dodd

The CTE Web page <http://www.iuk.edu/ist/Links.htm> has links to various online resources that may be of assistance to Faculty.

This page contains information on:

- Instructional Resources for creating online course material.
- Links to copyright information with regard to printed materials and copyrighted music, also on how to obtain a copyright for your own work.
- Information on the Scholarship of Teaching and Learning.
- IT Resources including web resources for faculty and staff, how to get a network account, policies on how IU accounts may be used and student technology FAQs.

I would like to highlight one of the extremely useful links in the Instructional Resources section. This will assist you in enriching your classroom or online course experience for your students through the effective use of instructional design strategies.

The Virtual Instructional Designer (VID)

The VID provides faculty with the “how to” research for constructing effective online courses or sections of courses. It contains great ideas for course design and is free. All you only need to do is create a userid and submit your email address.

This VID is a Learning Anytime Anywhere Partnership (LAAP) grant-funded project. It provides 24/7 assistance to faculty on developing online instruction or courses.

When you enter the VID you have 7 Main sections.

1. **Jump Start**
 - * Orientation to the VID and where to find what you need.
 - * Research materials on Online course quality, Quality web design, Learner analysis, Design decisions & choices, Institutional assistance.
2. **Communicate**
 - * Designing threaded discussions.
 - * Effectively using E-mail.
 - * Designing live chat.
3. **Content & Assignments**
 - * Choosing content & Sources – this section contains many good sources of material you can incorporate into your existing courses.
 - * Content & Instructional Strategies
 - * Assignments
 - * Learning Theory
4. **Motivation**
 - * Helping your students.
 - * Creating a Learning Community.

5. Evaluation

- * Assessing Learning.
- * Evaluation Issues.

6. Media & Technology

- * Course Development Tools.
- * Multimedia.
- * Web Development Tools.
- * Emerging Technology.

7. Tutorials

- * Designing Basic Web Pages.
- * Designing Advanced Web Pages.
- * Course Design Process Skills.
- * Preparing Instructional Materials.

Here is a short list of some of the topics covered:

- online learner analysis
- research on online course quality
- ideas on running effective online discussions and evaluation
- designing for accessibility
- discovering learning styles



TechnoBabble ... Chérie Dodd

What are USB storage devices?

A new standard for storage has become available so instead of lugging all those floppy disks around most people are turning to the USB Storage devices.



Simply plug them into the USB port on the computer and save your data.



They offer a fast and efficient way of storing data and are small and sturdy.

Most can fit on a key ring.

They range in size from 16 – 256 MB and are relatively inexpensive, depending on the size and brand name.

The thing that is confusing is the names given to the devices. Unlike floppies or CDs there is no one standard name at the moment so you will see names like:-

Dell USB Flash Memory Key Storage,
Cyclone Flash Key USB Pen Drive-Storage,
USB Pen Drive,
USB portable pen drives,
Lexar USB JumpDrive,
and USB flash drive.

