CONSIDER: WHAT (and who) does student engagement involve?

EXAMPLE: EXPERIENTIAL LEARNING

Course-based Undergraduate Research Experiences (CUREs):

- Distinct learning environments, where students develop content knowledge and technical skills specific to the area of research, and make discoveries of interest to the broader scientific/stakeholder community.
- Engage students in iterative work, to ensure the trustworthiness of their findings and generate meaningful scientific knowledge.
- Notably involve important elements of communication and collaboration; however, producing scientific publications versus other meaningful products is an area of ongoing debate.
- CURE programming affords the opportunity to engage students in research at a scale that is not possible through apprenticeships in faculty research laboratories.

CONSIDER: WHERE (and how) are students best engaged?

EXAMPLE: EXPEDITIONARY EDUCATION

Girls' Outdoor Adventure in Leadership and Science (GOALS) – **taking place July 13-28, 2019**:

- Learn science hands-on while backpacking for two weeks through Sequoia National Park, led by UC Davis and National Park scientists, with the help of a UC Davis mentor that is paired with each scholar.
- With the assumption that "our individual experiences in both STEM and outdoor spaces are shaped by our many intersecting identities", the program supports all levels of education (K-12 and university students and instructors) in learning via multiple geographic regions and latitudes, including marine to terrestrial ecosystems.
- Positively addresses "identity development" and combats "novelty anxiety" to produce better scientists via immersive programs, trips and educational offerings.
- Build relationships across state and national jurisdictions, bolstering economic growth in some communities.
- Reinforcing our belief in "the power of young people as leaders, scientists, and outdoors persons".

CONSIDER: WHEN are students best engaged?

EXAMPLE: YOUTH CITIZEN SCIENCE

Youth Citizen Science:

- Youth-centered practices are effective in promoting learning and environmental science agency: the ability to use experiences in citizen science and environmental science to make positive change in one's life and community.
- Strategies for getting youth involved in community and citizen science promote learning:
  - YOUTH:
    - Share findings with outside audiences
    - Engage with complex social ecological systems
    - Take ownership of data quality
  - EDUCATORS:
    - Position youth as people who do science
    - Frame the work globally and locally

CONSIDER: WHY is student engagement important and beneficial?

THE BENEFITS

- Educationally purposeful activities through student behavior and institutional practice - involving psycho-social processing, socio-political acculturation, and other holistic benefits that recognize the importance of emotion.
- Conferring an advantage on any career path, undergraduate researchers can learn tolerance for obstacles faced in the research process, how knowledge is constructed, independence, increased self-confidence, and a readiness for more demanding research.
- Pedagogical activities that engage students across disciplines are central to developing their innovation capacities.
- Entrepreneurship education has a positive effect on early-stage student entrepreneurship activities, with student attitudes and individual characteristics closely linked to entrepreneurship outcomes.
- In one study, students who completed three CURE semesters were significantly more likely than their non-participating peers to earn a STEM degree and graduate within 6 years.
- Following on from 'the student experience' and 'research-led teaching' before it, 'student engagement' has become the latest focus of attention among those aiming to enhance learning and teaching in higher education. It can become a vehicle to attract and retain students, ensuring they develop and graduate to become successful, productive citizens.

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Expeditionary Education (GOALS)

https://girlsoutdoorscience.com/

Youth Citizen Science

https://education.ucdavis.edu/yccs-key-practices

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