Open source for Environmental Sustainability

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PROJECT BACKGROUND

- **Goal:** Scale and improve implementation of OER resources in undergraduate Environmental Sustainability course at University of Baltimore
- **Course:** ENVS 201: Environmental Sustainability, one section (ENVS 201.002), Fall 2018
- **Objective:** Explore OER resources to improve existing OER implementation in general education Environmental Sustainability course through textbooks and other materials

Course textbooks: Tom Theis and Jonathan Tomkin, Editors, Sustainability: A Comprehensive Foundation. OpenStax CNX. Jan 5, 2015 http://cnx.org/contents/1741effd-9cda-4b2b-a91e-003e6f587263@43.5 License: Creative Commons Attribution 3.0

Zehnder, Caralyn; Manoylov, Kalina; Mutiti, Samuel; Mutiti, Christine; VandeVoort, Allison; and Bennett, Donna, "Introduction to Environmental Science: 2nd Edition" (2018). Biological Sciences Open Textbooks. 4. https://oer.galileo.usg.edu/biology-textbooks/4; License: Creative Commons Attribution-Noncommercial-Share Alike 4.0.

IMPLEMENTATION

- OER had been in place in ENVS 201 since 2015 in some sections, however it was felt that implementation could be expanded and improved
- The opportunity to expand OER implementation was made possible through a M.O.S.T. initiative OER Mini- Grant in 2018
- Workshops provided to grant recipients and the available databases of OER materials assisted in the location of new and improved OER materials for the class
- Regular internal meetings of grant recipients at UB also helped improve understanding of OER materials, licensing issues, and provided an interesting dialogue regarding how these materials were implemented.

IMPACT

- Students enrolled in ENVS 201 now save $120 by not having to purchase a commercial textbook
- The open source option generally proves popular with students
- Open source options allow for the utilization of multiple complementary textbooks without concern for cost
- One new textbook chosen for course in addition to existing one, found using database provided through M.O.S.T. grant
- Case study concerning key core general education science goal implemented in course
- Generally 30 students enrolled in each course section, 2-3 sections offered per year

IMPACT (CON'T.)

Course textbooks were implemented under creative commons licenses – Zehnder et al. (2018) and Theis and Tomkin (2015)
- Case study on the scientific method implemented in ENVS 201
- Assessment in ENVS 201 in comparison with another course (ENVS 221) without case study was done using performance on exam questions
- **Results:** students in ENVS 201 performed significantly better than those in ENVS 221 on one related exam question ($P<0.001$; Mann Whitney U test), and there was no significant difference in performance on the other question (Table 1)

Table 1: Results of assessment of performance of course with OER implementation (ENVS 201) and course without OER (ENVS 221).

		Multiple choice		Short answer	
Class	N	# correct	% correct	Mean ±SD	% correct
ENVS 201	22	20	90.9%	6.34±2.08	79.2%
ENVS 221	29	13	44.8%	6.84±1.93	85.6%

LESSONS LEARNED

- **Successes:** Open source textbooks save students money, are popular with students, and do not reduce performance in key general education core learning goals
- **Challenges:** Lack of available appropriate material for environmental sustainability courses; recalcitrance of some full time professors to transition to OER materials
- While material is readily available for many general education science courses (biology, chemistry, physics), this is not the case for environmental sustainability
- Limited to a handful of (fortunately) adequate textbooks and several case studies which are indexed
- Environmental sustainability not indexed on presented databases
- Much opportunity exists to improve and add to available materials, especially additional material such as case studies

FUTURE PLANS

- For ENVS 201 Environmental Sustainability, all future offered sections will use open source textbooks and implemented case studies
- Development of suitable OER materials is a possibility
- Most science courses at UB by this year have switched entirely to OER/ free materials and do not rely on commercial textbooks or lab manuals (ENVS 221, ENVS 201, PHSC 101), or mostly (BIOL 111, BIOL 121)
- We will continue to transition to open source/ free materials in all gen ed science courses and to participate in their development

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