Impacts of Outdoor Schools on Building Environmental Literacy

Preliminary Report
July 2017

Call to Action

Outdoor school has been an Oregon tradition for over 50 years. We know that engaging students in applicable, relevant and engaging experiences in the out-of-doors contributes to academic success and environmental literacy. However, there has been limited quantifiable measure of these impacts in Oregon. How do we track and compare best practices without a common measurement system? A common measurement system will enable programs to track their outcomes, looking at change within their individual programs overtime, among themselves and consider statewide trends.

Project Committee:

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- Dan Prince, Coordinator, Multnomah Education Service District Outdoor School

Summary and Key Findings

The "Impacts of Outdoor Schools on Building Environmental Literacy" project characterized outdoor school programs in Oregon, their subsequent impact on youth and evaluation measures employed to determine these impacts. Oregon's outdoor schools and the types of evaluations they employ are extremely diverse. Educational outcomes resulting from of these programs also vary substantially.

Key differences among outdoor school programs include the following:

- Arrangement of Program (e.g, number of nights in the field, successive programing or split)
- Subject Area (e.g, STEM/science, artistic/creativity, workforce)
- Instructors/Facilitators (e.g, high-school volunteers, natural resource professionals)
- Pedagogical Approach (e.g hands-on, inquiry, student choice)
- Partnerships/Community (e.g, types – local businesses; roles – classroom connections)
- Diversity, Equity and Inclusion (e.g, accommodations, language supports, representation)
- Facilities (e.g, state of repair, geography, lodging options)

Key differences in the outcomes of outdoor school programs include the following:

- School Success Measures (e.g, attendance, subject-specific interest)
- Interpersonal Development (e.g, problem solving, social-emotional)
- Intrapersonal Development (e.g, peacefulness, first time overnight)
- Environmental Literacy: Knowledge (e.g., physical and ecological systems, environmental issues)
- Environmental Literacy: Dispositions (e.g., environmental sensitivity, personal responsibility)
- Environmental Literacy: Competencies (e.g, investigation of environmental issues)
- Environmental Literacy: Behaviors (e.g, water and energy conservation)

Key differences in evaluation practices used in outdoor school programs include the following:

- No Use of Evaluation
- Informal Evaluation (e.g, observation, questioning)
- Observational Tools with Indicators (e.g, rubric, performance based assessments)
- End of Program Evaluation (e.g, summative work project, test, survey)
- End of Program Interviews (Group and Individual)
- Pre-post Surveys
- Logic Models (often employ aforementioned practices

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Project Overview:
"Impacts of Outdoor Schools on Building Environmental Literacy" is a project of the Oregon Environmental Literacy Program, which began in 2014 and is supported by the Gray Family Foundation. The intent of this project is to build understanding and knowledge about current outdoor school programming and its intended outcomes. The information gathered will help guide the discussion and development of measurements that address the impacts of outdoor school. We are particularly interested in developing evaluations and assessments that can be implemented for all types of outdoor school programs.

"Outdoor School for All" is a strong state mandate. Similarly, the legislative charge set forth in the Oregon Environmental Literacy Plan (HB 2544) calls for outdoor education to occur in Oregon. The Plan includes "making outdoor experiences part of regular school curriculum." Oregon Senate Bill 439, with supporting funding from Oregon Measure 99, calls on Oregon State University Extension Service (OSU-Ex) to "assist school districts and education service districts in providing outdoor school programs." This includes "evaluating outputs and impacts of outdoor school programs." This project does not fill this legal requirement. Rather, it began according to an apparent need for high-quality assessment and evaluation of outdoor school programs which were readily available throughout the state. Indeed, the project will continue to provide critical and timely information to OSU-Ex and outdoor schools necessary to provide high-quality outdoor education for all.

"Impacts of Outdoor Schools on Building Environmental Literacy" is a three-year project, which ultimately will produce:

- A categorization of Oregon's outdoor schools which articulates the types of outdoor school programs in Oregon, their outcomes, objectives and concepts they teach.[1]
- An outdoor school common measurement system. The measurement system will include an age appropriate environmental literacy assessment tool or suite of tools (e.g., survey, test for youth) and program evaluation tool (e.g., number of nights in field, pedagogical techniques, counselor training).
- Two research findings reports, results from the pilot study and follow-up statewide research.

