

OPAS Prepare Workgroup Meeting #1
February 20, 2007 – Capital Center

Attendees: Sean Gallagher (Hermiston HS), Dick Knight (Saturday Academy), Jo Oshiro (OUS/OPAS), Jay Bockelman (OIT), Walt Mayberry, Larry Flick (OSU), Michal Young (UO)

Absent: Bill Becker (PSU), Chris Steiner (Hillsboro), Steve Day (Beaverton SD)

Italics indicate activity since the meeting.

Summary

Focal Strategy: Increase the use of improved teaching methods such as active learning and student inquiry. The group endorsed this approach to greater academic preparedness, and moved on to discuss focusing on tools for teachers: case studies, curricula, other tools.

Potential Tactics:

- 1) Identify engineering-related content that teachers can use to enhance learning in middle through high school – the group decided not, at this time, to expand this focus into higher education. For college kids, the idea that they could be doing computer science or engineering is more of a problem than their preparedness, per Michal. If we do include postsecondary teaching and learning, we will need community college expertise.
- 2) Identify role models –
 - Document using case study methodology
 - Both to package curriculum and inspire and motivate teachers
 - Audiences:
 1. Teachers motivated to implement improved methods.
 2. Administrators – show them engineering is a legitimate part of the curriculum
 3. Students and parents – for inspiration
 - Develop a list of potential role models
 1. Great teachers
 2. Professionals who have become or are becoming teachers
 - a. Jill Hubbard, Tualatin HS
 - b. Dean Fassnidge, Conestoga MS, Beaverton
 - c. Evelyn Shearer, Southridge HS, Beaverton
 3. Physics teachers
 - a. Adam Kirsch, Crescent Valley HS, Corvallis
 4. Larry Flick's NSF Grant: Teaching Science and Math Through Engineering (see Resources under the Action Items, next page.)
- 3) Expand teacher development
 - Problems attracting and keeping teachers to professional development (and the profession)
 1. Bandwidth – too many programs, too little time and money, too much to do in general

2. Compensation for teacher time
 - To get administrator buy-in, the name of the game is test scores
 - Creation of social networks to support ongoing change and development
 1. MESA model
 2. Oregon Science Teacher leaders
 3. These communities require infrastructure, which costs.
 - Change management issues – change is hard; teachers teach the way they themselves learn.
- 4) Leverage the new math and science requirements – the group consensus is that we have a definite opportunity here
 - (Tom) ODE is just starting to address tying engineering and applied science to math and science and how these might possibly be used to raise test scores. While not sure of the window of opportunity, Tom will keep his eye on the process, and keep us informed. We need to get teachers knowledgeable in applied math and applied science involved in this process. Tom can keep us updated on these efforts.
 - (Larry) A needs assessment survey of math and science teachers, principals, curriculum directors – how should the new requirement be implemented? Could OPAS provide a structure or framework to make the link between applied disciplines, science, math, and improved test scores?
 - We need to be careful to avoid the perception that we are prescribing another “curriculum of the week”, that we are patronizing teachers, forcing change, or prescribing PTE for all.
 - (Dick) Identify the best practices around teaching as it relates to the opportunity to address the new math and science requirements with content driven by math and applied science. Help define the pre-engineering lesson, class, course sequence that would satisfy the new requirement and guarantee a pop in scores.
 1. (Walt) We could outline 2 or 3 courses
 2. (Tom) What are the standards for proficiency in applied science and math? Guidance so far has been minimal. (*Jo – ACTE, ITEA, Museum of Boston standards useful? – see Resources below*)

Action Items:

- (All) Review your bio on the website roster and email any changes to Jo.
- Develop a list of former engineers and scientists who have become teachers.
 - (All) email any known to Jo
- Investigate developing a collection of profiles of exemplar programs/people
 - (Jo) Engineering texts that David Coronado of MESA has reviewed
 - (Jo) Names of teachers and programs
- Resources and information for review – Jo to distribute
 - Infusing Active Learning into the Large enrollment Biology Class: Seven Strategies from the Simple to the Complex. Allen & Tanner, 2005.
http://opas.ous.edu/Committees/Resources/Research_papers/Infusing_Active_Allen_Tanner.pdf

