PEIL Project Final Report Environmental Restoration and Monitoring: Service Learning as a Tool

Faculty from three departments in separate colleges at CSU East Bay were involved in the project, and each faculty member was to incorporate environmental restoration service learning activities into their courses and assess the impact of these activities. Faculty members and courses that were redesigned to include service learning activities are shown in Table 2.

As the project developed and matured through the 2014-2015 academic year, students in REC 1000 Introduction to Recreation worked on research projects related to the California Nursery Historic Park, in addition to learning about environmental restoration at Tule Ponds at Tyson Lagoon, and engaging in restoration activities at the Masonic Home site. Students in TED 5391/5392/5393 Instructional Methods are working teachers in K-12 classrooms during the day, so due to scheduling constraints completed service learning activities of their choice at other times (e.g., on weekends); one class meeting was ÒcancelledÓ to allow students to engage in service learning activities and reflect on their experiences. Students in ENSC 2401 Environmental Biology Laboratory and ENSC 2900 Field Activity in Environmental Science learned about environmental restoration and local environmental history at the Tule Ponds at Tyson Lagoon and California Nursery Historic Park, and engaged in environmental restoration activities at the Masonic Home.

Figure 1. CSU East Bay students performing research for their REC 1000 projects at the Californi Historic Park.

Science literacy through participation in an active science experiment was also a key component of the project. In addition to the educational research component through the PEIL program, the project also focused on ecological research in order to study the process of reforestation. While approximately 40 trees and plants were planted and mapped by CSU East Bay students over the course of two quarters, the ecological research component of the project is still in its infancy due to time, material, and statistical constraints. Nonetheless, the project is well positioned to continue planting and expand ecological research efforts in the future, over the additional span of the restoration. Students in environmental science courses and REC 1000 were exposed to, and participated in, the design and implementation of a real-world, open-ended science experiment. Feedback was sought from students regarding their perception of ÒrealÓ science (as contrasted with ÒcookbookÓ science experiments commonly found in K-12 and even college laboratory settings).

Table 2. Faculty at CSU East Bay involved in course redesign around service learning and environm
as well as the departments, colleges, and courses targeted in the project.

Faculty member	Department / college	Course(s) redesigned
Dr. Mary Fortune	Hospitality, Recreation, and Tourism (College of Education an Allied Studies)	¥ REC 1000 Introduction to Recreation
Dr. Michael Massey	Earth & Environmental Sciences (College of Science)	¥ ENSC 2401 Environmental Biology Laboratory ¥ ENSC 2900 Field Activity in Environmenta Science
Dr. David Stronck	Teacher Education (College of Education and Allied Studies)	¥ TED 5391, 5392, 5393 Instructional Metho for Single Subject Classroom

Assessment

Assessment of the projeõs impact was conducted using pre/post attitudinal surveys, qualitative written reflection assignments, video recordings, and transcripts of the video recordings. The natura interactions captured by the video recordings are particularly important, since they document natural interactions without potential positive bias induced by course assignments or surveys (even though surveys were intended to be anonymous, and all feedback assignments are anonymized prior to analysis).

Preliminary

Figure 2. CSU East Bay students planting trees as part of the Masonic Home reforestation pr

Results of quantitative pre/post attitudinal assessments are pending at the time of writing, but responses were highly positive (both before and after service learning activities, so their difference might not be statistically significant). Qualitative assessments provide the majority of the data for assessing student impact.

One unanticipated difficulty was that of students who experienced the service learning activities in multiple courses (specifically, ENSC 2401 and ENSC 2900). This difficulty was addressed by placing experienced students in leadership roles, and by designing other activities (such as mapping the plantin

ENSC 2900 is only held on Fridays, while REC 1000 was scheduled for Tuesday and Thursday afternoons; REC 1000 students and ENSC 2900 students were also unable to collaborate as a resu of scheduling constraints. Scheduling was a major, but unanticipated, barrier to interdisciplinary service learning experiences envisioned in the design of the project.