Further, the project will help achieve the following outcomes:

- The Oregon Environmental Literacy Program's Research and Assessment subcommittee will regularly assess elements of fifth and sixth grade youth in Oregon's environmental literacy. These elements, as captured in the aforementioned measurement system, will be linked to the Oregon Environmental Literacy Programs' Research Framework (based on environmental literacy) and Standards Integration Framework document (characterizes an environmentally literate, developmentally appropriate, fifth and sixth grade youth in Oregon).
- Environmental education providers, especially outdoor schools, will refine their activities based on understanding of their impact on youths' environmental literacy relative to one another and throughout time.

[1] The categorization listed here is detailed in later pages of this report.

- Oregon State University Extension and other outdoor school providers will create and modify resources, activities and curriculum based on a concise understanding of what outdoor schools across the state accomplish (teach/instill/provide).

Purpose of Preliminary Investigation:
The project committee sought to understand what outdoor schools across the state accomplish (teach/provide). This included the outcomes (considered, in-part, according to environmental literacy: knowledge, competencies, behaviors, dispositions), objectives and concepts taught at outdoor school. This report details these diverse outcomes and the program-specific factors that influence these outcomes. It also describes current evaluation practices employed by outdoor schools in Oregon. The report provides a synthesis of initial findings from focus groups, an online survey and grant evaluation reports of Oregon's outdoor school providers, supporters and participants. It provides a categorization of outdoor schools and recommendations for creating a pilot assessment system.

Methods of Preliminary Investigation
Preliminary investigation involved group interviews, an online survey and analysis of grant project evaluation reports. There were two group interviews with twenty-four participants involved with outdoor school (e.g., program providers, natural resource professionals). Forty-eight surveys were considered and provided a broad range of perspectives. Respondents included parents, program providers, high-school counselors, teachers, administrators, volunteers, funders and natural resource professionals from regions throughout Oregon. Group interviews and the online survey asked the same open-ended questions about youth outcomes, important program and instructional features at outdoor school. Four years (2011-2014) of grant evaluation reports from the Gray Family Foundation's Outdoor School Grant Program were also analyzed, 126 reports in total. Questions about youth outcomes were not limited by age. Likewise, educational outcomes on evaluation reports did not consistently specify outcomes for whom. Respondents were able to consider youth outcomes for 5th-6th graders and/or high school volunteers. There were three objectives of the preliminary investigation:

- [Programmatic Features] Identify the primary programmatic characteristics associated with diverse outdoor schools throughout Oregon.
- [Practitioner/Instructional Features] Identify the primary factors associated with successful instruction and implementation of diverse outdoor schools throughout Oregon.
- [Youth Outcomes] Identify the primary youth outcomes associated with diverse outdoor schools throughout Oregon.

Analytic procedures were used to code these qualitative data and understand key themes which, at a later stage of this project, can be measured quantitatively. Open and axial coding occurred. Youth outcomes were not entirely open coded. Themes which arose from this analysis were iteratively compared with a predetermined theoretical framework for assessing environmental literacy (Hollweg et al. 2011). Hollweg et al's Framework for Assessing Environmental Literacy was combined with emergent themes to categorize the diversity of youth outcomes associated with outdoor school in Oregon. These themes were then compared to Oregon Senate Bill 439 which identifies a variety of youth outcomes associated with outdoor school. Instances where existing practices (discovered in preliminary investigation) align with Senate Bill 439 were identified for future reference.

Initial Findings – Diversity of Programming in Oregon's Outdoor Schools

Oregon's outdoor schools are extremely diverse. Programs can be categorized according to elements which, presumably, influence student outcomes. *Table 1: Categorization of Oregon's Outdoor Schools* provides seven elements for categorizing the diversity of programming statewide. These elements, which emerged from preliminary investigation, are:

- arrangement of program;
- subject area;
- instructors/facilitators
- pedagogical approach;
- partnerships/community;
- diversity, equity and inclusion; and
- facilities.

