Collecting Measures of Success: Metrics for Collections Symposium

34th Annual meeting of the Society for the Preservation of Natural History Collections, Chicago, IL

Measuring Success for Collections: Educational Products and Outcomes

Anna K. Monfils, Central Michigan University
Molly Philips, iDigBio, University of Florida
Libby Ellwood. La Brea Tar Pits and Museum
Debra Linton, Central Michigan University
Lisa White, University of California Museum of Paleontology

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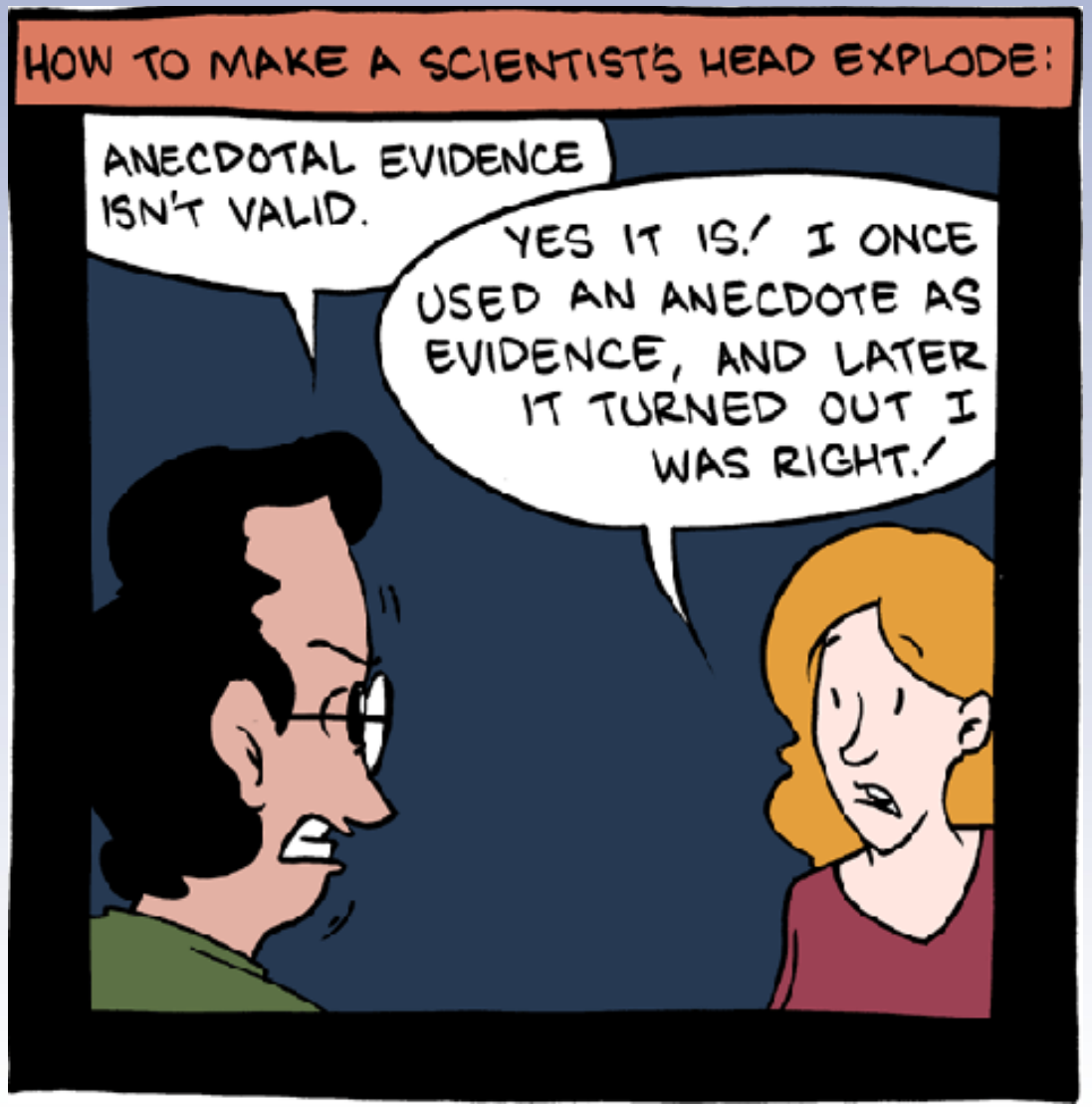
Education is a critical aspect of the national digitization effort

- CollectionsWeb RCN
- Network Integrated Biocollections Alliance (NIBA)
- Advancing the Integration of Museums into Undergraduate Education (AIM-UP!)
- NSF Advancing the Digitization of Biological Collections (ADBC)
- Integrated Digitized Biocollections (iDigBio)
- Biodiversity Collections Network RCN (BCoN)


HOW TO MAKE A SCIENTIST'S HEAD EXPLODE:
ANECDOTAL EVIDENCE ISN'T VALID.
YES IT IS! I ONCE USED AN ANECDOTE AS EVIDENCE, AND LATER IT TURNED OUT I WAS RIGHT!

