Oregon State University

Office of Precollege Programs

Broader Impacts of Research and Engagement in Action

The Office of Precollege Programs (PCP) has enabled OSU's faculty to broaden the educational impact of research projects while co-creating STEM curricula for K-12 audiences and professional development opportunities for educators across the state of Oregon (and beyond). PCP supports BI activities by:

Since 1988

- Offering professional expertise and a menu of educational services and infrastructure to deliver STEM programs and curricula, college connections, and teacher professional development;
- Engaging in institutional and community partnerships that are reciprocal and mutually beneficial to advance STEM youth education and the impact of STEM research in society.
- Collaborating with faculty researchers to develop new outreach programs and STEM curricula that rely on evidence-based practices, helping secure grants and brokering research to Oregon communities and beyond.
- Implementing an iterative process for program development that promotes co-learning by all stakeholders and builds faculty capacity and participation in the planning for and delivery of broader impact activities.

What is BI?

PCP activities support the National Science Foundation (NSF) Broader Impact goals, aligning with the guidelines developed by the National Alliance for Broader Impacts (NABI) and with the mission of the Center for Advancing Research Impact in Society (ARIS).

NABI defines BI activity as "planned experience, engagement, action, function, etc. conducted over a finite period of time, for a specific purpose, and with a target audience" (NABI, 2015). NABI's Guiding principles and questions were developed to aid NSF grant proposals meet NSF merit review criteria related to BI goals.

ARIS was founded in 2018 with a key focus on collaborations to share practices and resources related to "BI, knowledge mobiliz(s)ation, societal impacts, valorisation and research uptake" (ARIS, 2020). ARIS emphasizes inclusive public engagement to promote a diverse STEM workforce.

PCP supports several of NSF's current BI goals, including:

Promoting full participation of underserved groups in STEM;
Improving STEM education and educator development;
Increasing public scientific literacy and engagement with science & technology;
Developing a diverse and globally competitive STEM workforce;
Enhancing infrastructure for research and education.

Why PCP?

The value of K-12 programing as an engaged movement: a brief reference to existing literature

Research has shown that children can determine career paths by the age of 13, supporting efforts directed to early access to college settings (Tai, Liu, Maltese & Fan, 2006; Bernstein, Lubinski, & Benbow, 2019; Shet & Tremblay, 2019).

However, a recently published book on PCP programming in higher education takes a holistic and critical view of programs in the face of shifting demographics and the need for early college engagement, including a model of 25 dimensions for an ideal university PCP unit (Shet & Tremblay, 2019).

PCP, a part of OSU's Enrollment Management Unit, provides early access and opportunities for college connections. For over 30 years, PCP has created multiple K-12 opportunities for youth to envision themselves as future STEM professionals.

In the chapter about the importance of research, Carr et. al. (2019) alluded to the fact that the location of PCP units as arms of college recruitment and retention is a relatively new construct. The authors review existing research on:

1. the impact of PCP on college enrollment and degree completion (e.g. Perna & Swaill, 2001).
2. the experience of PCP students (e.g. Hicks, 2005).
3. specific PCP programs across the nation (e.g. Gullatt & Jan, 2003).

Seth & Trembley (2019) provide an overview of PCP lexicon while recognizing that programs offered at individual college and universities are very diverse in shape and form. Although there is consistency in categories, PCP efforts are constantly changing and adapting to needs.

This book represents an important step towards codifying the art and science of PCP activities and the recognition of this professional realm as an essential component of higher education institutions.

