Visualizing the Analysis: Using Infographics to Augment Critical Thinking Skills

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Introduction – Critical thinking has been noted as an important outcome of an undergraduate education at Texas A&M University (Loftin, 2010) as well as an important component of life-long learning and professional success (Halpern, 1998). To develop critical thinkers, critical thinking components must be intentionally integrated into course content (Beyer, 1987). Additionally, infographics are becoming an important communication medium for communicating in the fast-paced, information-driven society. Therefore, an assignment designed to increase students' analytical and critical thinking skills was integrated into a sophomore-level course as an agricultural issue analysis visually presented using an infographic.

How it works – Before beginning the agricultural issue assignment, students completed the communication style assessment (Hartman & McCambridge, 2010, 2011) and learned about critical thinking concepts (Paul & Elder, 2014). The communication style assessment provided students with a profile of how they communicate and how to effectively interact with others. Then, during week six, the instructor spent three, 50-minute class periods outlining critical thinking components and discussing research. First, the students learned how to find and analyze credible and reliable information. Second, the instructor provided an interactive lecture based on thinking critically about feeding nine billion people by 2050. Students analyzed the issue using Paul and Elder's (2014) critical thinking components. Third, the students developed their ideas about feeding the world and thought about the issue using the scaffolding process, which included drawing and discussing their ideas with a classmate (MacMeekin, 2013).

Week 10 the instructor assigned the agricultural issue analysis and placed the students into groups based on their communication style. The 10 groups included heterogeneous and homogeneous groupings, and each group had five members. The agricultural issue assignment included four steps:

1. **Identify an agricultural issue and target audience:** Students identified an issue and described the target audience, which was the students in the course. The instructor did not turn down any issues because the importance of the issue was up to the group. The students provided a description of the audience's demographics and psychographics along with a statement about their issue, which included how they identified their issue. The audience analysis was 20% of the assignments grade.
2. **Analyze an agricultural issue:** Students included facts and evidence to support or refute their issue and creatively designed an infographic that provided graphics and text that answered critical thinking questions (Paul & Elder, 2014; Stedman, 2015) related to
    - Interpretation (categorize, clarify, decode significance)
    - Analysis (examine ideas, analyze arguments and assumptions)
    - Evaluation (assess claims and arguments, assign value)
    - Inference (find alternatives, draw conclusions, make recommendations)

    The critical thinking involved in the analysis was the most intensive part of the assignment because students struggled with creating precise infographics that were not text heavy. They struggled with presenting their analysis as an infographic and not as a written research paper. Many of the groups had several iterations of their infographics, but all of them were satisfied with their projects at the end. The issue analysis was 30% of the assignment grade.

3. **Discuss an agricultural issue:** Each group presented its issue and analysis, which included the infographic and the information collected as part of the research process. Presentations were 12 minutes, seven minutes for presentation and five minutes for questions, and accounted for 25% of the assignment grade. Each group spoke from their infographic and developed two questions designed to create discussion about their issue.
4. **Participation in discussions:** In addition to the 12-minute presentation, students were required to attend class and participate in their classmates' presentations. Participation was worth 25% of the assignment grade.

Results to Date/Implications – The assignment challenged the students because, to effectively present an issue using an infographic, they had to critically analyze their issue. In reflection, students noted that the agricultural issues assignment required them to think critically, which helped them to see the issue from different perspectives. Students' ability to see an issue from various angles was evident during the presentations.

However, while working on the assignments, students faced a variety of challenges. Although they like to consume information in infographic format, many of them struggled to develop their own infographics using factual, concise information. When faced with group challenges, they relied on the communication style assessment to help them interrupt their group members' behaviors and communication actions. The assessment helped them to understand how to work with others and how to accept others in working environments such as the ones they were in. Another real struggle for the groups was understanding that it is OK if more than one answer exists—realizing that every issue does not have a textbook answer was tough for them.

The students enjoyed creating discussion questions and noted that it was one of the hardest parts of the assignment. They believed themselves to be more educated about their issues and believed they could provide more accurate information related to their issues. At the end of the assignment, students anecdotally noted that they had never been taught how to think critically, that they overestimated the assignment and the critical thinking process, and that thinking critically was not as hard as they had made it out to be. The students' infographics were published on the Department's social media platforms as a way to participate in agricultural information dissemination and to assist the social media coordinator with content curation.

Future plans – The instructor plans to continue using the assignment to intentionally integrate critical thinking components into the course content but not without the following adjustments:

- Place students into heterogeneous groups of three.
- Have longer presentations at the end of the semester because many of the groups had engaging discussion questions that sparked conversation.
- Integrate a pre- and post-assessment of critical thinking.

Cost/Resources needed – The resources included time and money. First, one week of the course was devoted to teaching students how to think critically and conduct research related to an agricultural issue. Second, the program purchased a $39.99 subscription to Pikochart, so the students could create the infographics. A free version of Piktochart is available, but the free version does not allow users to print high resolution graphics. Third, four class periods at the end of the semester were devoted to issues presentations.

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