Providing Annotated Examples Increases Science Learning

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Providing Annotated Examples Increases Science Learning

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Background & Goals
Background:
- Science 101 (SCI 101) is a first year seminar class that incorporates UNLV’s 5 University Undergraduate Learning Outcomes (UULOs) (See Resources for link)
- A “high stakes” poster project (worth 33% of total grade) addressing an ethical question in the sciences (of the student’s choice) is assigned to improve scientific information literacy and achieve multiple UULOs
- Students consistently score low in the areas of application of scientific results, critical analysis of results, proper citation usage, and poster design (See Figure 1)
- I developed an example poster (Figure 2) in the transparent instructions (Winkelmes, 2014) to increase the transparency of assignment instructions (Winkelmes, 2014)

Methods & Results
Methods:
- Transparent instructions (Purpose/Task/Criteria) given on Webcampus in 2014 without example poster (See Resources for more information)
- Developed and verbally annotated example poster (See Figure 2) in Fall 2015
- Compared Fall 2012 posters (n=50) to Spring 2014 posters (n=24) and Fall 2015 (n=50) using a 5 point scale
- 5 (Mastery) to 1 (Failed)

Results & Resources
Results:
- Student performance increased in the areas of citation use and format, scientific results, critical analysis of results, proper citation usage, and poster design (See Figure 2) in Fall 2015

Future Directions and Suggestions:
- Do not emphasize a single, printed example
- Use at least 2 annotated examples
- Allow online access to the examples

Potential Challenges & Applicability
Benefits:
- Providing freshman-level students with a verbally annotated example of a high stakes assignment:
  1. Expanded the application of scientific, peer-reviewed results
  2. Improved thoughtful analysis of results
  3. Increased proper usage and formatting of citations
  4. Reduced design flaws like the use of large blocks of text (Figure 4)

Potential Challenges:
- Plagiarism:
  - With emphasis on only 1 example, 10% of students copied the design &/wording too closely in 2015
  - Providing students with a printed annotated example in the Fall 2016 resulted in even more students using it as a template (42% or 15 of 35 groups copied parts of the wording)

Limits on Intellectual Breadth/Creativity:
- Unknown whether the annotated example would negatively impact critical thinking in higher level course assignments

Other Pedagogical Tools Are Necessary:
- The example poster was only one piece of providing Annotated Examples Increases Science Learning

http://www.unlv.edu/provost/teachingandlearning

Example of an annotated STEM paper:
http://www.unlv.edu/provost/transparency

Resources:
http://www.unlv.edu/provost/teachingandlearning

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