Meeting course learning objectives while providing in a rich, immersive service learning experience was also a challenge. For example, normally ENSC 2401 Environmental Biology Laboratory follows the content in the associated ENSC 2400 Environmental Biology classroom course, with conventional laboratory activities supplementing and expanding on material introduced in ENSC 2400. The service learning component was extraordinarily valuable for students as a learning opportunity, but the course content was much more loosely connected to the ENSC 2400 course material. In order to address this shortcoming, students were specifically guided, via in-class discussion, to highlight areas of the service learning experience that were related to course content (e.g., drought adaptation, plant physiology, ecology, etc.)

On a related note, a few students noted in their qualitative reflections that they felt course content lacked a certain amount of rigor, as a result of the service learning experience. These students noted that they would have preferred a more ÒconventionalÓ learning experience. Indeed, this is an area for further study: in a conventional class, perhaps ten concepts/skill areas/knowledge areas are explored over the course of a ten-week quarter; perhaps students retain a certain amount of the knowledge and skills explored in class (say, half). Even if fewer concepts are explored in a service learning context, if retention is improved, the service learning component was at least not harmful to student learning, and may provide other benefits (e.g., increased motivation or engagement).

The Role of the PEIL Program in the Project

This type of project is perhaps not typical for educational interventions, and is not typical even among PEIL projects. Rather than focusing on redesigning existing courses or creating new courses that incorporate pedagogical innovations, the focus of this project was to create community partnerships

Appendices

Appendix A: Examples of redesigned course syllabi

Appendix B: Examples of qualitative feedback assignments

Appendix C: Examples of other project-related course assignments

Appendix D: Poster presentations

ENSC 2401 – Environmental Biology
Winter 1

This course is the introductory biology course for environmental science majors (in conjunction with ENSC 2400, the separate theory course).

arrangements in class, and

Please contact the instructor if you have any questions.

One goal of the pilot project is to help improve science instruction, interdisciplinary instruction, and educational opportunities at CSU East Bay. You may have the opportunity to meet and work with students from Hospitality, Recreation and Tourism, as well as students who are pursuing degrees in Educational Leadership.

Since the educational research study is an integral part of the course, the expected impact of the study on you is minimal; it should require minimal extra time or effort. Please see the Informed Consent form for more details, and feel free to ask if you have any questions!

This should be a very exciting quarter, and I'm looking forward to working with you all!

The class is broadly organized around four topics:

1) Experimental design,
2) Evolution,
3) Species and ecosystem diversity, and
4) Ecology

Week	Topic	Assignments

!

"#$!%&&&!'$()*)()#+!,!-./01234!45!367892:!

!

; 742!	$<7..!45=>3!	'..>98?284!	"27@>89.!	#A284.BC462D!
E##F!%!	E2<35?2!IJ0			
G'"!H%!				
I!'J"!K!				

/8@2D9D7@/742!D2.27D36!46D5/96!35<<234>89!78@!787<Qe>89!@747T!!!

(62!J#)R!(#'Gc!!;DT!;7A>@!+4D583NP!;DT!G7DQ!Z5D4/82!78@!;DT!G>N2!G7..2Q!-$+gP!#7.4!`7Q:P!;DT!
i5Q32!`</2S5D@P!JD2.>@284!5S!462!G746!B!+3>2832!a/3<2/.P!78@!G.T!R7/D>2!"592D.P!"23D274>58!
+/=2D>8428@284P!ZD2?584!J7DN.!78@!"23D274>58!;2=7D4?284T!!!

c>4Y/>'/3>#$%<b>$f2/(5!0/×@!7!3588234>58!024L228!7..>98?284.!78@!+2DA>32!
R27D8>89!L62D2!.4/@284.!@5!35??/8>4Q!.2DA>32,D2<742@!734>A>4>2.!>842<<>9284<Q!07.2@!58!
>8.4D/34>58!4674!462Q!<27D8!@/D>89!462!d/7D42DT!!'85462D!957<!>.!45!>?=D5A2!.4/@284!
289792?284P!D24284>58!78@!<27D8>89!46D5/96!.4/@284!=7D4>3>=74>58!>8!D2.27D36!78@!
@2A2<5=?284!5S!D23D274>58B<2>./D2!734>A>4>2.!74!462!$7<>$5D8>7!a/D.2DQ!V>.45D>3!J7DN!78@!78!
28A>D58?2847<!D2.45D74>58!=D51234c!462!D2S5D2.474>58!5S!874>A2!57N!L55@<78@.!58!@29D7@2@!
<78@.T!+/==5D4>89!4674!678@.,58!<27D8>89!5==5D4/8>4>2.!4674!67A2!kD27<!L5D<@I!>?=734!58!
<537<!35??/8>4>2.!.4D2894628!462!<27D8>89!2j=2D>2832T!
!
f<Z/4%%Xc5B<5!%/
&=-)/GD6-7)/C77)77I)E,/J(E+(\(+6C*K/ /
&=<XY/76-\)8/J(E+(\(+6C*K/
&

