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Undergraduate research: eliminating the drinking from the firehouse effect

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Including undergraduates in research is an increasing trend in many programs of agriculture and natural resources across the United States. As teachers we struggle with how to introduce the most important concepts without overwhelming students in the process. Aavudai Anandhi, an assistant professor of agronomy at Kansas State University, developed a technique to understand complex topics when reading secondary research. She developed this technique in order to help her when researching for her dissertation, but she has continued using the technique herself and teaching students in her lab the technique too. She has noticed that students grasp the major concepts quicker and are able to interpret what they are reading better. This has resulted in her ability to keep students working in her lab for longer, because they feel empowered by understanding the purpose in what they are doing.

In fall of 2012, Anandhi shared this technique with Lauri M. Baker, an assistant professor in agricultural communications at Kansas State University. She adapted the technique and implemented it with her undergraduate students working on her research and those completing independent studies in research. Baker noticed the same results. Students grasped concepts quicker, they referred back to the technique throughout the research process, and were able to demonstrate greater understanding of the material. This success in a social science setting indicated to Anandhi and Baker that the technique works well for researchers at multiple levels of expertise and in a variety of disciplines. This inspired the pair to share this as a teaching tip with NACTA members in this format.

The technique itself is simple, but clearly effective. The process begins with students gathering all of the scholarly articles they can find on an assigned topic. The teacher will need to introduce the student to the concept of scholarly articles and show them how to find them within the university system. Next, the teacher asks the students to spend no more than five minutes reading each article. This is a “skim” reading for the most important points. As the student skims these articles, they put information about the articles into a research chart. The titles of the columns in this chart will vary by discipline, but columns may include: article title, subject, method used, specific subject and/or region investigated, theoretical base, in-text citation, jargon used, etc. It may be beneficial to you and the student to break the chart up into multiple sessions. A possible suggestion for how to break this up is by weeks. For example in week one the student could just read the abstracts of the articles and fill in the following:

| Article Title | Purpose/Objectives/Hypotheses | Method | In-text Citation |
|---------------|-------------------------------|--------|------------------|
| | | | |

Then, the next week the student could proceed to filling in more of the chart. This time the student would move beyond the abstract to find the following information (still spending no more than five minutes spent reading each article):

| Region | Population | Method Details/Sampling | Analysis | Theories Used or Jargon/Key Terms |
|--------|------------|----------------------------|----------|--------------------------------------|
| | | | | |

After the student has completed the chart, they look back at the results and are able to realize what has been studied on a particular topic in the past and what methods have been used to address the subject. This process clearly outlines where there are gaps in research and where there are common themes of methods utilized and jargon specific to this subject area. Next, students are encouraged to research any terms they don't understand, including methods of analysis that are a mystery. From this chart, the student is now asked to go back and read the articles in their entirety. This time around the students are not overwhelmed because they now know the terms and concepts. After reading all articles thoroughly, the student is asked to make any updates to the chart. Now, the student can begin writing a review of literature with confidence, while referring to the chart. At this point in the process, students are able to identify research objectives or questions based on gaps in the literature. The students are also able to begin working on a faculty member's research, knowing the purpose and direction of the research through this technique.