Small Group Discussion, November 21, 2019
Notes Compilation Summary
Morning Session

Students Discussion Tables

Q. What are the most important benefits that students receive by participating in UREs?

- **Skill Building, Academic Impact and Self Efficacy**
    - Academic Impact
    - Professional Skill Building (technical, professional, employability skills)
    - Critical Thinking
    - Accomplishment (doing, self-confidence)
    - Clarification of career pathways
    - Self-efficacy (building identity as scholar/scientist); psycho-social benefits; confidence-building – in charge of own learning ("I am capable; I am trusted; I feel empowered; I am confident.")
    - Increased general science literacy (and critical analysis) that can be transferred to (and enhance) study of other sciences
    - Transition to intrinsic curiosity-driven student learning

- **The Right Institutional Systems**
    - Need for institutional systems and processes that inform students of the opportunities (marketing)
    - Passionate, involved mentoring that involves the development of well-defined, clearly articulated project/goals
    - UREs are beneficial but need a clearer understanding of that benefit
    - Student outcomes are only as good as faculty/program
    - Opportunities to collaborate

- **Early and Sustained Engagement**
    - Earlier the better (leads to higher retention and completion)
    - Early and sustained engagement
    - Puts students on trajectory that makes them more marketable while being part of a community of support; provides students with a narrative

- **Intangibles**
    - Learning to deal with failure -> troubleshooting, resiliency
    - Understanding the process of science, esp. benefiting those who don't continue in STEM
    - Connect the Dots (real work application)
    - Develop global view of science and relation to other disciplines – ethical implications?

Q. What are the most important opportunities for students participating in UREs? Barriers?

- **Developing Professional Skills and Personal Growth**
    - Employment/transferability
    - Professional skills ("soft skills"), communication skills
    - Career exploration (expanded horizons)
    - Learning to deal with failure -> troubleshooting, resiliency
    - Opportunity to engage in professional activities like travel to conferences, competitions, or networking with employers, internships
    - Greater success/engagement among students who engage in UREs, prepares students for greater success in advanced work
    - Opportunity to build 'grit' and learning that unexpected results are not always bad outcomes
- **Access to Real-World Problems**
    - Application of classroom knowledge to real-world problems
    - Connectivity to real-world applications
    - CURE opportunities
    - Understanding the process of science, esp. benefiting those who don't continue in STEM
- **Networking**
    - Travel, conferences, networking opportunities
    - Networking with the STEM community (academic, professional)
- **Mentoring**
    - Good mentorship
    - Passionate, involved mentoring that involves the development of well-defined, clearly articulated project/goals.
    - Mentorship, and engagement with faculty
- **Marketing**
    - Need for institutional systems and processes that inform students of the opportunities (marketing!)
- **Professional Validation**
    - Understand/contribute to the discipline (multiple disciplines); be looked at as a colleague;
    - Validation
    - Leveraging technology to enable students to access UREs

Q. From the question above, what are the top three barriers for student participating in UREs?

- **Obligations & Circumstances**
    - Competing priorities (work, family, athletics, academics, extracurricular)

- Obligations (time, money, work, family)
- Life Circumstances
- Student time constraints
- Need to clarify expectations – explain to students what is expected of each participant before the project starts
- Student's personal circumstances; need to create trust between mentor and student
- Financial constraints beyond tuition: bus fare, clothing, losing work time to do research, etc.
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- **Lack of Awareness of UREs**

  - Lack of awareness of the opportunities
  - Lack of institutional framework/networks/resources/partnerships
  - Student perceptions and knowledge pertaining to URE (representation/exposure/awareness of these activities and their impacts)
  - Need to clarify expectations – explain to students what is expected of each participant before the project starts

- **Institutional Culture and Restrictions**

  - Culture
  - The institution culture and student perceptions about research and researchers can dissuade students from interest in participating in UREs
  - Institutional barriers, i.e. credit limits, restrictive degree requirements, financial aid issues

- **Other**

  - Fear (self-theories of competence, including culture, stereotype threat)
  - Mismatch between student and mentor/research opportunity
  - Resources

Q. What is the short-term as well as long-term impact of students' learning and skill development by participating in UREs?