@>A2D.2!427?.!78@!35?? /8>4>2.T!!
UT!!+/.47>870><>4Q!'34!D2.=58.>0<Q!78@!./.47>870<2!74!<537<P!874>587<P!78@!9<507<!<2A2<.T!!
bT!!+=23>7<>e2@!#@/374>58T!;2?58.4D742!2j=2D4>.2!78@!>8429D74>58!5S!>@27.P!?2465@.P!!
4625DQ!78@!=D734>32!>8!7!.=23>7<>e2@!@>.3>=<>82!5S!.4/@QT!!
!!
VC+J

XT&Y!!!g8@2D.478@>89!5$!462!>842DD2<74>58.6>=!024L228!<2>./D2!0267A>5D!78@!462!874/D7<!
28A>D58?284T!!-$67=42D.!bP!%K:!
XT&b!!!g8@2D.478@>89!5$!462!$5<<5L>89!7.!462Q!D2<742!45!D23D274>58P!=7DN!D2.5/D32.!78@!
<2>./D2!.2DA>32.T!!-$67=42D.!KP!\P!%X:!XT&bcK!!!JD5$2..>587<!CD978>e74>58.!-$67=42D.!KP!bP!\:!
XT&\!!!g8@2D.478@>89!5$!246>37<!=D>83>=<2.!78@!=D5$2..>587<>.?T!!-$67=42D.!HP!YP!\P!%X:!
XT&X!!!g8@2D.478@>89!5$!462!>?=5D47832!5$!?7>847>8>89!=D5$2..>587<!35?=242832!78@!462!
7A7><70<2!D2.5/D32.!$5D!=D5$2..>587<!@2A2<5=?284T

.4/ ? =2@!>S!Q5/!58<Q!.65L!/=!5832!7!L22N!
!
g8>A2D.>4Q!3<7..2.!D2d/>D2!@>.3>=<>82,,,+2<S,,,;>.3>=<>82!a5!582!L><<!02!47N>89!D5<<!78@!Q5/!
@58p4!822@!45!.65L!/=!7!.=23>S>3!4>?2!f5/!@5!65L2A2D!822@!45!35?=<242!7..>98?284.!58!
4>?2!78@!47<N!45!462!5462D.!>8!Q5/D!9D5/=!@>.3/..>58.!>8!7!4>?2<Q!?7882D!C$428!4>?2.!>4!
58<Q!47N2.!U,,,%&!?>8/42.!45!3623N!462!@>.3/..>58!057D@!78@!D2.=58@!45!5462D.!>8!Q5/D!
9D5/=!' 4!5462D!4>?2.!>4!L><<!47N2!?/36!<5892D!4>?2!45!@5!462!7..>98?284.!S5D!3<7..P!.5!
58<>82!>.!854!27.>2DP!>4!>.!1/.4!?5D2

A ig e #3: Reflections o nce Learning Outside of the Classro

And now for something completely different…

Ca one: the Course, Your Learning

Well, we're finally at the end. This was hopefully a non-standard biology lab course, and a memorable experience for you. For the final assignment in the class (ahem, and for 10% of the final course grade), I'd like for you to spend some time thinking about and reflecting on this opportunity, and to write your thoughts out for me.

Note that there are no "correct" answers, I want to hear your honest thoughts. As such, I will not be grading what you write for "correctness" or anything like that. Instead, I will be evaluating you based on the completeness and thoughtfulness of your responses.

The assignment grade will be assigned as follows:

;

; and,

I hope that this assignment will help me understand your viewpoints on this quarter's activities, the things you learned, etc., so please feel free to be honest.