2014 Survey of Students Working in Natural History Collections

Students in NHC Collections: Outcomes

- Students working in collections are:
  - Performing high order curatorial tasks
  - Critical to curation and digitization
  - Expressing increased understanding of the nature of science
  - Indicating collections based experience is influencing their undergraduate experience, course/major selection and graduate school plans

Students in NHC Collections: Opportunities

- Potential to optimize undergraduate experience by increasing:
  - Exposure to research
  - Interactions with internal/external researchers
  - Professional development opportunities
  - Training in all aspects of collection science

2015 ASSESSMENT OF COMMUNITY NEEDS AND EXISTING RESOURCES IN NATURAL HISTORY COLLECTIONS BASED SCIENCE EDUCATION

BIODIVERSITY COLLECTIONS NETWORK

iDigBio
Integrated Digitized Biocollections

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Community needs and existing resources in natural history collections based science education

I. Integrate various efforts and centralize resources to efficiently use time and effort
II. Incorporate biology educators
III. Develop meaningful undergraduate research experiences incorporating specimen curation continuum and data lifecycle
IV. Provide best practices for mentoring student workers in natural history collections
V. Develop, assess, and refine educational modules involving natural history collection data
VI. Disseminate/propagate materials
    i. Introduce modules in educational venues (education conferences and journals)
    ii. Incorporate partners
    iii. Train the teachers
    iv. Incorporate in textbooks and on-line resources

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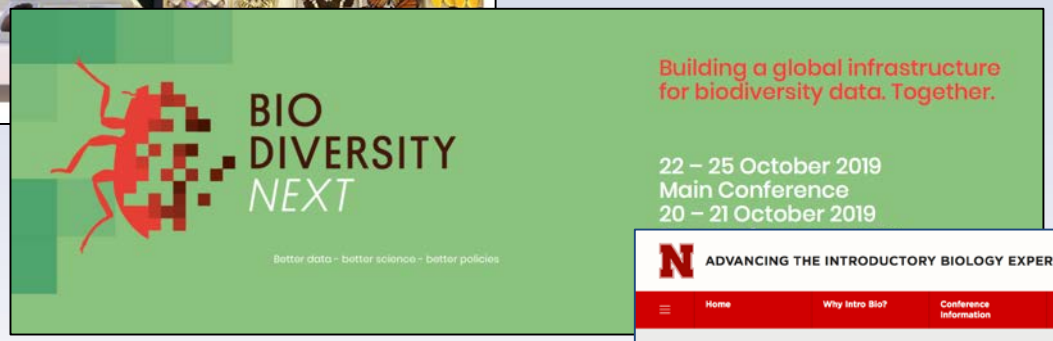
http://tinyurl.com/bluecontact

Goals of the BLUE Data Network

- Cultivate a diverse and inclusive network of biodiversity researchers, data scientists, and biology educators
- Build community consensus on core biodiversity data literacy competencies.
- Develop strategies and exemplar materials to guide the integration of biodiversity data literacy competencies into introductory undergraduate biology curricula.
- Extend the network to engage a broader community of undergraduate educators in biodiversity data literacy efforts.

Defining Biodiversity Literacy and Core Competencies



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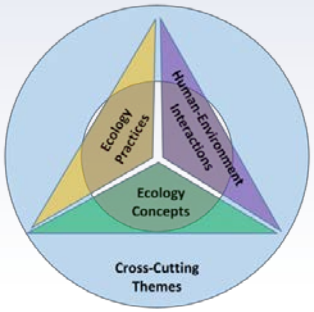

