Early Findings from a Youth-Adult Environmental Service-Learning Program

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Environmental Service Learning Project
Acknowledgements

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  – Curry & CASTL: Alison Baroody, Amy Keegan, Chris Rates, Julia Thomas
  – School Collaborators: Administrators, Teachers, Students and Parents at a local school
  – Community Partners: Lewis and Clark Exploratory Center, Thomas Jefferson Soil and Water Conservation District

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The Need for Engaged Citizens

• American youth need critical thinking skills to resolve environmental issues and engage in behaviors that help the environment (McBeth & Volk, 2009; OECD, 2009).

• Youth have shown declines in personal responsibility for environmental problems and conservation behaviors over the last two decades (Wray-Lake, Flanagan & Osgood, 2010).

• Declines in environmental behaviors and feelings toward the environment from 6th to 8th grade (McBeth & Volk, 2009).
A Call to Action

• United Nations Resolution
  – Decade of Education for Sustainable Development (2005-2014)

• Next Generation Science Standards
  – Released in April, 2013
What is Service-Learning?
Examples of Service-Learning

Does Service Learning Really Help?

Betty Medina-Lichtenstein

Betty Medina-Lichtenstein used to dread the beginning of the school year, when students from colleges and universities around Holyoke, Mass., would descend on her tiny community organization, La Casa de la Raza.

Serving Communities

Bellair Farm

The need of Bellair Farm, nestled in the countryside, and the Greater Boston Food Bank, based in Lynn, Mass., was pressuring, especially after productive winter weather failed to bring an early harvest, and the cold season Neilson had been growing vegetables in the spring turned out to be a disaster. He had to call upon his network of farmers and friends to help him get through the season.

County Schools to Honor Class of 2013 Service-Leaders

May 29, 2013

While all Maryland students are required to complete at least 75 service-learning hours before graduation, many Baltimore County Public Schools students far exceed this minimum requirement - earning as many as 7,500 hours. Among those students who earned the commendable distinction of being the top service-learning leaders at their schools are Sasha Maraj, Dulaney High School, David Gleyzer, George Washington Carver Center for Arts and Technology, Amanda Becker, Loch Raven High School, Jasmine McNeill, Overlea High School, and Madeline Silts, Towsontown High School.
Service Learning Defined

“an approach to teaching and learning in which students use academic knowledge and skills to address genuine community needs.”

-National Youth Leadership Council (2014)
K-12 Service-Learning Standards for Quality Practice

- Link to Curriculum
- Meaningful Service
- Youth Voice
- Exposure to Diverse Perspectives
- Progress Monitoring
- Partnership in the Community
- Reflection
- Sufficient Duration & Intensity

National Youth Leadership Council, 2014
National Youth Leadership Council Standards

• *Link to Curriculum*
  – SL is fully integrated with academic learning.
  – Learning objectives align with school curricular goals or extracurricular objectives.
  – Learning is applied and experiential, fostering students’ understanding the relevance of the material.
National Youth Leadership Council Standards

• *Youth Voice*
  – Students play an active role in identifying community needs and planning service activities.
  – Students evaluate and consider the impact of the project on the community.
  – Adults foster youth ownership of the project.
National Youth Leadership Council Standards

• *Sufficient Duration & Intensity*
  – Enough time and intensity to address community needs and meet project goals.
  – Time allowed for youth to investigate community needs, prepare, take action, reflect, show their learning, measure the impacts of the project, and celebrate their achievement.
  – SL may take weeks or months.
Relevant Literature

• Self-Determination Theory
  – SL matches key psychological needs: competence, autonomy, relatedness (Deci & Ryan, 1985)

• Service Learning Research
  – Meta-analytic work; effect sizes $d$ from .17 to .43 (Celio, Durlak & Dymnicki, 2011; Conway, Amel & Gerwien, 2009)
    – Research Syntheses (Billig, 2005, 2008; RMC Research Corp.)

• Environmental Literacy Research
Context for the Study

- Participants
- Curriculum
  - State Standards
  - National SL Standards
Lesson Sequence

• Define service-learning, discuss engaged citizenship
• Discover needs and problems
• Investigate solutions
• Develop a plan
• Enact solution
• Reflect, celebrate and evaluate
Environment Service Learning Project
Theory of Change