- Notes for the MESA Teachers Focus Group. OPAS, 2006.
http://opas.ous.edu/Committees/Resources/Staff_papers/MESA_Focus_062006.html
- Cooperative Learning in Technical Courses: Procedures, Pitfalls and Payoffs. Felder and Brent, 1994.
http://opas.ous.edu/Committees/Resources/Publications/Felder_Brent_Coop_Learning_Technical_Courses.pdf
- Applying Science and Mathematics to Engineering course description brochure. Flick, 2006. <http://opas.ous.edu/Committees/ApplySciMthtoEng.pdf>
- The OPAS Strategic Planning Summit 2005 Resource Materials, OPAS, 2005. <http://opas.ous.edu/materials.htm>. Note especially Chapters 3, 4, 5, 6. This material has not been updated since 2005.
- ITEA Standards (*Jo has hardcopy of some of these documents for sharing.*)
 - i. ITEA Website <http://www.iteaconnect.org/>
 - ii. Technology for All Americans: A Rationale and Structure for the Study of Technology (*Starts with technological literacy, but moves beyond that*)
http://www.iteaconnect.org/TAA/PDFs/Taa_RandS.pdf
 1. Technology is the Intersection of Processes, Knowledge, and Contexts (nice triangle graphic):
 - a. Processes in Technological Systems (TS)
 - i. Designing and Developing TS
 - ii. Determining and Controlling the Behavior of TS
 - iii. Utilizing TS
 - iv. Assessing the Impacts and Consequences of TS
 - b. Knowledge
 - i. Nature and Evolution of Technology
 - ii. Linkages
 - iii. Technological Concepts and Principles
 - c. Contexts
 - i. Informational Systems
 - ii. Physical Systems
 - iii. Biological Systems
 - iii. Standards for Technological Literacy: Content for the Study of Technology: Executive Summary
http://opas.ous.edu/Committees/Resources/Standards/Execsum ITEA_Standards.pdf
 - iv. Standards for Technological Literacy: Content for the Study of Technology
http://opas.ous.edu/Committees/Resources/Standards/ITEA_Standards.pdf
 - v. Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards
<http://www.iteaconnect.org/TAA/PDFs/AETL.pdf>
 - vi. Checklist for Analyzing Standards-based Curriculum or Lessons
http://opas.ous.edu/Committees/Resources/Standards/Tech_Curriculum_Checklist.pdf

- Project 2061 Science for all Americans (AAAS)
 - i. Website <http://www.project2061.org/publications/sfaa/online/sfaatoc.htm>
 - ii. Larry's summary on technology
http://opas.ous.edu/Committees/Resources/Standards/Nature_of_Tech_AAAS.pdf
- National Science Education Standards (NSES)
<http://opas.ous.edu/Committees/Resources/Standards/NationalStandards.pdf>
- OPAS Textbook Review
http://opas.ous.edu/Committees/Resources/Staff_papers/Sci_Text_Survey%202.pdf
- OPAS Standards Review
<http://opas.ous.edu/Committees/Resources/Standards/standards.html>
- TeachEngineering Curricular Resources <http://www.teachengineering.org/>
- ACTE Research and Resources - http://www.acteonline.org/resource_center/
- (Jo/Walt) Implement a link to individual emails off the webpage roster in such a way that individual addresses are not easily spammable. *Walt has provided this information to Jo; it's on her list for all the rosters.*

Next Meeting: Tuesday, March 20, 3:30 – 5:00

Discussion Details

Sean leads.

Please review your bio on the website.

Review, discuss, and clarify our strategy – Increase the use of improved teaching methods such as active learning and student inquiry.

Focussing on tools for teachers is something that we've already discussed.

One of the teacher tools could be case studies.

Larry has some potential cases in mind. Physics teachers do a lot of active teaching now. Possibly Adam Kirsch at Crescent Valley HS.

Tom: Many former engineers move into roles as physics teachers, sometimes chemistry – Dean Fassnidge, Evelyn Shearer. If he recalls any, please email to Jo.

Dick: please keep a list.

Sean: sounds like we are heading down the road of developing case studies.

(General agreement.)

Walt: is the purpose of the case study to package curriculum or inspire and motivate teachers?

Larry: case study can do both. 2nd year for Teaching Science and Math through Engineering NSF project (email to workgroup) More focus on science through construction technology program – out of that came tools for science teachers. Problems that teach thermodynamics, electricity. Submitting projects and tools for a grade (to Larry). Coming back this summer to hopefully teach a new group of teachers.

Sean: over to Dick to expand on bullets “Consider potential areas for focus and action”

Dick: back to Walt’s question. 3 natural audiences:

- 1 – give it to teachers that are motivated to implement
- 2 – give it to administrators to demonstrate that eng. Is legit part of a curriculum
- 3 – go to students and families to motivate

(See agenda bullets)

First we think we know where some good stuff is going on out in the world.