Portfolio of Broader Impact Activities

Meeting institutional strategic goals by triangulating research, teaching and outreach to impact society

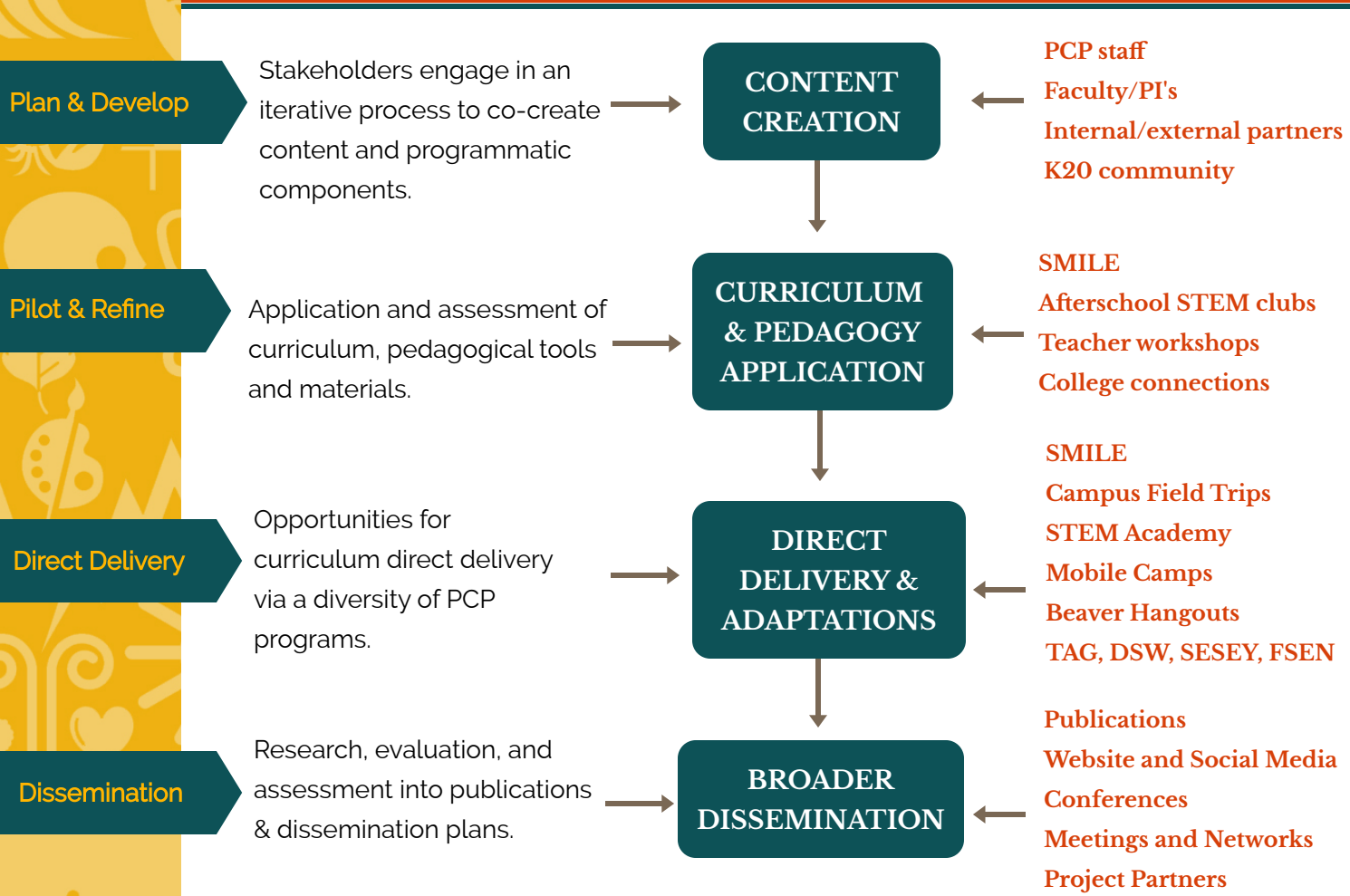
"Precollege programs create opportunities and pathways to STEM through Broader Impact Partnerships. Through these partnerships K-12 teachers and students have access to cutting edge research, researchers and graduate and undergraduate students pursuing STEM careers " -Dr. SueAnn Bottoms, PCP Director

"Engaged precollege program units do not only have a distinct mission in each university but also hold distinct models of engagement with the communities they serve" - Dr. Susan Rowe, PCP Research and Engagement Manager

Early and continued exposure to STEM disciplines and concepts, as well as college connections, are key to getting and keeping students interested in STEM fields and careers. This is especially important for recruiting groups traditionally underrepresented in STEM fields. OSU PCP has a long history of delivering quality programming and helping faculty enhance the broader impact of their research.