Intervention
High Quality SL

Proximal Outcomes
Environmental Literacy

Distal Outcomes

Classroom Sci. Lessons

Outdoor Sci. Experiences

Adult Facilitation

Environmental Knowledge

Attitude Toward the Environment

Environmental Action Skills

Environmental Citizenship

Interest in Science
Design and Timeline

January, 2013
- Quant
- MSELS
- Science Interest Survey

- Qual
- Student Interview
- Teacher Interview

Feb, 2013
- Quant
- Instructor Logs

- Qual

March, 2013
- Quant
- Instructor Logs

- Qual
- RAFT

April, 2013
- Quant
- Instructor Logs

- Qual
- Reflection

May, 2013
- Quant
- Student SL Survey
- MSELS
- Science Interest Survey

- Qual
- Student Interview
- Teacher Interview
Data Sources

• *Fidelity of Implementation*
  – Student Survey about Service-Learning
    • I was given choice.
  – Teacher Survey about Service-Learning
    • I think that project was important for the group it served.
    • Students were asked to write or think about ways to improve their work
  – K-12 Service Learning Standards
    • Extent to which addressed in each lesson
  – Student Interviews
Measures

• Middle School Environmental Literacy Survey (MSELS) McBeth & Volk (2010)
  
  – Environmental Knowledge
  
  • “Most of the oxygen in the atmosphere comes from: a) insects, b) plants, c) the soil, d) the sun.”

  – Attitude Toward the Environment
  
  • “I love the environment” a) strongly agree... e) strongly disagree

  – Environmental Action Skills
  
  • Select the statement that best identifies the environmental issue described in the passage. (Issue Identification)
Measures

• Middle School Environmental Literacy Survey (MSELS)
  – Environmentally-Responsible Behaviors
    • I have talked with my parents about how to help with environmental problems.

• Student Questionnaire for PISA 2006 (OECD, 2009)
  – Interest in Science
    • Science is important for helping us understand the natural world.
    • I am interested in learning about science.
    • I like reading about science.
Qualitative Data Sources

• Interviews
  – Lasted 5 – 30 minutes
    • interest in science/ environment,
    • relationships with peers and adults
    • knowledge about environment and environmental actions
    • relevance of environmental issues
    • service-learning experiences
Qualitative Data Sources

RAFT Assignment (Tomlinson, 2003)

Use all of the information you’ve learned about the river over the past weeks to complete one of the writing assignments below. Carefully look at the data, observations and photographs that you’ve collected. Now, think about what you’ve learned about the water quality of the river. Select one of the writing prompts below and teach your audience about the current health of the river ecosystem at Darden Towe. Use vocabulary and a voice that is appropriate for the audience that you select.
## RAFT – Choices for Demonstrating Competence

<table>
<thead>
<tr>
<th>Role</th>
<th>Audience</th>
<th>Format</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroinvertebrate</td>
<td>Citizens</td>
<td>Letter</td>
<td>Sedimentation</td>
</tr>
<tr>
<td>Scientist</td>
<td>Streamwatch</td>
<td>Report</td>
<td>Water quality (especially macroinvertebrates)</td>
</tr>
<tr>
<td>Citizen</td>
<td>Newspaper</td>
<td>Letter to the editor</td>
<td>The importance of riparian buffers</td>
</tr>
<tr>
<td>Student</td>
<td>Classmates &amp; teachers</td>
<td>Poem</td>
<td>Value of the river to our community</td>
</tr>
</tbody>
</table>
Dear Editors,
Please don’t litter cause trash wash down runs into the Rivannah River that Charlottesville uses. You got to think... were bathing in the water that has dirt, trash and oils. When the city use the water they add a lot of chemicals just so it is healthy enough for us to use. Did you know there 97% water salt we cant use and 2% frozen and only 1% our to use and drink and survive off of. Its just not us that uses the water so does wild animals, birds, geese and humans. So why don’t we stop the sediment. We need to plant buffers and put up silt fences so it’ll stop and help the water stay clean. Please help. If a 15 year old girl like me cares about the water you should to! And I was the only one that got in the woods and sticky briars to clean trash so it wont kill us or the animals. When the trash washes down then we have dirty water. The 2 times we have been to the river it ‘s 40 degrees. We need more silt fences and more buffers that will help to hold all the sediment back so it wont go in the river and kill fish or wild animals or us humans.
Final Reflections

Take some time to reflect on your experiences this year along the Rivanna River.
What does the river mean to you personally or to our community?

What should other people know about the river?

Think about how you can communicate your thoughts about the river to others. Create a final reflection that shows what the river means to you (or us), or that communicates a message about the river to others.
Animal Paw Prints
Engraved In The Soil
Hoping For Clean Water
Natural source of H₂O

We need water
We all drink it
We all use it

If the human population keeps on with not caring about the outside world
Then the human population will start to decompose
Along with the fallen trees and dead grass
Have you ever thought about all of the habitats we are destroying?
Have you ever thought about how many fish and microinvertebrates we are killing?
Student Perception of SL

Learned a lot about environmental science

Working on this project was challenging for me.