Each element can be further defined, or operationalized, by different variables. For example, the categorizing element of pedagogical approach emerged and within that element, instruction may vary in regards to the degree of authenticity, creativity, student voice or disciplinary roles. Several programmatic features listed in Senate Bill 439 emerged and are identified in italics below. These features included the number of nights in the field and creativity or hands-on pedagogy. Important considerations are listed for some of the categorizing elements.

Table 1: Categorization of Oregon's Outdoor Schools Table lists and operationalizes seven programming elements which emerged from preliminary investigation. Programmatic features listed in Senate Bill 439 that emerged during preliminary investigation are identified in italics and listed first in each section.

Categorizing element	**Variables within categorizing element**		**Considerations**
Arrangement of program	- *# of nights/days* - *overnight* or partial days - # of youth per session/program/week - successive or split		
Subject Area	<u>Coarse scale</u>: - free time - instructional	<u>Finer scale</u>: - Science/STEM - Natural History/Geography - Social-Emotional - Creative - experiential (includes Phys Ed) - CCSS - Stewardship/Sustainability - workforce/careers - camp functions	<u>Assumption:</u> Relative to all questions - To what does this apply? Presumes common understanding of 'outdoor school' programming, which may not be clear. Assure that terms are commonly understood and clearly defined.
Instructors/facilitators	- adult volunteers - parents - college volunteers - school teachers - school administration - high school volunteers/counselors (often stressed as most important factor in successful programming) - trained staff - natural resource professionals (content and/or instruction)		<u>Factor in this theme</u> - ratio to students <u>Degree of training re</u>: - content - pedagogy - camp norms/policies
Pedagogical approach	<u>May vary in regards to:</u>		Most specific to

	- *hands on* - *creativity* - degree of program organization - authenticity - interdisciplinary - inquiry - teacher engagement/attitude - teacher choice - student voice - disciplinary role - environmental action - multisensory		instructors.
Partnerships/community	<u>Types of partnerships</u>: - NGOs (e.g, watershed council) - university students - parents/community - government organizations - retirees - school district - farms - high schools - foundations - local businesses	<u>Role of partners</u>: - learning stations/ presentations/content delivery - meals/food - recruitment of counselors - fundraising/ $ sponsorships - classroom visits/relevant instruction - regular curriculum - counselors - site use/rental/MOUS - advisory committee - curriculum development - transportation - medical - educator/teacher trainings - publicity/parent information - materials/supplies - clean-up/break down	- No mention of Oregon Department of Education throughout preliminary investigation. - Each type of partnership is factored by role of partnerships and a measure of the degree of partnership.
Diversity, equity, inclusion	- *accommodations/modifications* - $ need - language - representation - impacts/successes - role, degree of celebration - behaviors		Multisensory is applicable here.
Facilities	- same site or rotating (rental?) - ecology/geography - state of repair/disrepair - lodging/food - kitchen - dorms - indoors/outdoors - classrooms		

Initial Findings – Oregon's Outdoor Schools have Diverse Impacts on Youth

The impacts of outdoor school programming on youth, the outcomes of outdoor school, are also very diverse. There were seven categories of youth outcomes which emerged or were confirmed. These outcomes include the domains of environmental literacy (Hollweg et al 2011), interpersonal skills and school success measures. *Table 2: Categorization of Youth Outcomes* provides seven elements for considering youth outcomes. These outcomes were provided for, and thus may occur for, 5 – 6th graders and/or high-school volunteers. These categories are:

- School Success Measures
- Interpersonal Development
- Intrapersonal Development
- Environmental Literacy: Knowledge
- Environmental Literacy: Dispositions
- Environmental Literacy: Competencies
- Environmental Literacy: Behaviors

Each element can be further defined or operationalized by associated variables within that element. For example, within the categorizing element of the environmental literacy domain of knowledge, five variables emerged. These include understanding of physical and ecological systems, understanding of environmental issues and understanding of solutions to environmental issues. Several outcomes listed in Senate Bill 439 emerged and are identified in italics below. These outcomes included pro-social school appropriate behavior, increased performance and interest in STEM, leadership and decision-making skills. Important considerations are listed for many of the categorizing elements and variables. Several outcomes were very commonly cited as important. These include environmental sensitivity, the understanding of environmental issues and workforce development/exposure.