List top three short-term impacts:

- **Greater Personal and Professional Awareness**

  - Situational Awareness
  - Learning to deal with failure -> troubleshooting, resiliency
  - Personal growth, learning how they learn
  - Learning how to learn independently (outside of the classroom context)
  - Increased student agency – "want to learn" vs. "need to learn"

- **Professional and Transferrable Skills**

    - Professional skills ("soft skills"), communication skills
    - Transferable skills, i.e. trouble shooting, organization, communication, field specific analytic approach to problem solving – mental agility
    - Technical Skills
    - Think like a scientist
    - Having appreciation for interdisciplinary linkages in URE and ability to apply interdisciplinary approaches to URE – they realize that they are living in a multidisciplinary world.
    - Gain foundational skills
    - Introduction to new technologies and hands-on experience

- **Other Intangibles**

    - Having a place to belong
    - Fast application of classroom content
    - Identification of career/educational direction and/or interests
    - Confidence to conduct experiment

List top three long-term impacts.

- **Becoming a Practitioner**

    - Becoming a critical thinker/scientific literacy
    - Growth and development as a resilient, experienced and knowledgeable practitioner (includes failing forward, dealing with obstacles)
    - Employability and workforce knowledge/readiness
    - Professional skills ("soft skills"), communication skills
    - Transferable skills, hard and soft, trouble shooting, organization, communication, field specific analytic approach to problem solving – mental agility.
    - Develop global view of science and relation to other disciplines – ethical implications?

- **Becoming a Learner**

    - Self-Awareness
    - Competency building exemplified by lifelong learning
    - Cultivating a capacity and desire for life-long learning.,
    - Learning to deal with failure -> troubleshooting, resiliency
    - Transition to intrinsic curiosity-driven student learning
    - Enabling more informed career choices.
    - Increased general science literacy (and critical analysis) that can be transferred to (and enhance) study of other sciences

- **Networking**

Q. What are the common lessons learned across URE types regarding students' outcomes and success?

Propose up to three common lessons learned.

- **Critical Learning & Skill Building**
    - Learning to deal with failure -> troubleshooting, resiliency
    - Professional skills ("soft skills"), communication skills
    - Understanding the process of science, esp. benefiting those who don't continue in STEM
    - Need to deliberately balance foundational knowledge with URE objectives in courses – clarifying how the URE meets course objectives.
    - Increased general science literacy (and critical analysis) that can be transferred to (and enhance) study of other sciences

- **Student Outcomes**
    - UREs are beneficial but need a clearer understanding of that benefit
    - Student outcomes are only as good as faculty/program
    - Builds skills and helps students recognize how that matters for the future
    - Transforms student experience (meets the purpose of community colleges – students transform from passive to active)
    - Develop global view of science and relation to other disciplines – ethical implications?

- **Supports Students in Multiple Ways**
    - Career path exploration (helps students explore, define and refine goals)
    - Builds connections with people
    - We need to meet students where they are when we develop UREs
    - Early and sustained engagement
    - Transition to intrinsic curiosity-driven student learning

- **Institutional Systems (including mentorship cultivation and marketing)**
    - Need for institutional systems and processes that inform students of the opportunities (marketing!)
    - Passionate, involved mentoring that involves the development of well-defined, clearly articulated project/goals.
    - Professional development of STEM mentors, faculty that facilitate UREs, is needed, and use input from alumni in the process (use URE alumni as mentors of URE students)

Faculty Discussion Tables:

Q. What are the key benefits that faculty receive by teaching UREs and, in some cases, leading the URE efforts at an institution? List three to four benefits.

- **Professional Development & Faculty Engagement**
  - Professional Development: having the opportunity to go to workshops and conferences both discipline-specific and pedagogic practices; update faculty technical skills.
  - Professional Development and Ongoing Scholarship
  - Professional growth and development
  - Re-energizing Faculty
  - Faculty engagement (excitement/rejuvenation/interaction with other faculty)
  - Networking and Professional Dev. Opportunities
  - Personal and professional value and enjoyment (job satisfaction)

- **Student Relationship**
  - Transformation of the students
  - Closer relationships with students

- **Faculty Leverage and Power**
  - Makes our jobs better day to day
  - Gives faculty leverage
  - Promoting inclusivity by changing traditional classroom power structure and deepening student/faculty relationships.
  - Leadership: developing academic leadership skills

- **Collaboration and Relationships**
  - Increased collaboration at multiple levels: micro-, mesa-, and macro-levels. Gets instructors out of their silos.
  - Relationships/Collaboration: students, alumni, colleagues, administration, external partners (industry, university, etc.); a seamless pipeline that serves all
  - Collaboration and relationship building, both students and faculty

