6-2019

Participation in Informal Learning Opportunities among Undergraduates in Biology

Emily Holt
University of Northern Colorado

Ashley Barbara Heim
University of Northern Colorado

2018-2019 Assessment Mini Grant Project Report

Submit a brief (no more than 3 pages) report describing the project, its outcomes, and how the results were or will be used. Due to the Office of Assessment by June 30th, 2019.

Project Title: **Participation in Informal Learning Opportunities among Undergraduates in Biology**

Co-PI: Emily Holt, PhD (Faculty)
Email: emily.holt@unco.edu
Phone number: 970-351-4870
School of Biological Sciences

Co-PI: Ashley Heim, MS (PhD Student in Biological Education)
Email: ashley.heim@unco.edu
Phone number: 603-858-2561
School of Biological Sciences

Study Rationale, Purpose, and Goals

Most informal STEM learning research has focused on K-12 students, families, adults, or communities, with a concerning absence of studies conducted at the post-secondary level. In an attempt to begin to address this lack of research, Co-PI Heim developed and administered a novel survey, the Informal Learning Experiences Survey (ILES), to first- and second-year UNC biology students in Fall 2017. The goal of this pilot study was to understand why undergraduates participate or not, in informal learning experiences. The purpose of the ILES was to quantify the type and frequency of undergraduate student informal learning; students' reasons for or barriers against participating in informal learning opportunities; and confounding factors that may influence their decisions to participate in such opportunities.

The purpose of the current study was to qualitatively describe why first- and second-year undergraduate students participate in informal learning experiences, including their intrinsic and extrinsic motivation for doing so, refine the Informal Learning Experiences Survey, and give context to our initial findings. Our long-term goal was to understand the intrinsic and extrinsic factors that motivate students to participate in informal learning experiences in college, and their expected outcomes of such experiences. Our three short-term goals, for which we sought support from the assessment mini grant, were to: (1) identify intrinsic and extrinsic factors that motivate undergraduate students in introductory biology courses to participate in informal learning experiences, (2) identify what outcomes students hope to gain from participating in informal learning experiences, and (3) refine the ILES based on student interview responses.

Project Outcomes

Funds from the Assessment Program Mini-grant were used to support graduate and undergraduate time and equipment for the proposed phase of this project. Numerous products have resulted from this work:

- Conducted a thorough *literature review* which compiled previous work and informed our direction of study.
- Developed an original *set of questions or prompts* for student think-aloud interviews.
- *Developed a rubric* to categorize student responses.
- *Transcribed student interview responses.*
- *Coded interview data* from the transcribed interview responses.
- Conducted preliminary *thematic analysis* of interviews.
- *Refined* the Informal Learning Experiences Survey based on findings from thematic analyses.
- Administered the revised version of the ILES to BIO 110 and BIO 111 students in Fall 2018.
- *Presented findings* as a poster at the Teaching & Assessment Symposium in May 2019.

How Results Were Used

Findings from thematic analyses of think-aloud interviews contributed to refinement of our novel tool, the ILES. We hoped to develop more reliable items for subscales of the ILES that were not reliable after initial administration of this survey in Fall 2017. In the think-aloud interviews, we probed 10 students about why certain subscales of the ILES might be unreliable or difficult to interpret. Further, interview findings helped inform our planning of an informal learning intervention at the Denver Zoo in Fall 2018 for a majors biology course. The refined ILES is intended to serve as a tool to assess undergraduate participation in informal learning; specifically, we hope it has and will continue to inform post-secondary instructors and program directors about how to better incorporate informal learning in the introductory biology curriculum.

<u>Key Findings from Our Study</u>

What did hierarchical multiple regression tell us?

- Only the independent variables of interest, not the demographic variables, explained both frequency and types of informal learning experiences in both of our models.

What did the revised ILES tell us?

- **Students visited parks nearly 2x as much as other informal learning places** in the last 6 months, and most often did so **to gather with friends and family**.
- **Limited finances, school responsibilities, & lack of transportation** were common barriers for not participating.

What conclusions can we draw from this study?

- Students who visited **parks** and participated in **educational clubs** were those who learned about science for the purpose of **learning something new**.
- Students think **theme parks** have learning **experiences designed for their age group**.

- Students feel **culturally/socially accepted** at many **outdoor settings** (e.g., nature centers, botanical gardens), but also experience **financial barriers** at such places.
- When controlling for demographics, the following variables related to the **frequencies and types of informal learning opportunities** that students engage in at the post-secondary level:
    - -Barriers against informal learning
    - -Reasons for learning about science