Table 2: Categorization of Youth Outcomes Table lists and operationalizes seven elements in terms of youth outcomes, which emerged from preliminary investigation. Youth outcomes listed in Senate Bill 439 that emerged during preliminary investigation and are identified in italics and listed first in each section. Items marked with * were very frequently cited as important and listed second in each section.

Categorizing element	**Variables within categorizing element**	**Considerations**
School success measures	- *prosocial, school appropriate behavior* - *subject specific interest/enthusiasm* (most often science/stem) - *subject specific performance* (most often science/stem) - *overall school engagement* - *students who struggle in the classroom, do well in outdoor school* - *workforce exposure*/interest* - cultural diversity/celebration* - positive connection to adults* - problem solving/critical thinking - attendance	Distinction between interpersonal/access skills difficult to distinguish at times. Assure common definitions of variables. Potential avenue for determining commonalities among variable - use a cognitive affective framework.
Interpersonal development	- *leadership* - *decision making* - *problem solving* - *critical thinking* - empathetic	Responsibility to camp and peers as well as earth. Self-sufficiency identified in HB 439, may account, in part, for

	- self-efficacy (realm – specific and needs further qualification) - responsible - cooperation - self-reflective - motivation (realm – specific and needs further qualification)	self-efficacy and self-reflective.
Intrapersonal development	- first time outside - first time overnight - peacefulness - less stressed out	Can be considered in terms of health and wellness.
Environmental literacy: knowledge	*understanding of physical and ecological systems – commonly referred to as natural world* (varied widely)	Most frequently cited. Included hydrology, ecology astronomy, insects, animal biology, soils, plants, weather and geography.
	*understanding of environmental issues**	Included *interconnectivity* and loss of biodiversity.
	understanding of solutions to environmental issues*	Included sustainability, waste reduction, watershed improvement, conservation, forest management and sustainable farming.
	social culture and political systems	Infrequently cited.
	citizen participation and action strategies	Included personal choices, alternatives to material waste, energy conservation, ecomanagement and water conservation.
Environmental literacy: dispositions	environmental sensitivity - commonly referred to as a "personal connection to natural world"*	Included awareness, appreciation, awe, excitement, admiration, connectedness, bonding, curious of outdoors and sense of place.
	motivation and intention to act*	Included waste and energy conservation, environmental career interest* and interest in ecomanagement.
	assumption of personal responsibility	Included conscientious about impact, responsibility for stewardship and ownership.
	locus of control	Youth see role in sustainability.
	attitudes and concern toward the environment	Included respect for environment/biocentric, importance of environment/anthropocentric and concern for unhealthy places.
Environmental literacy: competencies	*investigate environmental issues* (scientific and social aspects of issues using primary and secondary sources)	Commonly cited: scientific method, data collection and inquiry.

theoretical framework (environmental literacy) used to define competencies includes additional variables not apparent in preliminary investigation -	identify environmental issues	Infrequently cited.
	analyze environmental issues	Infrequently cited.
	evaluate and make personal judgments about environmental issues (the interaction between environmental conditions and sociopolitical systems)	Infrequently cited.
	use evidence and knowledge to select and defend one's own position(s) to resolve issues	Infrequently cited.
Environmental literacy: Behaviors *theoretical framework (environmental literacy) used to define behaviors includes additional variables not apparent in preliminary investigation*	ecomanagement - commonly referred to as stewardship/environmental care*	Included native plantings, clean-up/litter removal, soil improvements, compost, mulch, conservation biology such as smolt rearing/release, trail improvements, building and repair.
	consumer/economic action - commonly referred to as appropriate resource use*	Waste reduction (compost, reusable, recycle) and energy/water conservation at home, school and ODS.