- **Institutional Recognition**
  - Professional and institutional recognition
  - Opening opportunities and PR for the institution/programs

- **Scaffolding & Strengthening pipeline**

Q. What type of support do faculty need to implement UREs? To sustain their leadership in URE initiatives over time? List three to four key supports for implementation

- **Practice UR Strategically**
  - Space to fail: recognition that new curriculum and heavily open-ended curriculum often create results that are not expected. This can lead to phenomena like other faculty, staff and student push-back.
  - Training and curriculum development: access to existing materials, prof. development promotion and funding; supporting professional networks.
  - External influence (statewide initiatives/professional societies)

    - Get UR in strategic plan
    - An UR coordinator, try to move this position to hard money – can gather metrics etc…

- **Administrative Support**

    - Administrative Support; i.e. shared vision, priorities, and stability, grants etc., correct analysis of student evals
    - Infrastructure – i.e. class caps, load calculations
    - Lab staff support

- **Research Culture on Campus**

- **Time and Money**

    - Funding opportunities
    - Time
    - Money (space, supplies, buyout)
    - Time and money: for design and development, for travel and faculty development, and release time/compensation for extra work
    - Support for obtaining funding.

- **Students**

List three to four key supports for sustaining leadership.

- **Strategic Support**

    - Get UR in strategic plan
    - Administrative buy-in/strategic alignment
    - Undergraduate research is integrated into the campus strategic plan.
    - Embedded/scaffolded research within gen ed courses
    - Create centralized office/structure

- **Leadership Development**

    - Well-trained in supporting undergraduate research.
    - Professional development specific to leadership

- **UR Hires**

    - Add UR as a factor in hiring and promotion
    - An UR coordinator

- **Communications**

    - Communication platform: developing a plan for marketing, recruitment of faculty and students, outreach to community

- **Other**

    - Time
    - External influence (transferability/articulation)
    - Try to negotiate that indirect costs from grants are used to support UR

Q. How do faculty ensure that the UREs offered align well with industry/workforce preparation needs?

Propose up to three promising strategies.

- **Essential Partnerships and Relationship Building**
    - Industry, federal, and academic partners/employers provide feedback/info on desired skills & competencies to incorporate into the URE
    - Involve industry, federal, and academic partners in campus events related to URE (e.g., speakers, mentors, participants) and acknowledging their efforts (e.g., awards, banquet, recognition)
    - Mindfully build in industry/workforce connection into any project or grant
    - Make sure faculty attend meetings (local and national) with business focus, which we might not usually do.
    - Don't overlook small local businesses

- **Advisory Boards**
    - Establish and maintain advisory boards that include key employers.
    - Make use of advisory boards (combo workforce/academic for transfer programs)

- **Skills and Credential Building**
    - Focus on life skills/"soft" skills: problem solving, communication, critical thinking, translational skills
    - Promote transferrable skills- teamwork, communication, problem-solving, evidence-based decision making, adaptability, and research ethics.
    - Promote widely applied hard skills – Excel, GIS, data manipulation, data collection, lab safety and protocols, how to read a protocol
    - Focus on explicitly teaching broad skills (professional, communication, problem solving, etc.)
    - Using digital badges (e.g. acclaim)
    - Access to internships

- **Clarity of Desired Outcomes**
    - Know your population – is the goal for transfer to further degrees, or directly into industry. If the goal is directly to industry partner with that industry if possible, or to partner with 4-year schools if that is the goal. Try to obtain qualitative data from industry.

- **Alumni Network**
    - Alumni Network - Could be focused to a particular program rather than the college-wide alumni program. Be aggressive.

- **Research Position**
    - A position or part of a position as a Research Skills Experience Coordinator. (This can be staff, faculty or administration.)

Q. What are the common lessons learned regarding faculty success across URE types?

Propose up to three lessons learned.

- **Align to Goals / Champion Successes**
  - Assessments with data-aligned college goals are clearly communicated. Stories of individual student successes are clearly communicated.