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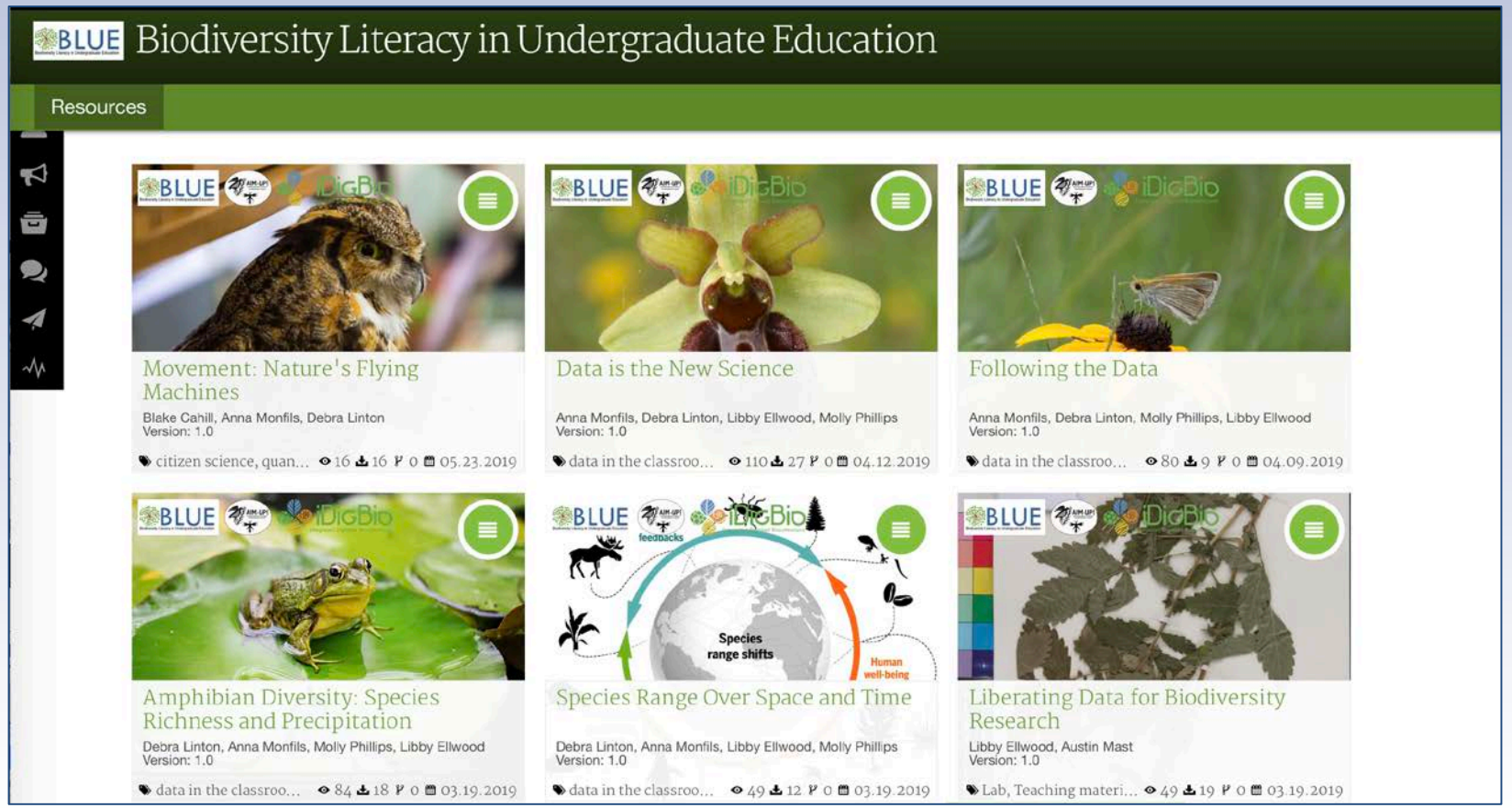
Creating Open Education Resources



https://qubeshub.org/community/groups/blue_data/blueresources

BLUE Biodiversity Literacy in Undergraduate Education

BIO 620: Student Centered Curriculum Design for the 21st Century Biology Classroom

Fall 2018 BIO 212: Foundations of Form and Function

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Student and Instructor Resources

Description

Movement is a key function required for the survival and reproduction of organisms. Microorganisms, such as bacteria and unicellular protists, achieve movement via cellular structures such as cilia and flagellae. Plants and fungi are incapable of individual locomotion but can disperse their offspring via seeds and spores and can grow towards or away from environmental stimuli. Animals have evolved a multitude of methods for movement in terrestrial, aquatic, and aerial environments. One of the most successful types of animal locomotion is **flight**. Flight has evolved at least four separate times, in the insects, pterosaurs, birds, and bats. Flying animals have a diversity of body forms and aerial abilities. They can teach us a lot about form and function. In fact, scientists study animal flight to develop flying robots, airplanes, and rocket ships. In today's lab, you will investigate the forces involved in the form and function of flight in birds and insects.

