

Focus Area Discussions

Delegates chose a focus area to work on and spent the bulk of the time at the summit developing goals and strategies for this focus area. In this section, we present the summary of priority strategies for each area. Supporting documentation and notes from each group's work can be found in Appendix C. Because each group chose to tackle this work in somewhat different ways, each section also looks somewhat different from the others.

Alignment and Coordination: System-wide

Developing policies and practices throughout the educational system that increase the consistency between standards and assessment at one level with the prerequisites for the next level. Assuring that credit can be transferred regardless of whether the student plans on an associate degree or a four-year degree.

Main Strategy: Create (K-20) statewide council that has both strategic and tactical levels, tasked to develop policy, recommendations, and coordinate existing and new engineering and applied science programs.

Key Actions	Lead	Timeline
<ul style="list-style-type: none"> • Check with ETIC to see if it wants to own this: <ul style="list-style-type: none"> ○ If no, take to Joint Boards ○ If yes, have them ask Joint Boards for charter 	Bruce Schafer	9/23 – 11/14
• Create model/ charter – both levels	?	?
• Take to Joint Boards and Governor, include WFTF, Superintendent of Public Instruction	?	?
• Members appointed	?	?
• Strategy group develops recommendations	?	?
• Tactical group develops tactical plans	?	?
• Coordination group has initial meeting	?	?

Measures:

- Funding increase
- Twofold increase in freshman Engineering/Applied Science students
- Increase in successful transfers
- Twofold increase in graduates – 2X
- Decrease in redundant credits
- Increased hiring of Oregon graduates
- Increased stature of Oregon engineering education

- Decreased developmental/ remedial instruction
- Increased high school strand/ equivalent in EAS

Supporting Strategy: Utilize statewide coordination group that takes on

- Skill set development
- Discussion of career pathways
- Discussion of OPAS summit
- Based on “Engineered Community” group that has met in the past.

Key Actions

- \geq ½ day meeting
- Additional meeting

Lead

Nicki
TBA

Timeline

Jan 2006
2006

Alignment and Coordination: Curricula and Co-Curricula

Using best practices from the co-curricular world in classroom instruction and vice versa. Identifying ways that the two learning environments can complement each other and address the gaps in each system.

Goal: All Students involved in Co-Curricular Activities (CCA)

Strategy: Coordinate and fund co-curricular activities.

Key Actions	Lead	Timeline
<ul style="list-style-type: none">• CCA Summit: teachers and administrators and CCA (NSF funding and in kind contributions)	OMSI + OUS Ray Vandiver	By 8/06 (coterminant with action below)
<ul style="list-style-type: none">• Create CCA network/ virtual ecosystem	OMSI + Microsoft + WOU	By 8/06 (coterminant with above)
<ul style="list-style-type: none">• Share resources and curriculum	OMSI	8/06
<ul style="list-style-type: none">• Jointly explore funding options	Summit	8/06

Measure: Attendance, virtual ecosystem exists, number of students participating in CCA

Resources: National Science Foundation, corporate in-kind, foundations

Best Practices

Adapting and leveraging ideas from other states. Mapping the models and methods from successful programs in other states to address Oregon's challenges and needs.

Note: This group met Thursday afternoon only, with the task of identifying best practices that might apply to Oregon.

In this group's review of the literature, best practices shared the following components:

- Hands-on learning
- Role models
- Relevant to students' lives
- Internships
- Parent involvement
- Student choice
- Open-ended inquiry
- Industry participation
- Field trips and site visits
- In-depth learning
- Contests and challenges
- Small classes
- Simulation/ role play
- Near-peer mentoring
- Girls-only groups
- Toys and tinkering
- Recruitment
- Starting young
- Support groups/ relationships
- Scholarships
- Interactive web sites
- Showcasing student work
- Clear articulation of engineering as a career (marketing)

Co-Curricular Best Practices – Exemplary National Programs

- Women in Engineering (doc 6.10)
- National Engineers Week (doc. 6.8)
- Lemelson/MIT InvenTeam (doc. 6.6)
- Girls Go Tech (doc. 6.3)
- Girl Power 21st Century (doc. 6.2)

Career Pathways

Describing the relationship of educational programs and integrated work experiences to careers. Effectively communicating this information to students to allow them to make informed and productive decisions. Pathways may provide multiple entry and exit points for students who cannot complete all their educational goals at one time and thus join the workforce after completing one or more levels with the possibility of returning to an educational program later.

