Seeing is Understanding: Using Visualization Activities to Encourage Higher-Order Thinking

Michele Griegel-McCord, McMicken College of Arts and Sciences ~ LT @ UC Conference, October 10, 2017

CONTEXT:
Colleges and workplaces have increasingly called for graduates to be independent learners and be proficient in higher-order thinking skills, such as those at the top of Bloom’s Taxonomy (Fig 1).

Pedagogical best practices increasingly seek to cultivate the “habits of mind” (Fig 2) needed to achieve these learning goals.

SOLUTION: Visualization Tools
• Concept Maps
• Mind Maps
• Knowledge Maps
• Thinking Maps
• Graphic Organizers

These tools differ slightly, but all require students to put ideas into non-linear, visual-spatial-verbal relationships with each other.

Research on Visual Mapping Tools
Concept maps are a more effective learning tool than lecture, discussion, notes and outlines (Nesbit and Adesope, 2006).

The longer a student uses concepts maps, the more effective they are as learning tools (Schooeder et al, 2017).

Several studies show that graphic organizers increase reading comprehension (Manoli and Papadopoulou, 2012).

“Operations such as mapping cause and effect, note taking, comparing and contrasting concepts, organizing problems and solutions, and relating information to main ideas or themes can be broadly beneficial” (Strangman et al, 2017).

IMPLEMENTATION IN ENGLISH COMPOSITION COURSES

Brainstorming
Controversial Issue Stakeholders

Students create flexible webs of stakeholders that can be manipulated to represent stakeholder groups, positions, and oppositions.

Mapping
Stakeholder Relationships

Students draw visuals to represent various hierarchies and groupings among stakeholders.

Using Visuals to Write Original Analytical Thesis Statements

Students use maps to verbally articulate relationships between stakeholders that may not obvious to the casual observer.

Digital Mapping Tools Used: Coggle, Powerpoint Smart Art

PROBLEMS:
1. Students default to simplistic, formulaic, and unoriginal thinking and writing in college.
2. Instructors assume students can easily execute higher-order thinking skills like analysis, without explicit instruction.
3. Thinking skills and knowledge transfer is limited.

According to a 2014 study by the AACU, while more than 80% of employers recognize critical thinking and analysis as necessary for success in the workplace, only 26% of employers feel that students are proficient in those skills (Hart Research Associates, 2014).

RESULTS AND RECOMMENDATIONS

• Students moved beyond initial binary thinking about the issue. MORE BRANCHES = MORE COMPLEXITY.

• Thesis statements were grounded in real-world context and reflected student’s original thinking based on their analysis of the patterns in the research.

• Student feedback on mapping was positive and indicated they would use this visual tool in other courses.

• Provide direct instruction on how to create a variety of maps early in the term and use the maps at various stages of a research project.

• Have students explain the organization of their maps so they can verbalize the visual representation of their initial thinking.