

Marsh Madness: An Education Adventure focused on Wetland Environments



Robert Doyle¹, Melissa Mullins¹, Marty Harvill¹, Nora Shell² & Tom Conry²
¹Baylor University, Department of Biology, Center for Reservoir and Aquatic Systems Research
²City of Waco, Water Utilities



Introduction

- 2006 -2012: U.S. Department of Education GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) funding
- Worked with students for six years beginning in the sixth grade, in a cohort approach
- Field science experiences at the Lake Waco Wetland, a 180-acre wetland and research and education center
- Teacher preparation and professional development elements were also included

Objectives

GEAR UP primary goal: to significantly increase the number of low-income students who are prepared for meaningful interaction with colleges and universities

Program-specific goals:

- To provide students with field and laboratory experiences in a wetland environment
- To develop rigorous biology and environmental science based content related to grade-appropriate targets.
- To stimulate interest among students in post-secondary education by ongoing interactions with environmental professionals



Methods

Hands-on science projects, working together in groups on science projects, and working on science-related activities not for schoolwork are associated with higher student achievement in science.¹

Marsh Madness field experiences incorporated all of these elements, and were designed by Baylor faculty and staff in conjunction with teachers and school district science specialists to address cohort needs. Students completed a different field experience each semester, for a total of 11 over the course of the project.

Teacher workshops included Saturdays in the Swamp and a weeklong Summer Swamp School each year for cohort science teachers.

Results

Assessment after Year 4 of the project showed no difference in participation by gender, or under-representation by race/ethnicity (Figures 1 and 2). However, because participation was voluntary, students or campuses did self-select for greater participation in the program by academically higher performing students (Fig. 3).

Teacher attitudes regarding the importance of student-directed research changed as result of completing their own research projects in Summer Swamp School (Fig. 4). However, there are barriers to implementation of student research in classrooms (Table 1).

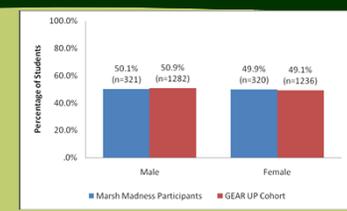


Figure 1. Participation by gender.²

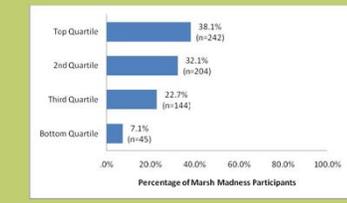


Figure 3. Class rank of participants.²

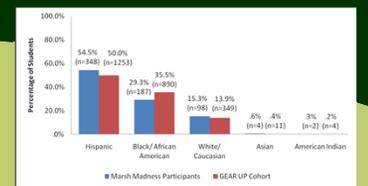


Fig. 2. Participation by race/ethnicity.²

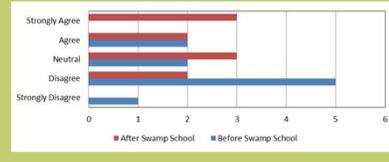


Fig. 4. Teacher response to the statement: "All my students learn science best when they work on self-initiated research projects for which students must identify the research questions." (N=10 teachers)³

Table 1. Teacher perception of barriers to student-conducted research³

Potential Challenges for implementing scientific research projects in classroom	%teachers that reported challenge		
	Campus A	Campus B	Campus C
Not enough time to do project based inquiry	66%	50%	100%
Project based inquiry is not aligned with the TAKS	0%	0%	0%
High pressure to prepare students for the TAKS	66%	50%	66%
I cannot find a suitable project for my students	33%	0%	33%
My students are not ready for project based inquiry	33%	50%	0%
My school lacks resources	66%	0%	33%

References

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2. GEAR UP Waco Year 4 Interim Report, Program Implementation and Effectiveness. The Academy for Educational Development Center for Education Policy and Practice, Washington, D.C. July 2010.
3. GEAR UP Waco Swamp School 2011 Pre and Post Survey Preliminary Findings Report (Draft). FHI 360, July 13, 2011.