- **Setting Expectations**
  - Willing to have initiative to just begin the process with limited support
  - Faculty need to have reasonable expectations (with students, faculty, and administration)
  - It seems most feasible in terms of time and commitment to focus on CUREs (due to not having additional load on top of other responsibilities)
  - We are creating disruption, and that's OK, because the goal is Student Success and UR develops student confidence. We build creative, flexible thinkers.
  - Acknowledgement of barriers

- **Success Factors**
  - Strategically recruit a diverse student body from the beginning (Initial conditions might be important in maintaining diversity in URE activities).
  - Creating the network and landscape for support of URE that includes compensating faculty fairly and equitably
  - There are benefits and challenges to each type of URE, and success depends on the individual faculty and institution. (There is no one size fits all).
  - High rewards for students and faculty
  - More mentoring is better

- **Collaboration and Communication**
  - Having a partner or collaborator really contributes to faculty success.
  - Value collaboration and delegation.
  - Collaboration
  - Communicate

Institution Discussion Tables

Q. What are the most important benefits that accrue to an institution that commits to and grows their URE efforts? Propose the top three benefits.

- **Institutional Image, Relevance, Reputation, Relationships**
    - Increases the positive value of the community college to the community
    - Demonstrates the relevance of the institution and/or the field of study
    - Enhances institutional image and reputation: not trying to brand ourselves as a research institution, rather as an enhanced educational experience and perception of institution. Research is a tool to improve our pedagogy.
    - Aligns with mission of the institution, it is a mechanism of meeting those goals and mission.
    - Increases the visibility of the institution
    - Recognition – funding, publicity, leading-edge programs, awareness
    - Relationships - internal, external, public perception, industry
    - Get to know who your community is-. This should not be just a discussion at the admin level but should include all stakeholders in these conversations. Define and design skills in partnership with employers that is well-aligned and uses technology that is relevant to employers (and community organizations).
    - Building a network for funding through a variety of methods (dedicated alumni, ties to local industry, govt agencies, improved visibility)

- **Student Outcomes & Success**
    - Increases student inclusion and equity
    - Improves student outcomes: Placement (whether employment after 2 years or transfer to 4 year), retention due to affirmation of career path
    - Influences Student Success – transfer, retention, graduation rates, workforce, articulation agreements
    - Impacts performance measures and student success (engagement, retention, and graduation)

- **Connection, Integration, & Engagement**
    - Connect UREs to applied experiences: internships, externships, job experiences, and then collect data back from the experience to better understand how the need is met/or not met, and feedback loop supports making better decisions moving forward. This includes the students and what their experience was and how prepared they felt.
    - Recruitment and engagement of faculty and students. Engagement is a proxy for successful outcomes.
    - Integrating the URE into the programs for the students

- **Equity & Access**
    - Addresses equity by increasing access. Tapping the populations of community college students that have historically been underrepresented in STEM and higher education provides greater access to an authentic research experience and future opportunities.

Q. What are the elements of an institutional culture at community colleges that will accelerate the practice of UREs over time? Propose three key elements of institutional culture

- **Common Vision and Goals**
    - Align strategic goals with URE to justify resources, courses, etc.
    - Common and shared vision
    - Alignment with institutional priorities
    - Buy-in to the UGR from administration; why is UGR important to do?

- **Innovation Mindset**
    - Entrepreneurship and innovation mindset
    - Focus is on innovative teaching, recruitment, and annual review
    - Trust, risk taking, transparency

- **Culture that Honors Research as Teaching**
    - Pedagogical tool – research is teaching
    - Prof. dev culture
    - Incentivizing research as part of reward structure

- **Recognition and Celebration**
    - Need a better culture of recognition
    - Communication and celebrating at the institutional level

- **Collaboration & Shared Governance**
    - Shared governance—internal commitment to URE as an important experience and supported by all on campus
    - Being inclusive and openness to collaboration
    - Autonomy in decision-making or access to decision-makers because there are fewer layers between faculty and presidents, provosts – ability to build out what you want.

Three key elements of infrastructure.

- **Alignment in Policies & Programs**
    - Standardization of what URE is at your campus and the flexibility with what URE can be and mechanism of delivery
    - Programmatic and policy changes and support from government funding agencies, public-private partnerships, and donations
    - Alignment with institutional priorities

- **Incentives, Rewards, Recognition, Professional Development**
    - Recognition - Faculty compensation and/or recognition
    - Incentivizing research as part of reward structure
    - Prof. dev culture
    - Academic support in development of programs which includes investment in people: reassignment for doing the work in UREs, teaching and training/professional development support, sabbaticals;

- **Space & Facilities & Resources**
    - Dedicated spaces and facilities, including librarian services/archival services, and ways to showcase student work in perpetuity
    - Space – if chemistry or physics, do you have labs? Including creative repurposing of space. Small grants to get started. Money to build larger labs.
    - Support; possibly physical support such as lab space and equipment
    - Administrative support (space, funding, allowances with a long-term vision)

- **Partnerships**
    - External partnerships – internal and external to address resource questions (ties in with the inclusiveness).