As s a recruiting arm of OSU Enrollment Management, PCP also engages and supports undergraduate and graduate students, providing them with the skills, tools, and understanding of the broader impacts their future research can have on society.

PCP Broader Impacts & Engagement Model



SMILE Program

Provides STEM pathways for underserved youth via after school STEM clubs and professional development for teachers.

Annually serves 600-700 students in grades 4-12 and 60 teachers. 96% of SMILE students graduate from high school.

Beaver Hangouts

Promotes success of underserved middle and high school youth via equitable access to post-secondary options. OSU students volunteer as coaches connecting with classrooms via videoconferencing.

Serves 700 students, over an average of 3,500 hours total each year.

Campus Field Trips

Encourage and inspire youth to attend college. Interacting with current OSU students is an integral part of field trips.

Annually hosts over 7,500 students, teachers, and parents for a day of STEM activities at OSU.

OSU's baseline financial support allows PCP to diversify its financial portfolio through partnerships with researchers and private foundations.

STEM Academy

Engages youth in year-round programs to increase college attendance and participation in STEM fields.

Four signature programs including STEM Summer Camps serve approximately 1,900 students each year.

TAG Programs

Talented and Gifted Programs provide educationally challenging and engaging curriculum, allowing youth with high abilities to explore interests in ways they can't do in the regular school setting.

Nearly 600 students participate in four signature programs annually.

Precollege Programs have a strong focus on science and engineering outreach, contributing to the following programs:

1. **Summer Experience in Science and Engineering for Youth (SESEY)** is a one week summer program for high school students from underserved groups.
2. **Mobile STEM Summer Camps** invite youth to create things worth inventing and develop skills applying STEM concepts.
3. **Discovering the Scientist Within** provides a free alf-day workshop to encourage young women's exploration of STEM careers.
4. **Family Science & Engineering Nights** are a statewide network of events to engage youth and families in STEM activities.

Referenced Resources

Bernstein, B. O., Lubinski, D., & Benbow, C. P. (2019). Psychological Constellations Assessed at Age 13 Predict Distinct Forms of Eminence 35 Years Later. *Psychological Science, 30*(3), 444–454. https://doi.org/10.1177/0956797618822524

Carr, E., Shultz, K., &. Steinman, L. (2019). "Importance of research in precollege programming." In S. L. Shet & C. W. Tremblay, (Eds.) (2019). Pre-College Programming in Higher Education: The Evolution of a Movement. A practitioner handbook for current and future pre-college program leaders. (pp. 163-178). Kindle Direct Publishing.

Center for Advancing Research Impact in Society (ARIS, 2020). "About. us," available at https://www.researchinsociety.org/about-us/aris.

Gullat, Y., & Jan, W. (2003). How Do Pre-Collegiate Academic Outreach Programs Impact College-Going among Underrepresented Students? Washington DC: Pathways to College Clearinghouse.

Hicks, T. (2005). Assessing the Academic, Personal and Social Experiences of Pre-College Students. Journal of College Admission, (186): 19-24.

National Alliance for Broader Impacts (NABI). (2015). *Broader Impacts Guiding Principles and Questions for National Science Foundation Proposals.* [Tri-fold]. Columbia, MO

Perna, L. W., & Swail, W. (2001). Pre-College Outreach and Early Intervention. Thought & Action, 17 (1), 99-110. Retrieved fromhttp://repository.upenn.edu/gse_pubs/287

Shet, S L. & Tremblay, C. W. (Eds.) (2019). Pre-College Programming in Higher Education: The Evolution of a Movement. A practitioner handbook for current and future pre-college program leaders. Kindle Direct Publishing.

Tai, R., Liu, C. Q., Maltese, A. V., & Fan, X. T. (2006). Planning for early careers in science. *Science, 312*(5777), 1143–1144. doi:10.1177/1932202X14536566

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Precollege Programs

Envision, Believe, Succeed

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