- Jo make a list: texts that David Coronado has reviewed; names of teachers/programs
- (1) Should we expand this bullet point 1 to include higher ed
 - MYoung: bigger problem to get to the kids who have no idea that computer science is something that they could be doing; imagines the same in engineering. So he is completely comfortable sticking to MS-HS, so as not to let widening the focus lose energy. (Jo send Michal those papers: NCState, Cell Bio)
 - Larry:
 - Jay: Michal including CC in that?
 - MY: Not sure – typically CC students we see have already decided that they want to be CS majors – not sure where that decision happens; feels pretty ignorant
 - Tom: some percentage of those CC students decide in CC to go further (some do remedial), some do CC for financial reasons, already.
 - Dick: absolutely impressed with the amount of equipment these technical prep programs can have.
 - Walt: may be easier for CC to attract industry-experienced teachers – less certification hassle?
 - Sean: at Hermiston, the overwhelming percentage of grads end up at the local CC.
 - MYoung: we have seen an uptick in students coming from CC, but the majority come straight from HS.
 - Dick: At PSU, somewhere from 25-50% of students come from CC into engineering
 - Walt: Washington is structured to encourage students to spend time at CC.
 - Sean: We have students deciding that they can handle the math and have the desire at different points in their careers.
 - Tom: some nicely developed systems to move students through the system.
- (2) Role models:
- (3) Expand teacher development resources:
 - Problem of attracting and keeping teachers
 - Bandwidth problem; competing demands (Larry, Tom)
 - Compensating teachers for their time (most pay \$100 day)
 - Isolated programs

- Is the appropriate target the teachers or the principals? Sean – the name of the game is test scores
- Email workgroup MESA Focus group
- Creation of social network.
 - The Oregon Science Teacher leaders
 - These communities require infrastructure (costs)
- (4) New requirements:
 - How do we tie eng to math as testable subject?
 - Sean: he has posed this question to his highly qualified math teacher who teaches computer software and hardware
 - Could we provide this structure/framework to make this link?
 - Fundamental pressure on the school is to raise test scores?
 - Science scores on to NCLB still in committee at the Federal Level?
 - Tom: ODE is just starting to address this. This is a perfect opportunity to have some input.
 - Dick: How long is the window?
 - Tom: He doesn't know; hasn't seen the time line, staff has not yet been assigned. Probably at least a year and maybe more. New Perkins authorization also has connections to math and science accountability.
- (5) Other?

Next Steps:

Tom: be involved in the development of the ideas of what is applied math and science, get teachers knowledgeable in those areas involved in the process.

Larry: Needs assessment – survey of math/science teachers, principals, curriculum directors – how should this new requirement be implemented? One piece might be sense of entrenchment in the math community – is it there?

Jay: Need to get at district level too – some district trying to manage curriculum at a district rather than a building level.

Tom: Most districts don't even have curriculum coordinators;

Sean: Most are struggling with this

Dick: approach as assume teachers are doing the right thing – how do they get to more students – do we have anything of value to offer

Larry: Difficulty of getting teachers/professors to think about teaching their subject matter differently. Not easy.

Sean: change always difficult for anybody. Trying to instill “the equity principle” – teachers like to teach how they were taught, rather than to the needs of the current students and culture.

Larry: corollary is teachers teach the way they themselves learn ... the case example should be focusing on how the teacher interacts with students and how a variety of students work through and react to get to learning.

DK: potential action items cluster

- Identify best practices around teaching as it relates to the opportunity to address the new math and science requirement with content driven by math and applied science – helping to define the pre-eng based class that would satisfy the new math/sci requirement and guarantee a pop in scores; helping to define what the applied math and science courses in HS would look like.
 - Walt things we could outline 2 or 3 courses
 - Tom: what does applied sci/math mean for proficiency? What are the standards? Guidance so far has been minimal.
 - Sean: what would Tom suggest as the best way to keep in contact with those efforts at ODE?
 - Tom: make sure that knowledgeable people get included. He can keep us updated on those efforts.
- Work on the environment around these issues

Dick: booklet of 1 pg profiles of exemplars – might be useful in making it real, credible – Would that be useful? Come up with OPAS flavor programs that could slot in to filling math/science requirements and ask:

- OPAS flavor?
- Suitable for meeting math/sci req?
- Extensible?
- Do a prototype profile?
- MYoung: preferable to find a traditional math/sci doing what we want to see for political

Tom: getting people to present at conferences to help spread this around?

Jo to get from Walt how to make hypertext link not spammable.