# Student Worksheet: Analyzing a Journal Article

***Please read the assigned journal article and answer the following questions. Review the "Paraphrasing" module as needed to help you understand how to paraphrase to avoid plagiarism.***

**Your name:** Drimba Alexandru **Date:** 15.12.2019

**Journal article title:** A real-time wireless smart sensor array for scheduling irrigation

| Step 1. What is the purpose/hypothesis/aim/objective of the study? | |
|---|---|
| **a. Write down the exact statement in which the authors describe what they were testing. (Hint: This information may be provided in the article as a purpose statement or as a hypothesis). Include quotation marks around the exact wording, and indicate page number(s).** | "A prototype real-time, smart sensor array for measuring soil moisture and soil temperature that uses off-the-shelf components was developed and evaluated for scheduling irrigation in cotton." - page 2, Abstract |
| **b. Now describe the purpose of the study (as you understand it) in your own words.** | The study's purpose was to develop and test a relatively cheap irrigation scheduling system, by using off-the-shelf components to create a distributed network of sensor nodes that monitor soil moisture and temperature. |
| **c. What was the "gap" in the research that the authors were trying to fill by doing their study?** | They tried to create an irrigation management system that, unlike previous attempts, provides real-time wireless access to the collected sensor data, is cheaper, more scalable, is not just a theoretical model, and requires minimal maintenaince and inspection. |

| Step 2. What is/are the major finding(s) of the study? | |
|---|---|
| **a. Make some notes about the authors' <u>major</u> conclusions or findings as written in the article. Include quotation marks whenever you use their exact wording, and indicate page number(s).** | "The smart sensor array reliably recorded and transmitted the readings of the Watermark® sensors and allowed us to successfully implement our irrigation scheduling protocol." - page 5, Sumarry |
| **b. Now write those conclusions (as you understand them) in your own words.** | The most important conlusions were that the proposed prototype successfully implemented a more efficient and performant irrigation scheduling than the traditional approach, by significantly minimizing the soil water tension in non-rainy periods. |
| **Step 3. How did the authors test their hypothesis?** | |
| **a. Briefly summarize the main steps or measurements that the authors used in their methods. Try to explain in your own words as much as possible.** | The authors tested their smart sensor system prototype in a 2.3ha cotton field, during May-September 2004. They compared soil water tension levels between two sides of the same field, one implementing a traditional irrigation scheduling, and one implementing the proposed system. |
| **b. Do the authors suggest any problems or limitations with their methodology? Do you see any problems or limitations with their methodology?** | A limitation of the system is that the sensors can transmit only up to 0.8 km, limiting the total area that a single data logger can collect data from. A problem encountered over their preliminary testing is that biomass greately reduces the transmittion range. This has been solved by placing the RFID tag on top of a 1.2m pole. |
| **c. How did the authors analyse their data? What test/s did they use?** | They analyzed data by collecting sensor values from multiple sensor nodes, and then comparing those values to (a) the data read from the sensor's manufacturer's handheld digital meter and (b) values from the area of the field that was using the traditional irrigation method. |

| Step 4. How reliable are the results? | |
|---|---|
| **a. Do the authors suggest any problems with the study that could lead to unreliable results?** | The authors stated that their system is best used in conjunction with a center-pivot variable rate irrigation system, suggesting that their system will not yield reliable results when using other irrigation systems. |
| **Step 5. Based on your analysis, are the claims made in this journal article accurate?** | |
| **a. Do the conclusions made (about the results) by the author make sense to you? Are the conclusions too broad or too narrow based on what was actually done in the study?** | The conclusions do make sense, but I consider them too broad as compared to the number of test presented in the study. I think the system should be tested on more types of soil, crops and irrigation systems to prove its efficiency. |
| **b. Based on the accuracy of the methodology and the reliability of the results as described in Steps 3 and 4, do you think the conclusions can be believed?** | Yes, they can be believed, but I think further testing is required to prove the conclusions can be applied to a broader range of testing environments. |

| Step 6. What is the importance of this scientific work? | |
|---|---|
| **a. Write (in your own words) the significant contributions of the experimental work in this journal article as reported by the authors.** | One of the most significant contributions presented in this article is the creation of sensor nodes using off-the-shelf components, such as RFID tags, temperature and moisture sensors, microcontrollers and other accesible components. |
| **b. Re-read your notes and explain why you think this is**<br>○ **a strong or weak scientific article**<br>○ a **strong or weak scientific study** | I think this can be considered a strong article, because it introduces a new proposed method, which is proven to be successful and that achieves good results.<br>I think this can be considered a strong scientific study, because it introduces an original idea, but also compares it with already existing methodologies. |

## Resources for students:

1. If you are struggling with plagiarism and paraphrasing, then refer to our online "Paraphrasing" module.
2. If you are struggling with figuring out how to read the information, then refer to the section on active reading in the "Learning from Textbooks" section of A Guide for University Learning.
3. If you want to learn how to find more academic information on other science topics, then refer to our online "Searching for Scientific Journal Articles" module.