Students completing this module will be able to:

- Explain the forces acting on flight.
- Describe how lift is created by wings.
- Compare how antagonistic muscles (flexors, extensors) power flight in animals with endoskeletons and exoskeletons.
- Discuss how wing morphology (form) relates to flight ability (function).
- Evaluate the impact of body mass and wing morphology on bird migration distance.

Instructor Access

Download Materials

Citation with DOI

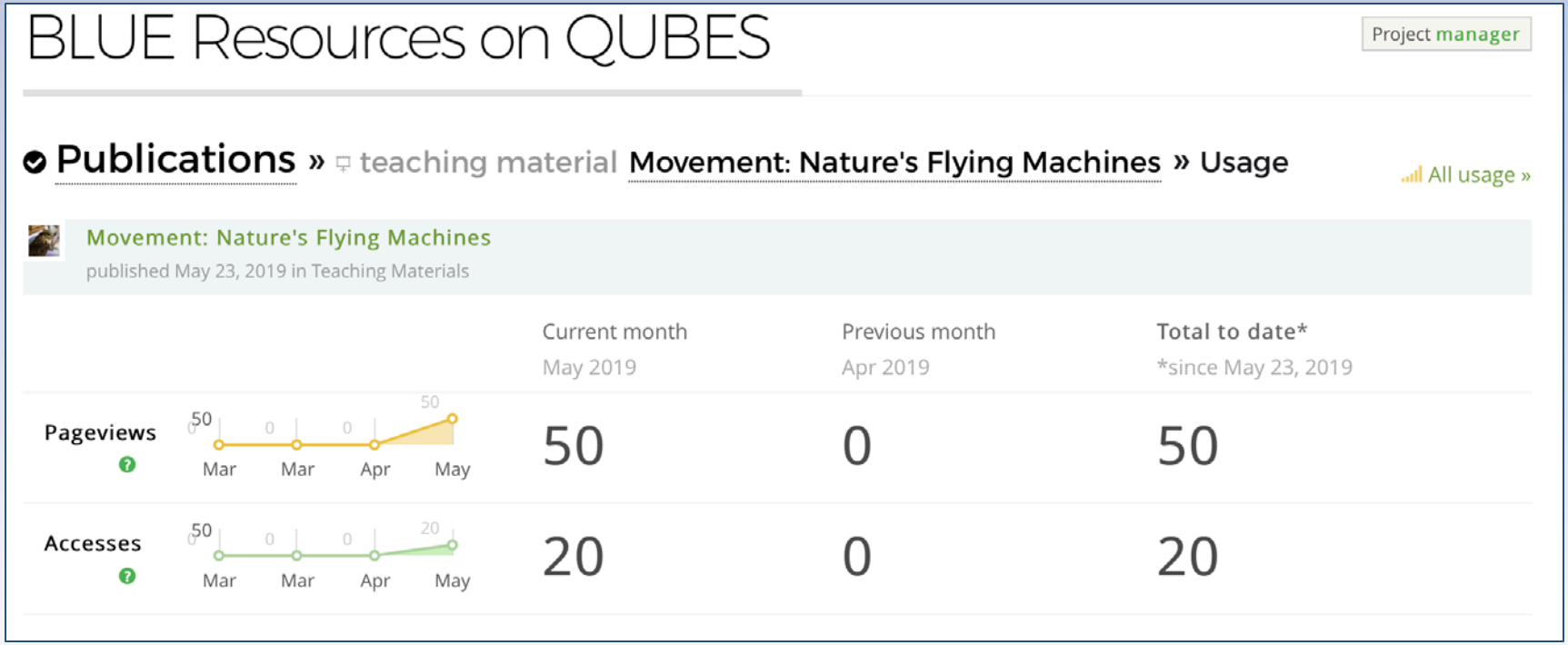
Cite this work

Researchers should cite this work as follows:

Cahill, B., Monfils, A., Linton, D. (2019). **Movement: Nature's Flying Machines**. Biodiversity Literacy in Undergraduate Education, QUBES Educational Resources. doi:10.25334/Q4P165

BibTex | EndNote

Data Usage



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Facilitating Broad Scale Implementation

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*Vision and Change**
Strategies for Change Action Item
A Community of Practice

"Faculty must engage in regular conversations and peer-to-peer mentoring about teaching and learning, and improve, test, and share their own understanding of how students learn. "

Small Collection Symposium, Boise, ID 2014

*Brewer and Smith. "Vision and change in undergraduate biology education: a call to action." *AAAS, Washington, DC* (2011).