Initial Findings – Further Impacts of Oregon's Outdoor Schools on Communities

There are several outcomes associated with outdoor school that were not explicitly considered in this study, but were partially revealed through initial data collection. For example, there are impacts on parents. One parent provide a quote to this extent, saying:

> *"as a parent, it was wonderful to get to volunteer and be there with the kids (though my daughter was less thrilled about it). I personally developed relationships with other parents, teachers and students there that have continued to grow since then"*

There are impacts on the community. One respondent discussed the influence on teachers and scientists in training, saying:

> *"We also partner with …. University, sharing resources, collaborating on curriculum design, and allowing students in the science and education departments to gain practical experience by teaching at outdoor school."*

One grant evaluation report discussed impacts on a specific under-represented community, which received targeted support, saying:

> *"Over the years our Hispanic families have been reluctant to send their children to outdoor school. There are a variety of reasons, not the least of which is feeling alienated from the school system. Huge efforts have been made to reach out to our Spanish speaking families. We host several events throughout the year that honor their heritage and its contribution and place in our school culture. We feel trust is increasing and families are feeling more comfortable within our schools. The number of hispanic kids that attended camp this year grew and supports this belief."*

Diversity, Equity and Inclusion

The findings in this preliminary report should be considered critically. There are shortcomings relative to Diversity, Equity and Inclusion (DEI). Initial data did not consider whether respondents belonged to under-served or dominant populations. Therefore, data could not be disaggregated according to a DEI lens. Likewise, it is understood that the larger educational context/standards where outdoor school occurs has inequities. Race, gender identity, socioeconomic status, religion, sexual orientation, language, country of origin, disability and more may impact how an individual does or does not engage with outdoor school. As this project progresses (piloting a common measurement system) additional efforts will be made to further involve diverse populations and perspectives. Data will also be collected that allow for outcomes to be disaggregated in accordance with a DEI lens.

Considerations for a Common Measurement System of Oregon's' Outdoor Schools

One goal of this study is to develop and test a common measurement system for outdoor schools in Oregon. Prior to creating a new common measurement system we considered the current conditions of evaluation in outdoor schools. Survey respondents, interview participants and grantees provided information about current evaluation measures.

Outdoor schools use a wide variety of evaluation methods in a wide variety of ways. This ranged from using no evaluation to rigorous measures used in formative and summative manners. Likewise, a few important considerations were commonly discussed. Some programs strive to keep evaluation measures short. Evaluation is often seen or discussed as difficult. Some programs struggle to use evaluation meaningfully. Other programs work with outside partners like university researchers or STEM hubs. *Table 3: Current Evaluation Measures in Oregon Outdoor Schools* lists the types of evaluation used by outdoor schools. The table synthesizes information from survey respondents, evaluation reports and group interviews. It includes how evaluation methods are used and by whom. For example, some programs utilize end of program evaluation like a final project in a summative manner. Projects are used to determine mastery or attainment of particular knowledge or skills. Programs utilize performance based measures along with rubrics to measure predetermined indicators of success or quality. These measures can be used summatively and formatively.

Table 3: Current Evaluation Measures in Oregon Outdoor Schools Table lists the type of evaluations currently being used in outdoor school programs in Oregon. Who is taking the evaluation and how it is being used is also listed.

Type of evaluation	How evaluation is used	Who takes evaluation	Considerations
None, no evaluation used	n/a	n/a	Respondents indicated lack of capacity.
Informal evaluation (observation, questioning)	- summative to determine impact - formative at program-level - formative to target instruction	- students - staff, teachers, volunteers	Respondents indicated evaluation as difficult. Often surface-level in scope.
Observational tools with indicators (performance based assessments, rubrics)	- summative to determine impact - formative at program-level - formative to target instruction	- students - staff, teachers, volunteers	Vary in scope from comprehensive to surface-level.
End of program evaluation (final project, test, survey, feedback forms)	- summative to determine impact - formative at program-level	- staff, teachers, volunteers, - students	Vary in scope from comprehensive to surface-level.
End of program	- summative to determine impact,	- parents/volunteers report	

interviews/teacher work session (group & individual)	often regarding affective change (dispositions) - formative at program-level	about students - staff, teachers, volunteers	
Pre-post survey	- summative to determine impact, often regarding affective change (dispositions) - formative at program-level	- students	Frequent mention of use for partners to secure/maintain funding.
Logic model	- summative to determine impact - formative at program-level - formative to target instruction	- staff, teachers	Used in majority of evaluation reports as required by funder. Usability and efficacy of logic model varied.

