

# **PS The Rain Garden Project: Place-Based Education, Service Learning, and Scientific Literacy\***

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## **Abstract**

Hands-on, place-based learning in conjunction with service learning can be used to engage non-science majors in introductory science courses. The combination of service learning and place-based teaching methods can provide a framework for an appreciation of the usefulness of scientific literacy. Non-science majors enrolled in an introductory environmental science class on the Winter Haven, FL campus of Polk State College participated in a semester-long, experiential service-learning project that focused on local water resource issues. The campus is on a recharge area for the Floridan Aquifer. The sustainability of the aquifer has received recent publicity and the availability of freshwater resources is relevant to the students' quality of life. The City of Winter Haven Water Resource Management Plan calls for the use of rain gardens to capture runoff and increase rainwater infiltration into the Floridan Aquifer.

Students enrolled in Introduction to Environmental worked in small groups with Winter Haven Resource Management staff to design and build rain gardens on campus. The rain garden project gave students opportunities to apply classroom concepts and prior knowledge as well as to build knowledge through conversations centered upon local water resource issues. The exchange of ideas within the framework of the project's personal relevance created an awareness of the usefulness of scientific literacy and the role scientific literacy can play in solving problem. Service learning gave students an opportunity to reflect upon their civic responsibility and the role of scientific literacy in civic planning.



# The Rain Garden Project: Building Scientific Literacy through Service Learning

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## Abstract

Students enrolled in an introductory science course at a community college participated in a semester-long service learning project that addressed local water resource issues. The students worked in small groups with staff from the City of Winter Haven Natural Resources Management Division to site, plan, and build rain gardens, which catch runoff from impervious surfaces and encourage infiltration of rain water. The project gave students the opportunity to apply classroom concepts and use conversations to solve concrete problems as well as the opportunity to work with local scientists. The exchange of ideas within the framework of the project's personal relevance created an awareness of the usefulness of scientific literacy and the role scientific literacy can play in solving problems.

## Introduction

Students enrolled in an introductory science course at Polk State College (Winter Haven) participated in a semester-long, hands-on, service learning project that addressed the sustainability of the local aquifer. The campus is located on a recharge area for the Floridan Aquifer. The Aquifer provides fresh water for central Florida and the long-term sustainability of the aquifer has received publicity. This is an issue that will impact the students' future quality of life.

Students worked in small groups with staff scientists from the City of Winter Haven Natural Resource Division to site, design, and build rain gardens on campus. Rain gardens are designed to catch rain water running off from impervious surfaces and allow rainwater to infiltrate. The project gave students the opportunity to apply classroom concepts and use conversations to solve concrete problems. The students had the opportunity to work and converse with local scientists. The exchange of ideas within the framework of the project's personal relevance created an awareness of the usefulness of scientific literacy and the role scientific literacy can play in solving problems.

## Methods

This qualitative research was a single case study conducted during Fall Semester, 2013. Data was collected through field notes, online focus groups, students' reflection papers, and open-ended interviews. Themes were identified and coded using the method of Ryan and Bernard (2003). Themes emerging from the data were compared using a matrix and triangulated to verify validity using the methodology described by Creswell (2012) and Whitaker and Albertson (2011). To improve trustworthiness of the data, students were not graded on any assignments used as a data collection instrument. Students who chose not to participate in the research, participated in all aspects of the project

This study was limited by time, place, and institution. The participants were enrolled in one class at one community college.



## Results

Students were asked to describe their prior knowledge about the Floridan Aquifer. One comment that summarized most students prior knowledge was, "I knew nothing about the Floridan Aquifer. I assumed Florida did not have a water problem because it is surrounded by water."

Five themes emerged from the data.

- Students internalized and understood class concepts through hands-on application to a concrete problem.
- Students built scientific literacy through conversations and hands-on application of class concepts.
- Students perception of science and their ability to use science changed during the project.
- Students valued working with local scientists.
- Through service-learning, students began to appreciate the need for civic responsibility and a water ethic.

## Conclusion

- Students became more confident in their ability to apply the correct classroom concept to solve problems and understood that they could use scientific concepts to solve problems.  
"I see that the garden our group made is storing water and it is not running off into the lakes or roads. More of our water is now infiltrating into the ground."
- Students participating in the project talked and wrote about how the hands-on nature of the project, teamwork, and conversations made scientific concepts seem more relevant to them. The students said that they built knowledge through sharing ideas and conversations.  
"When we were working, we talked about how this (local, freshwater resources) can affect our lives, and this lead to other things that can affect our lives like health problems."  
"The hands-on work helped me understand that you don't have to be a scientist to make a difference."
- Students began to believe that they could use science to solve problems.  
"Working on this project made me realize that I could use science to solve everyday problems. One way I could use a form of science to solve problems is to take each problem step-by-step and make a plan on how to solve it and stick to it."  
"My perception of science has changed. I always looked at science as atoms, space, and experimenting. This project showed me something different. I think critically about decisions."
- Working with local scientists made a difference in the way students thought about science.  
"Being able to communicate with people who spent their whole lives working on water management and conservation is really positive and it gives you chance to ask those specific question that you might not otherwise get to ask."  
"The project meant more because we had people come in to talk to us who actually worked with water and problems like this ."
- Students began to think about the need for civic responsibility and the need for a water ethic.  
"It (service-learning) put a purpose in the project. I am doing something form my community."  
"Water is the most valuable resource on the planet. Its time we started treating it like that."

## References

- Creswell, J.W. (2002). *Educational research: Planning, conducting, and evaluation quantitative and qualitative research*. Boston, MA: Pearson.
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