Our project made a difference to other people in our community.
Changes in Dimensions of Environmental Literacy

- Knowledge
- Sensitivity
- Feelings
- Intentions to Act
- Issue analysis
- Issue identification
- Action planning
- Behaviors
Qualitative Questions

• SL Experiences
• Environmental Knowledge
• Environmental Attitudes
• Action Skills
• Environmentally responsible behaviors
• Perceived changes or ambivalence
Qualitative Analyses Step 1

• Narrative Summary (Maxwell & Miller, 2012; Way, 1998)
  – Read individual student’s data sequentially
  – Preserve meaning by summarizing a student’s experience (Seidman – “profile”, 1998)
  – Note general coding categories/ themes present
Qualitative Analyses Step 2

Categorizing (Maxwell & Miller, 2012)
– Create final codebook with definitions
– Assign chunks of data to codes using Dedoose
– Look for patterns across students’ data
SL Experiences

• Perceived choice (autonomy)
• Relationships with others (relatedness)
  – Peers
  – Adults/teachers
• Likes/ dislikes
• Feelings

Problems
• All of the sediment in the water
• Lack of buffers
• Not enough slit fences
• Lack of ground cover
• Water is mucky & gross
• Too many nutrients & bacteria
Knowledge about the Environment

Dear Human Citizens,

We are the great race of macroinvertebrates known as Hellgrammites. We may not have spines like you vertebrates, but that does not mean we will stand for the appalling amount of filth you have deposited in our river. In some places the JTU of our river is over 100! The high turbidity is blocking light from reaching any of our aquatic plants, and causing our prey to starve to death before we can eat it. Not to mention that the sediment clogs our gills and makes it impossible for us to breathe any of the dissolved oxygen in our water.

All of the runoff caused by the impervious cover you build is full of chemicals, unwanted nutrients, and, as I mentioned before, sediment. We understand that you try to lessen your impact on us with things like silt fences and riparian buffers, but I’m afraid trying is not enough. If you fail to improve your efforts I’m afraid we will have to exterminate you.

Your incessant pollution may have greatly reduced you numbers but we will not be defeated. We will attack any human that dares to enter our waters if you fail to stop pollution our river.

Sincerely, The Royal Council of Hellgrammites
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Environmental Attitudes

• Connection to nature
• Sense of responsibility
• Value of nature
• Concern
• Pessimism/hopelessness
• Hopefulness/optimism
• Empowerment

The battle for the river begins as a giant earth golem heads towards the river now that the tree guardians can no longer defend it. But a group of young humans saw the threat and created a massive plant creature, Biollante the Buffer. Bio's job is to keep the sediment from polluting the river. Can she hold back the monster? Or will she be overpowered by this monstrosity?
How would you code this?

the rain falls then runs
to the kingdom of lost life
where the mud and sludge
clings and chokes everything alive
where the water runs black
the life will never come back
because the death won’t leave
if you let it stay

Pick from these or your own emergent codes:
• Connection to nature
• Sense of responsibility
• Value of nature
• Concern
• Pessimism/ hopelessness
• Hopefulness/ optimism
• Empowerment
Environmental Action Skills and Behaviors

Action Skills
• Researching
• Identifying Problems
• Planning Solutions

Environmentally-Responsible Behaviors
• Actual vs. potential
• Positive or negative
River Narrative

People do not understand what it means to be healthy, to be striving to support a good home for all of the macroinvertebrates, fish, frogs, and turtles. In my opinion, they do not realize that they depend on me for water, food, research, and recreation, and therefore need to keep me healthy. But instead of doing that, you do just the opposite, you pollute me by building houses, highways, subdivisions, centers, and shops right on my edge. You excavate and clear trees away just for a “good view”, but how about having that “good view” be me? How about cleaning me up? Helping me support all of my various plants and animals?

And how about not putting cow farms right on my banks? Because those animals use the bathroom in me, and walk on my soft, sandy bottoms. The cows walking on my bottoms stir up dirt and sediment which eventually cloes fish’s gills. To help prevent sediments, pesticides, and fertilizers from going into me, you guys could plant buffers, consisting of trees, shrub flowers, and ferns right on my edge. These plants will hold down the soil with their roots and prevent it from going into me. You could also reduce paved roads, parking lots, and roofs right on my edge because they fill me up with filthy water.

I do please realize that you need to take care of me, that if you need to preserve me and to keep me happy and

Actual negative behaviors
Potential positive behaviors
Actual negative behaviors
Potential positive behaviors

Call to Action
Preliminary Lessons Learned

• Value of *written* qualitative data from youth
• Tradeoffs of intense dosage vs. spread across a year, in-school vs. out of school settings
• Youth voice – challenging but critical part of service-learning
• Service-learning as a pedagogical approach with potential for fostering engaged environmental citizens
Environment Service Learning Project

Theory of Change

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Interest in Science
Possible Next Steps

- Assess efficacy of professional development efforts to use SL.
- Engage in instructional design project.
- Test critical ingredients of SL and work toward small adjustments to activities that are currently widespread.