Conclusions

By nature of the methods used and the intended task, the findings provided here can be reductionist. Education programming in general, and outdoor school in particular, is extremely complex. Preliminary findings should be considered accordingly. Likewise, preliminary findings are designed to support further study. Study that seeks to develop a common measurement system. Developing a common measurement system is a task requiring great care. Evaluation can drive instruction. Throughout preliminary study, stakeholders (e.g, study participants, project committee, oregon residents, education researcher) shared issues and indicated concerns with implementation of a common measurement system. Issues/concerns ranged from very broad, near philosophical issues/concerns to more specific implementation issues/concerns. These issues/concerns, which are not presented as comprehensive, are:

- Unique and diverse programing
- Limited resources (time, money, staffing)
- Preserving local traditions
- Political and funding ramifications of poor performance with evaluation
- Content/activities may change from year to year within and across programs
- Consistency of evaluation implementation
- One-size fits all approach
- Outcomes not measured, could become outcomes not valued
- Resistance to common measurements and/or change to existing system
- Different interpretations/understandings of outdoor school, or similar efforts/terms such as environmental education
- Difficult to measure longitudinal effects
- Competition among providers for limited funding and/or student populations
- Comparability and usage of complex data set
- Diversity of programing may require overly generic/reductionist evaluation tools which provided limited meaningful data
- Technology needs

Stakeholders also shared recommendations relevant to creating a common measurement system and engaging in a pilot study. These recommendations are:

- Evaluation must not distract from limited programming time.

- Attain consensus/agreement on metrics.
- Attain consensus/agreement on goal(s) of outdoor school.
- Consider a framework that can be adapted per program needs.
- Consider alternative formats.
- Consider commonalities in programming or outcomes.
- Discuss, share and listen to providers, teachers, students and communities.
- Keep evaluation measurement simple and developmentally.
- Assure outcomes/goals are aligned with existing efforts (e.g, OELP).
- Consider avenues for programs to highlight and measure outcomes not identified in common measurement.
- Outcomes need to disaggregate data so that it shines a light on potentially disparate outcomes for historically marginalized participants.
- Involve diverse stakeholders in assessment creation.
- Consider closely aligning common measurement system to Senate Bill 439.
- Ensuring that each variable is DIRECTLY related to Outdoor School Programming.
- Assure info from exemplary programs is shared among programs/providers.
- Consider assessment formats which are both quantifiable and capture outcomes traditionally associated with qualitative assessments.
- Use assessment formats and capture data that are valued within larger educational and political system.

This preliminary report operationalized the youth outcomes and program-level features related to current outdoor school programming. While these features were cross-referenced with Oregon Senate Bill 439, it should be noted that some legislative requirements were uncommon or absent from preliminary findings. This source these absences is not clear – does not currently occur in outdoor school, considered of lesser performance or the investigation precluded these responses. Rather, these absences are included for consideration, recognizing the importance of legislation in crafting a common measurement system. These legislative requirements, uncommon or absent from preliminary findings include:

- [Students learn about] the role of timber, agriculture and other natural resources in the economy of this state.[2]
- Provide students with the interdependence of urban and rural areas
- [Promote] higher academic scores on standardized measures of academic achievement in reading, writing, math … and social studies.[3]
- [Promote] better application of systems thinking.....
- [Promote] improved communication skills.....
- [Promote] greater enthusiasm for language arts, math...and social-studies.[4]
- [Promote] better ability to apply …. civic processes to real-world situations.
- [Promote] improved understanding of mathematical concepts and mastery of math skills.
- [Promote] improved language arts skills.
- [Promote] better comprehension of social studies content.

[2] Natural resources were common, but relationship to economy of state rarely cited.
[3] Science is omitted because it was evident in preliminary findings.
[4] Science is omitted because it was evident in preliminary findings.