

OPAS Prepare Meeting #4
May 15, 2007 – Capital Center and Teleconference

Attendees: Dick Knight (PSU, Saturday Academy), Tom Thompson (ODE), Tim Brower (OIT), Ellen Lyon (Glencoe HS, Hillsboro School District), Jo Oshiro (OUS/ OPAS), Walt Mayberry (retired), Larry Flick (OSU), Michal Young (UO).

Agenda:

3:30 - 3:35	Welcome and Introductions
3:35 - 3:40	<p>Quick Update on Open Action Items</p> <ul style="list-style-type: none"> • University assessment: matriculating students' preparation for success: initial discussions with PSU and OSU; will plan follow-up meetings. • ODE Standards' White Paper (Steve Day): Group was supportive of recommendations to support SACPS on skill-and process-based standards, to advocate for middle school exposure to career alternatives, and pursuing either/both leveraging CTE activity and increasing engineering content of traditional academic course; will follow-up at a future meeting. • Framing Student Success White Paper (Larry Flick): Group was supportive of approach. Revisit after PLTW. • Career-Related Learning Experiences (CRLEs) Requirement: an opportunity? Review at a future meeting after connecting with the Motivate Workgroup.
	<p>Project Lead the Way <i>The Prepare Workgroup intends to identify initiatives that</i></p> <ul style="list-style-type: none"> • <i>have significant impact on students' preparation for and selection of engineering and applied science careers</i> • <i>are extensible to a significant fraction of Oregon schools/students</i> • <i>Is PLTW a candidate for this focus?</i> <p>Special Guests: Tim Brower (OIT) and Ellen Lyon (Glencoe)</p> <ul style="list-style-type: none"> • Presentations - Tim's slides • Q & A <p>Discussion:</p> <ul style="list-style-type: none"> • Opportunities, issues, expansion potential • Options • Next Steps
4:55 - 5:00	<p>Next Meeting Tuesday June 19, 2007</p> <ul style="list-style-type: none"> • Items for the Agenda?

Summary as posted on May 16, 2007

The most recent meeting of the Prepare Workgroup was May 15, 2007 and hosted Tim Brower of OIT and Ellen Lyon of Glencoe High School, Hillsboro School District, to talk about Project Lead The Way (PLTW).

PLTW is a national curriculum administered by a non-profit organization. It is based in part on nationally developed standards – National Science Education Standards, Standards for Technological Literacy (ITEA), Standards for the English Language Arts, National Content Standards for Engineering and Engineering Technology, Principles and Standards of School Mathematics. The coursework is activity, project, and problem-based with an emphasis on teamwork. There are end-of-course exams which are nationally normed. The curriculum has three foundation courses, Introduction to Engineering Design (9th grade), Principles of Engineering (10th grade) and Digital Electronics (11th grade), and four specialization courses, Computer Integrated Manufacturing (CIM), Civil Engineering and Architecture, Biotechnical Engineering, and Aerospace Technology. Of the specialization courses, only CIM is currently

offered in Oregon. The 12th grade course is Engineering Design and Development, which incorporates a capstone project. Courses are designed to be 1 hour a day for 36 weeks.

The workgroup found two areas of concern with PLTW: they are not currently meeting goals for recruiting girls to the program, and the curriculum does not appear to include computer science, although there is a strong component of sophisticated application usage.

Workgroup members Dick Knight, Walt Mayberry and Jo Oshiro are going to develop the information received yesterday into a proposal for the workgroup to endorse the adoption of PLTW in 100 high schools in Oregon, and outline ways in which the workgroup could be instrumental in achieving that goal. Some methods discussed are letters of endorsement for grants that Tim Brower is currently writing to ETIC and to ODE, helping develop a business plan and identify potential corporate and foundation partners, and providing input and feedback on documents such as a statement that Ellen Lyon volunteered to write on the benefits to high school principals and superintendents on what problems the adoption of PLTW will solve for them, over and above the curriculum being good for students.

The workgroup and staff will continue to pursue talking to universities about what constitutes academic preparedness for engineering programs and how well current students are meeting those criteria, and the optimal methods for closing any gaps. The workgroup also intends to resume discussions with Larry Flick about how OPAS can help work with him on injecting more rigor into CTE construction engineering classes.

The next meeting is scheduled for Tuesday, June 19, 2007 3:30 – 5:00.

Action Items as emailed on May 18, 2007

- Verify the number of high schools in Oregon. Answer: 219 – thanks, Sean.
- Bruce – can your contacts at the Portland Business Journal come up with a few more copies of the Book of Lists?
- Ellen Lyon – Draft a statement on what problem(s) PLTW solves for principals and superintendents
- Sean – can we hear your perspective on PLTW?
- Tom – What constitutes a valid “partner for an ODE grant?”
- Jo – contact info to Tim Brower for Sam Tupou, Curriculum Coordinator in Eugene, the RV Cluster, Steve Day of Beaverton School District, Brad Naas of Alder Creek Middle School.
- Jo – ask Scott Giltz for the contact info for the Autodesk sales manager
- Bruce – is there an opportunity to show off PLTW at COSA? What is your forum at COSA? Table? Breakout? Topic?
- Di – can you get the Oregonian to cover fun science stuff from OUS institutions as part of a Science feature – OIT Weather balloon projects have participants of all ages.
- Those not attending: review PLTW info sent out in previous emails.