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Connecting Students to Citizen Science and Curated Collections

STUDENTS CONTRIBUTING TO OUR UNDERSTANDING OF GLOBAL BIODIVERSITY

Course Documents | Instructor Login

What?

Learn about plant systematics and collecting in the context of our information-rich digital age. Connect physical plant specimens to citizen science observations and online herbarium databases. Explore how making these connections helps contribute to our understanding of global biodiversity.

Why?

This project will help prepare you to be an information-literate scientist, with an understanding of what biological collections data represent, where they come from, and how they can be used.

How?

You will complete this project through a combination of traditional plant taxonomy instruction, participation in citizen science, and exposure to online databases.

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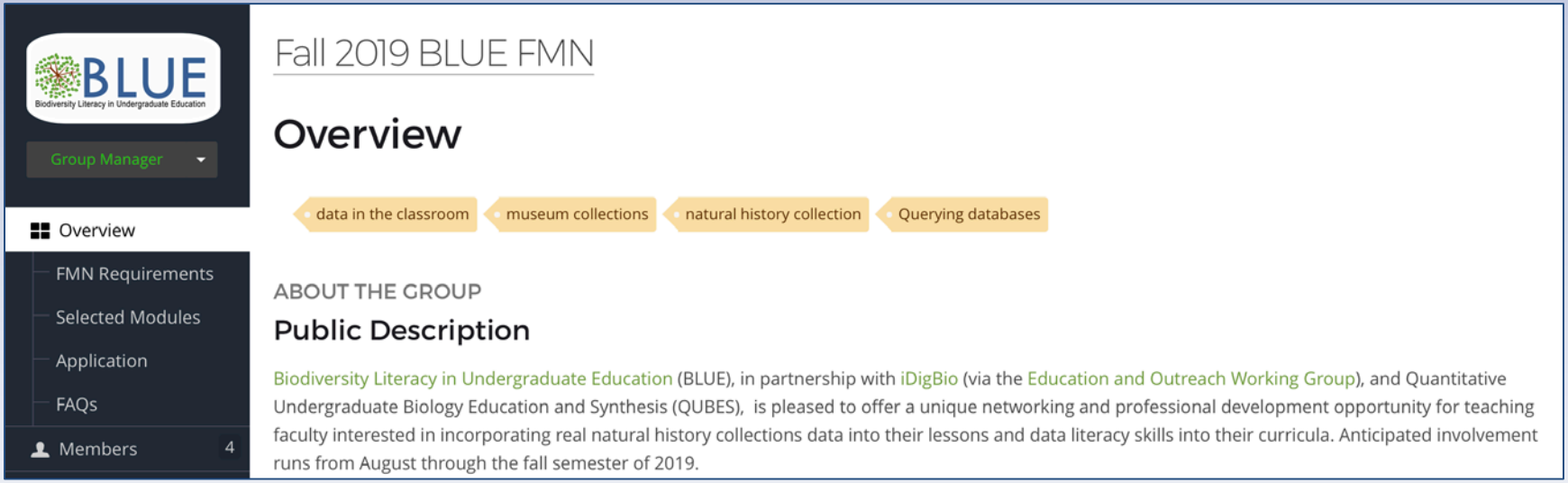
2019 BLUE Faculty Mentoring Network and BLUE Scholars



https://qubeshub.org/community/groups/blue2019

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Metrics
How do you show your impact? Who is your audience?

- Learning outcomes through vetted surveys (evidence)
- Dollars affiliated with
- Undergraduate researchers and paid students
- Courses served (note disciplines)
- Demographics
- Number
- Student outcomes
- Jobs requiring skills that
- Affiliations (number of letters of support)
- Website hits
- Affiliated institutions/initiatives
- Records of mentions for Education and Outreach
- Training (Ecology Education Scholar/Blue Scholar)
- Letters from institutions
- Service to national initiatives
- Presentations (with student authors)
- Site your collection!!!!
- Publish your datasets
- Numbers all the time!!!!
- Engage Community of Practice (RCN-UBE)