Goal #1: Consistency within state education levels (common framework, local customization)

Strategy #1: Create a customizable pathway framework. (See draft model next page)

Action #1: Continue current Pathways to Advancement efforts statewide (adopt best models and research best practices from other states.)

Who: Statewide Engineering Pathways Task Force (SEPT)

Goal #2: Improve communications and educate our consumers

Strategy #2: Create strategic multi-faceted marketing of common framework to inform all stakeholders (connect to marketing group)

Action #2: Identify and convene representatives from Pathways stakeholder group

Who: SEPT.

Goal #3: Evaluate Framework Model

Strategy #3: Assess what works well and eliminate the rest

Action #3: Develop valid process with SEPT and implement assessment.

Who: SEPT

SEPT: Statewide Engineering Pathways Task Force

Transition from an ad hoc group to an officially-sanctioned group to accomplish the work above.

Suggested Members:

- CCWD
- ODE
- OUS
- ETIC
- Engineering Associations
- Regional Coordinator/ Pro-Tech Deans
- Other Professional Societies
- K-12
- Other (Consult with other pathways initiatives groups)
- OACTE representative

Diversity

Increasing the ethnic and gender diversity in technical fields. Developing new strategies to attract diverse students. Enhancing and growing existing programs and methods to increase the diversity of students preparing for and succeeding in applied science and engineering education.

Goal: Raise performance of under-represented groups at all levels:

Strategy: Implement parent education to break down cultural barriers to engineering and related careers.

Key Actions	Lead	Timeline
Provide champions that promote the strategy	Industry – ETIC	Initiate within 6 months / run for 5 years
Building Learning Communities	Headstart	6 months planning, 1 year implementation
Internships	Partnership – schools and industry	Ongoing, enhance
Industry mentors	Industry	See above TISA by champion
Personal Testimonies	Engineers, students	Ongoing

Key Measures of Progress:

- 9th grade education plan written by students (exploit existing)
 - Tally
- Surveys at younger levels
- Increase in co-curricular participation, ...
 - Including ORTOP, ISEF, ...
- Goal is positive change
- Change+ Applications, 1st year retention, graduates progress to engineering and CS ...
- Increase in parent participation – PTO, P-T conferences, ...
- Number of at-risk parents personally touched by parent education program

Resources: - Parent Education

Existing	Additional
Parent Teacher Organizations (PTOs)	Industry leadership to champion OPAS with organizations
Community liaisons (in some schools) - include Native American education	\$\$ for internships, learning communities, ... (see action list)
ASPIRE program (HS)	Personnel time
GEAR UP (6-8)	
Girl Scouts and Campfire	

Instructional Professional Development

Increasing the capacity of teachers and faculty to deliver learning experiences that inspire and prepare students. Identifying and providing professional development programs and strategies that enhance their knowledge, skills, and mastery.

Goals:

- 1) Give teachers and counselors tools and training needed to excite students about problem-solving and engineering/ applied science.
- 2) Teachers will value engineering applications in delivering their subject matter.
- 3) Improve the relevance and quality of teaching at post-secondary level.

Goal 1 Strategy:

Develop pooled resources for teaching engineering/ applied science projects.

Actions	Lead	Timeline
Identify/coalesce resources (Including industry and professional groups)	OSU – Larry Flick; U of O (GK12)- Dean Livelybrooks	1.5 years
Beta test project kits in 3 Education Service Districts (ESD)	ESD’s – Megan Helzerman, High Desert-Kathy Emerson Lane ESD- Bob Curtis.	1.5 years
Expand the above as they are developed		

Resources: 0.5 FTE

Goal 2 Strategy:

Elucidate engineering role in supporting core curriculum

Actions	Lead	Timeline
Provide concrete examples of curricula	Professional organizations: ASEE; OSTA; OCTM – Winnie Miller-lead	Piloted by May
Deliver OSTA/OCTM presentations	Larry Flick, Dean Livelybrooks, Winnie Miller, others	Report by pilot fall of 2006
Document meeting existing core standards & requirements	ODE- Jim Schoelkopf	Fall 2007

Resources: 1) 0.1 FTE

Goal 3 Strategy

Improve the relevance and quality of teaching at post-secondary level

Actions	Lead	Timeline
Develop industry/ university/community college partnerships to reform curriculum thru professional development	U of O- Ginny Lo	2 years

Marketing Engineering & Applied Science Careers

Strategies for raising awareness of and interest in engineering and applied science careers. Increasing the number of Oregonians interested in pursuing engineering and applied science as a career and gaining the education they need to successfully do so.