I would like you to reflect on, and respond to, the following sets of questions (you don't have to respond to every sentence, these are just some ideas to get you going…):

1) What we

200pts
DUE THURSDAY, JUNE 4 BY 2:00pm
Location: California Historic Nursery
Length of presentation: Not to exceed 10 minutes
Format: Poster, Video, PowerPoint Presentation, other (check with Instructor)

Each Learning Community team will select a problem(s) or opportunity (ies) related to the California Historic Park and Nursery and Service Learning. Poster presentations should be creative and include active learning ideas related to park and recreation events and activities. Group projects must be accompanied with a short written essay with a complete Bibliography of EVERY place you gathered information AND who did what. Using information without giving credit is PLAGARISM. Facts must be supported with citations (APA format). You will present your project in class and post on the discussion board. Please include in your presentation a write-up of your thoughts and reflections as related to the course learning objectives. For full credit you must use the Essay Rubric and 7 C's of Communication and comment on 2 other posts on the Discussion Board.

1) Poster guidelines - http://guides.nyu.edu/posters AND http://www.posterpresentations.com/html/free_poster_templates.html. Each team member must speak/present information (a minimum of two minutes).

Mapping the planting area

Today we are going to map th e planting area in two ways: semi-quantitatively , by hand, and using handheld Global Positioning System (GPS) unit.

Making a (not so) simple map

Today, your group will start by making a simple map of the planting area. You will do this using a compass (the compass feature of a smartphone, or of the handheld GPS unit, should do nicely if you donÕt happen to have a magnetic compass with you), a ruler, and possibly a yardstick/meter stick .

Your map should have an arrow indicating North, and a scale for distance.

In order to get started, get in teams of four and orient yourself and your map. The instructor will help you get oriented, so that the North arrow on your map aligns with Òtrue northÓ (or if your compass/map use magnetic north, be sure to clearly mark this fact!)

Once your map is oriented, pick a plant in the planting area, and mark it on your ma p.

can be much more specific (Òthe oak is located on a bearing 272 degrees from the buckeyeÓ). As you can imagine, the latter is much more precise.

North is considered zero degrees (0¡), and bearing proceeds in a clockwise direction from there. East is ninety

Data table

Map

Scale:

ENVIRONMENTAL RESTORATION & RECREATION: SERVICE LEARNING FOR INTERDISCIPLINARY EDUCATION

Mary F. Fortune, Mike Massey, David Stronck & Joyce Blueford

Introduction

This project focuses on service learning activities for: 1) Reforestation of oak woodlands on degraded lands in the East Bay, and 2) Exploration and development of recreation activities at the California Nursery Historical Park (where oak seedlings are being grown). The purpose of the study is to measure educational impact of service learning on students enrolled in Environmental Science and Hospitality, Recreation and Tourism classes winter and spring 2015. Community partners include the Math Science Nucleus, Fremont Parks and Recreation Services, Tri-CED Community Recycling, and Masonic Homes of California.

The oak reforestation scientific research involves planting trees, and selectively protecting them from being eaten (using mesh to isolate them from grazing). Students monitor growth (by measuring height, circumference, counting leaves, etc.) and survival over a number of years. Measurements are simple and concrete, but have great significance in the study of restoration ecology.

Our working hypothesis is that the project benefits students by:

1)!Providing access to active, engaging collaborative service learning opportunities,
2)!Increasing understanding of science and its role in studentsÕ lives, linking learning to tangible benefits for the environment, the university, and the surrounding community
3)!Serving as an opportunity for students to think critically about issues related to environmental sustainability, one of the defining challenges of the 21st

Methods

References

Ecological Restoration and Service Learning: Student Learning and Quality of Life

by Mischa Minkler-Green and Dr. Michael Massey
California State University East Bay
Center for Student Research

Service Learning and ecological restoration were used as modes of educating students in Environmental Biology Winter, 2015 at California State University East bay. A blind study was used to understand:

- Student quality of learning
- Effect on studentsÕ overall quality of life
- Student enjoyment of class

Hypothesis:

Students will learn concepts in environmental biology effectively during ecological restoration service learning project. Being outside and active will increase participantsÕ quality of life.