- **Assessment**
    - Assessment is a required element—can be leveraged to use the data collected to make data informed discussions

Q. What factors can lead to a college administration taking on greater ownership of implementing UREs?

List three to four key factors.

- **Impact Data**
    - Student success metrics – student experiences, publications and presence at conferences to highlight the college, press video
    - Impact data
    - Assessment is a required element—can be leveraged to use the data collected to make data informed discussions

- **Mission Alignment**
    - Consistency with college mission – recruitment, retention, placement
    - Mission and values alignment.
    - Make sure UREs are a means of making their job easier. "The WIFM method." This can be anything from talking points or a solution to a problem or a tie into a strategic plan. This can also involve bringing in money.

- **External Pressure**
    - External pressure through publicity, comparison to other CCs, board of trustees, etc.
    - Accreditation: positive impacts
    - Accreditation: risks and risk-oversight
    - Mandates from above
    - State level
    - Requests from stakeholders
    - Highlight that other institutions are doing…we don't want to fall behind

- **Resources to Help Fund**
    - Economic benefits – grants, scholarships, funding, industry buy-in/equipment, money to update lab spaces
    - Show me the money and sustainability

- Dedicated spaces and facilities, including librarian services/archival services, and ways to showcase student work in perpetuity
- Brings in money to the institution
- Academic support in development of programs, which includes investment in people: reassignment for doing the work in UREs, teaching and training/professional development support, sabbaticals;

- **Communications, Marketing**

  - Good salesmanship, marketing
  - Highlight the prestige it brings to institution
  - Pay attention to all different kinds of administrators and understand what they do/contribute. presidents, provosts – external stories versus provosts needs to keep internal dynamics on board. Also pay attention to facilities managers, dept chairs, street level bureaucrats.
  - Communication of those implementing or participating in research with board of trustees, stakeholders

- **Inclusion**

  - Inclusion – asking them to participate in some way that's appropriate to their role.

Q. How do institutions ensure that the UREs offered align well with local industry/workforce needs? Propose up to three promising strategies.

- **Assessment & Data**

  - Review and assessment – through advisory boards, program reviews, student perception
  - Formative assessment – constantly re-evaluating what is going, looking at local industry with a growth mindset
  - Data – employment rates, effectiveness of URE on industry placement after graduation

- **Industry and Employer Engagement**

  - Forming collaboration with local community constituents (employers - apprenticeships, government, etc.)
  - Connect UREs to applied experiences: internships, externships, job experiences, and then collect data back from the experience to better understand how the need is met/or not met, and feedback loop supports making better decisions moving forward. This includes the students and what their experience was and how prepared they felt.
  - Industry engagement strategies - Bring industry into advisory boards and steering committee, but also thank-you nights/acknowledgement events, other networking events. Actually engage – ask them to co-produce what they need, program outcomes. Look at curriculum reviews.
  - Think about industry broadly – engineering firms and businesses, but also research universities, local government as industries.
  - Pay attention to transferable skills that industry needs – teamwork, ability to learn and adapt, etc. and build into program itself.
  - Engage with industry as PARTNERS
    - As Advisory board members
    - Focus groups to learn needs –produce report that can be disseminated to admin, students, parents, etc.
    - Align courses/research around those needs
  - Industry partnership – making UGR relevant to industry problems, involving industry in the development and implementation of UGR

- **Alumni Engagement**
    - Alumni to give feedback to the programs to help improve, align, and make the program relevant to industry
    - Alumni follow up/connections
        - Sign up on linked in while they are at institution then you can follow them (to connect with the resume building classroom activity, bring in a photographer so students can immediately post their profile photo)

- **Community Knowledge**
    - Get to know who your community is- not just a discussion at the admin level but including all stakeholders in these conversations. Define and design skills in partnership with employers that is well aligned, and use technology that is relevant to employers (and community orgs)

- **Focus on the Student**
    - Integrating the URE into the programs for the students
    - Student awareness of how their experience is relevant