Additional points of information, discussion and resources

- The ACT National Curriculum Survey is conducted every 3-5 years to help calibrate the ACT tests to current high school curriculum. The ACT tests supposedly measure academic mastery of curricular material, while the SAT supposedly measures scholastic aptitude. The news is not good, especially for STEM: “preparation for college” is equated to preparation for freshman college biology. See the entire report at http://opas.ous.edu/Committees/Resources/Publications/ACT_NationalCurriculumSurvey2006.pdf. In brief, high school and post-secondary instructor expectations are not well aligned:
 - High school instructors emphasize the importance of:
 - English/Writing: Idea Development
 - Mathematics: Advanced Content
 - Reading strategies de-emphasized after 9th grade
 - Science: Science Content
 - Post-secondary instructors expect (or emphasize in remedial classes):
 - English/Writing: Usage and Punctuation
 - Mathematics: Rigorous understanding of fundamentals
 - Reading strategies emphasized in remedial classes
 - Science: Inquiry/Process
- OIT places students by math test, as does OSU. Tom questions the placement tests, as at OSU a 3 hour review class can make the difference between not qualified and qualified.
- Dick really wants to put more emphasis on adding engineering content/skills to traditional math courses. The complete picture is complicated: we are not going to advocate replacing core college-prep classes with career-specific softer stuff; nor requiring everyone to take a pre-engineering class. He'd like to review these issues the next time Steve Day can attend a meeting.
 - Larry Flick continues working on this strategy for his possible NSF grant, and will be in Minnesota pursuing that with the Math in CTE people.
- Project Lead The Way (PLTW):
 - Tim spends about half his time on PLTW, and the other half as department chair. He emphasizes that PLTW is an Oregon, not an OIT, program.
 - Tim's presentation, and the article he brought, “Tough Choices, Tough Times” emphasize that STEM education issues and shortfalls are global, as is demand.
 - Lens for the PLTW presentation:
 - Are we in agreement with what PLTW does?
 - Is it extensible?
 - What could OPAS bring to this?
 - Leverage community connections
 - Possible dollars
 - We need to hear Sean's perspective on this.
 - 26 states have an affiliate university (ours is OIT), with 24 training sites around the nation. In the West: Seattle University and a local community college; San Diego State, OIT, Nevada, Colorado.
 - OIT is working on collecting Oregon data, especially longitudinal data, modeled on Indiana and Georgia's PLTW programs. An external evaluation of PLTW is being done by a company called TrueOutcomes.

- PLTW has trouble recruiting girls. Ellen Lyon recruited 5 girls to her class; they all signed up. They are a positive influence on the males in the class, but are not always comfortable with the group dynamics. When the working groups are self-selecting, the girls gravitate towards each other – Ellen is not sure whether they are running to or from. These girls are natural engineers, and were recruited from middle school TAG workshops and a freshman science class.
- Tim notes that PLTW emphasizes teamwork and presentations, and that lots of students don't want to work in teams.
- Side-note: sketching is still considered an important skill by industry, and it is rarely taught in schools anymore.
- The 4th year Engineering Design and Development class incorporates a capstone project which might be structured to meet Career-related Learning Experience requirements.
- PLTW is weak in computer science and software engineering. Discussion touched on whether computer science and/or software engineering overlapped with the curriculum described, and how transferable the skills are.
 - Previous discipline-specific courses have been added via industry interest (and sometimes funding). Industry specifies desirable educational outcomes, and PLTW curricula folks work to those ends.
 - Walt notes that PLTW gives students an arena for synthesis, evaluation, and problem-solving, so he is less concerned about the lack of computer-science-specific content and process. There is great value in the project management, time management, teamwork, evaluation, synthesis, analysis, critical thinking and just sitting down for an extended period of time and applying brainpower to a problem.
 - For more information, see David Lorge Parnas, "Software Engineering Programs Are Not Computer Science Programs," *IEEE Software*, vol. 16, no. 6, pp. 19-30, Nov/Dec, 1999, available for purchase at <http://csdl2.computer.org/persagen/DLAbsToc.jsp?resourcePath=/dl/mags/so/&toc=comp/mags/so/1999/06/s6toc.xml&DOI=10.1109/52.805469>
- A concern: do the college-bound students take these classes? Tom notes that experience says that when you have the rigor, the students will come. This is a way to bring in the capable underachievers. Everybody competes for the high-end students.
 - Ellen: rigor is teacher-driven as the curriculum is very flexible. She runs it like a science class.
 - Bruce: There is some reason to believe that if offered at a large high school, most of the PLTW kids will not end up in college.
 - Ellen: her students come in two distinct types, both of whom find their niche and are creative:
 - College-bound TAG freshman
 - CTE sophomores
 - CRLE and graduation requirements for 3 units of World Language OR CTE OR Fine Arts make a PLTW option more attractive for some students.

- How can schools take advantage of this? How can OPAS help?
 - Matchmake school districts and industry partners to get over equipment and startup costs.
 - Consult on a business plan: this or any program must in the long run work on money that is already in the education system.
 - 1/3 the schools in Oregon = 73 for a cost of about \$3 M.
 - Foundations, ODE and/or ETIC act as lead partners
 - Companies adopt and partner a school for about \$10 K (one-time costs).
 - Ways to bring in new money.
- After the money, these barriers to implementation remain across the state:
 - Fear of spending the initial \$30 K and a minimum of \$4 K per year
 - What's offered must be valuable enough that schools/districts are willing to pay a teacher to teach it

Next Meeting: Tuesday, June 19, 3:30 – 5:00 at the Capital Center.