Methods:

Students enrolled in Environmental Biology lab participated in both classroom learning and outdoor field learning consisting of

- Learning to recognize local native plants, understanding the ecological
- Geographical, and geological history of the region
- Exposure to the concepts of environmental biology through tangible contact with features of the region surrounding CSUEB.

Video footage was taken for the duration of the class.Anonymous surveys were distributed at the completion of the project. Questions were answered on a 1-4 scale, 1 being disagree and 4 being agree. Questions addressed student learning and effect on quality of life below:

- This outdoor service learning experience increased my desire to go outside
- I felt better when we were outside the classroom for class
- I felt like I learned less material being outside the classroom for class
- I felt like being outdoors for class improved my quality of life
- I couldnÕt really see a connection between my personal health and restoration of the natural environment as a result of this class
- My experiences in this class made me want to get into better physical shape

Results:

- Average overall student response regarding outdoor activity was 3.48, with 3 being positive and 4 being highly positive.
- Students also rated the projectÕs impact on their quality of life at an average of 3.48 (with 3 being positive and 4 being highly positive). Students majoring in Environmental Sciences/Studies answered survey higher than other majors.

ÒOh my gosh! We're going to be responsible for their [the trees] lives!Ó

ÒOh my god, IÕm so happy this one (plant) came out perfect.Ó

Student 1: ÒOh you're not going to plant?"
Student 2: "No."
Student 1: "He doesnÕt want to get his hands dirty!"

Discussion:

Surveys had mixed reviews. Most students found the project to be engaging and inspiring, but few reported that they would have learned better in a classroom. It is to be expected that some differences among students would occur, because everyone learns differently. For future classes, more written work to complete in the field may help student engagement for those who prefer a textbook/in-class learning environment. Environmental Science majors were more likely to report enjoyment in course and appreciation for an outdoor learning environment. Quality of life is a broad and open-to-interpretation concept. It is difficult to measure, however, it is comforting to know that one class emphasizing experiential learning, service learning, and ecological restoration can be a positive experience for students. If education can combine service with achieving greater quality of life, we are on the right track.

References:

Center for Student Research, California State University East Bay. Hayward, CA.

to: **info@georgewright.org.** for Proceedings of the Conference

TriCED, a local recycling non-profit has been working with the Masons to reduce their food waste and keep it onsite which totals about two tons per week. Green Mountain Technologies has developed "The Earth Flow" which is an in-vessel system that converts up to two tons of daily organic waste into compost. Shredded woody, green waste and horse manure will be added to the system to so decomposition will produce rich compost ready to be sued in restoration. The design incorporates a fully enclosed vessel and odor control system with an inclined auger for mixing, shredding, and discharging the organic waste. The typical process time for the waste to flow through the vessel is 14 to 21 days.

The Math Science Nucleus (MSN), a non-profit organization that incorporates high-school and college students to help in designing the actual restoration projects will assist greatly in the training of the youth. The MSN has worked on many local restoration projects over the last 15 years using youth to maintain and in some cases design the restoration. MSN has developed strategies that help education students on the science behind restoration. For a complete look at the those projects, please go to http://msnucleus.org/watersheds/index.html.

From a recent symposium on Oak Woodland Management scientists outlined some of the knowledge that is still needed to understand and better manage oak woodlands. One thing they pointed out that oak woodlands often do not respond the way we think they should. The current project is collecting data about the local restoration of the forest. Science based knowledge that provides better explanations of how oak woodland

From a recent symposium on Oak Woodland Management scientists outlined some of the knowledge that is still needed to understand and better manage oak woodlands. One thing they pointed out that oak woodlands often do not respond the way we think they should. The current project is collecting data about the local restoration of the forest. Science based knowledge that provides better explanations of how oak woodland ecosystems function is especially needed. An important tool is a continuously updated, statewide geographic information system accessible to local planners and the public. Documenting the types of trees and use of food waste composting and the techniques we use would help other large restoration projects. An extremely important feature of oaks

students. Teachers and administrators in the five comprehensive high school of the city of Fremont have already indicated their support and interest in participating in the restoration project. A requirement for graduation from these high schools is to do community service.

4. The hands-on experiences will probably inspire many participating students to seek employment in related areas, ranging from growing plants in a nursery to doing scientific research. Work experience using green technologies, e.g., composting may motivate

Benefits from this project include the following: