Leveraging Rain Garden Education to Build Environmental Literacy in the SBAE Classroom

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Introduction

The environment will be further impacted by the future choices made by today's youth. Therefore, it is important to have an environmentally literate public beginning at a young age (Chepesiuk, 2007). To gauge environmental literacy, authors used the constructs illustrated in Figure 1.

Framework

Hungerford and Volk (1990) argue three variables must be impacted for there to be behavioral changes to occur within environmental literacy as shown in Figure 2. The study uses these three variables to study environmental literacy by evaluating the knowledge, affect, cognitive skills, beliefs, and behavior of the participants.

Methodology

The research measured the change in environmental literacy of students who engaged in a rain garden curriculum experience from summer 2019 to fall 2021. Students participated in a five-day curriculum on rain garden fundamentals and design with a focus on stormwater runoff and mitigation of stormwater erosion. The students installed a rain garden at the school. Before completing the curriculum, 730 students completed a pre-test. Once the curriculum and rain gardens were finished, 285 students completed a post-test. Once data was paired, there were 133 usable responses. Environmental literacy was measured using constructs illustrated in Figure 1.

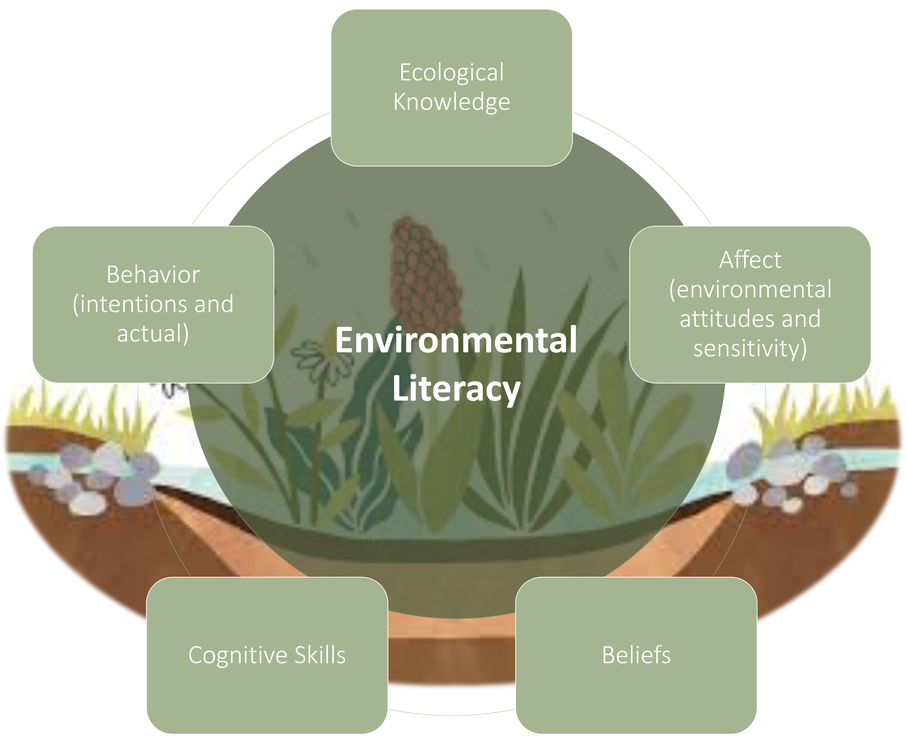

Figure 1. Environmental Literacy Constructs

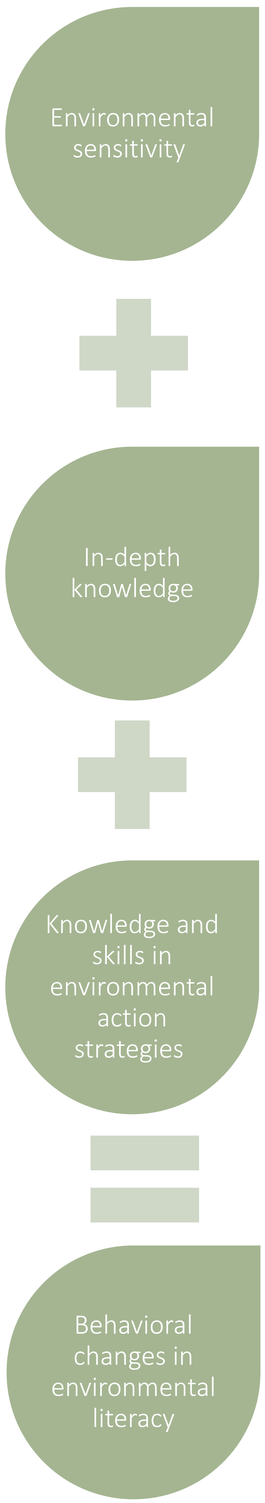

Figure 2. Theoretical Framework

Results

Out of a potential 17 points on the knowledge test, students scored on average 6.76 (~40%) on the pretest, and 10.59 (~62%) points on the posttest. This difference when analyzed with a paired samples t-test was **statistically significant** (t = 9.64, p = . 000). When measuring behavior, student's intention to engage in positive behavior concerning stormwater management increased from pretest (M = 3.22) to posttest (M = 3.49). The gain in positive behavior was **statistically significant** (t = 2.802, p = .006) as seen in Table 1.

Table 1. Results of the four constructs.

Instrument	Test Type	*M*	*t*	*p*
Knowledge Test	Pre-Test	6.76	-9.64	.000*
	Post-Test	10.59		
Beliefs	Pre-Test	3.90	.315	.753
	Post-Test	3.87		
Attitude[1]	Pre-Test	2.25	-1.343	.182
	Post-Test	2.35		
Cognitive Skills	Pre-Test	4.47	.209	.835
	Post-Test	4.40		
Behavior Intentions	Pre-Test	3.22	-2.802	.006*
	Post-Test	3.49		
Behavior Actual	Pre-Test	2.45	-.111	.912
	Post-Test	2.46		

Note. Attitude used a reverse scale of 1 (*very true*) to 5 (*very false*). The highest possible score on the cognitive construct measure was 9.66.

Conclusion

- Curriculum demonstrated statistically significant improvement in the knowledge construct of environmental literacy and stormwater management intentions
- No statistical difference found in constructs of cognitive skills, behavioral intentions, and attitudes, as well steadiness in beliefs and actual behavior.
  - Covid-19 restrictions limited the ability to conduct the curriculum as originally designed

Recommendations

- More intentional experiential opportunities in building rain garden infrastructure may be need to see affective/behavioral gains due to the lack of hands-on experiences due to Covid-19 restrictions
  - Conduct an evaluation after participants have been given time to act on their intentions to see if behavior changes have occurred overtime
  - Study if the age of the high students altered the ability for environmental beliefs and behaviors to change.

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View our abstract by scanning the QR Code.

References

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Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. Journal of Environmental Education, 21(3), 8-22. doi:10.1080/00958964.1990.10753743.