Overarching Goal: Within 5 years, every student entering high school has been exposed to engineering and has the resources available to make an informed choice about a STEM path.

Strategy 1: Create a multi-tiered program to build awareness of opportunities and career options

Key Actions	Lead	Timeline
Engage a professional firm	OPAS	3 months
Create and promote co-curricular guide	OPAS	3 months

Measures:

- Sustainable marketing plan in effect
- Guide is online/ available in print/ being used (web hits)

Resources:

- Industry-funded
- Web-host, coordinator, and “ongoing owner”

Strategy 2: Leverage and/or replicate existing models and best practices

Key Actions	Lead	Timeline
Promote short-term teacher trainings, such as SuperQuest	SAOF	ongoing
Promote outreach opportunities/ competitions such as ORTOP, ISEF	Varied (foundations, outreach organizations, industry, marketing firm)	<u>Begin</u> promotion today; measure in 1 year

Measures:

- Every school has a STEM/ co-curricular program

Resources:

- Varied (supplies, materials, teacher training, volunteers)

Strategy 3: State/ Industry/ Education/ Association System Partnership(s)

Key Actions	Lead	Timeline
Create clearinghouse to facilitate mentors and speakers as resources	SAO	Jan. 2006
Establish teacher-business mentorship program ranging from short-term to full-year sabbaticals	ETIC and others, OR Business Council, and B.E.C.	Kick off within 3 months

Measures:

- Track hits and successful pairings
- Track numbers of teachers and businesses participating

Resources:

- SAO
- Presenters to pitch to businesses/ ETIC and others

Standards, Courses and Curricula

Improving standards and aligning courses to standards. Identifying gaps in curricula and course content to fill them. Continuous improvement to curriculum to assure the highest quality courses.

Goal #1: Develop standard outcomes and pre-requisite knowledge and skills for core 100-200 level engineering science at a statewide level.

Key Action Ideas	Lead	Timelines
Create/ bring together an inter-disciplinary, sector and industry curriculum advisory committee	JBAC coordination, support, endorsement, delegate facilitator, faculty K-20/ Industry	May 2006
Establish common and consistent course numbers	“	May 2007
Professional development for group around outcomes	“	On-going
Groups continue to meet to provide on-going review and dissemination	“	On-going

Measures:

- 1) Outcomes have been written.
- 2) Common and consistent course numbers established.
- 3) Group agreement on professional development.

Resources:

- Release time
- Travel reimbursements
- Incentives to participate

Goal #2: Design and/or develop assessments based on standard outcomes and rubrics

Key Action Ideas	Lead	Timelines
Identify existing models (e.g. AAAS Benchmarks, Oregon standards)	JBAC coordination, support, endorsement, delegate facilitator, faculty K-20/ Industry	2005
Apply to a single course in STEM as a prototype and assess	“	2006
Extend to core courses	“	2007

Measures:

- 1) Models identified
- 2) Prototype complete
- 3) Core courses complete

Resources:

- Release time
- Travel reimbursements
- Incentives to participate

Student Success: Access, Motivation and Retention

Identifying perceived barriers to access and developing strategies to increase student confidence in their ability to succeed. Identifying motivational and retention strategies that will inspire students to pursue engineering & applied science education and support these students in completing this education.

Strategy 1: Standards and Classroom Delivery

Owner: Steve Day

Rethink Standards: Form stakeholder team for development of problem solving, inquiry-based model

Actions/Measures	Timeline	\$ and Resources
New model developed	2005/06	Existing and Incidental
New model adapted	2007/08	ODE
Evaluate impact	Annual	ODE

Strategy 2: Co-Curricular and Integrated Programs

Owner: ETIC

- Create Council for resource coordination and planning state-wide

Actions	Timeline
Comprehensive map of resources (web accessible)	Spring 2006
Identify gaps across State Benchmark measures	Summer 2006
Advocate for appointing coordinator	Start fall 2006

Measures:

- Number of students, number of experiences
- Number entering CC, University, EAS