Mechanics VCP Session 2 (April 11, 2013)

Breakout Session Notes

Breakout Session 1: What do you do to motivate students?

Group 1

- Xiaobin - Shows some applications in real world of the content; explains why and when the skills will be needed in the future
- Reza - applications in the future; brings some models/demonstrations (beams)
- Amelito - talk about past students, invite other students to talk about relevance of material
- Matthew - Know on a personal level, one-on-one session with students; "Forget about grades but focus on learning material. grades follow learning."; Ask students to show solution on the board.
- Ask alumni to do presentations. What they found useful about the class.
- One-on-one sessions: focus on students who are not doing well.
- Have students focus on the end goal

Group 2

- provide examples that relate to real-world applications, future career
- course material will be a pre-requisite to future courses
- material will be on exam for class, or for FE exam, professional licensing
- rely on students to help motivate each other, understand each others perspective
- employ open-ended design problems to motivate a little competition
- grades our not curved, mastery determines score

Group 3

- Use models in the classroom; swimming pool noodles as beams and shafts (with student participation).
- Projects using wooden coffee stirrers or paint stirrers to make beams for testing.
- Engage students by asking questions; large class size limits student interaction in class (40 to 50 students).
- Project using computer modeling of a problem they had worked on during the semester; students choose problems and type of analysis.
- Computer modeling motivates the top level students to learn and apply concepts.

Group 4

- Grades can a motivation for students.
- Real world problems can be used in class projects.

- Students work as teams and do some hand-on things in class.
- Electrical and chemical engineering students can difficult to be motivated by hand-on exercises.
- Mixing students from different engineering departments in one class can make motivation more difficult.

Group 5

- Ken - small classes 6-12 students with some students that are previous students. The classroom environment is comfortable because students and faculty know each other well. The group dynamic is cohesive.
- Vicki - larger classes (approximately 80). Bridge contest that focuses on the accuracy of predictions. Utilizes cad and the machine shop that excites students as they work in teams of 4.
- Pedro - varied class sizes - approx 80 as well. Various majors and focus. Combines materials with examples to target interest. Asks students to look for applications when they leave the classroom. Gains positive feedback from students.
- Carisa - very large lectures 300 students on average. It is very difficult to motivate them in such a large format. I try to be as positive as possible and attempt to take time to talk to various students before and after class to make myself more approachable. I'm hoping to gain some ideas from this group.

Breakout Session 2: design a progression of learning activities that start on lower tiers of the matrix, and end on higher tiers

Group 1

- Topic - Truss
- Activity 1 - Determine what needs to be solved for and what information we have to start
- Activity 2 - What concepts do we know that can be applied to solve the problem
- Activity 3 - Compare truss with other structures
- fatigue or stress concentration problems eventually related to real-world problems

Group 2

- multi-step problems (dynamics).
- Start with projectile motion problems with primarily fall under remember/understand congnitive processes. Use RECALL for x/y acceleration values to use
- Combine a projectile problem with another technique (again recall) so that the student would have to USE both techniques in a given problem. In addition, they would have to DIFFERENTIATE what techniques to use and CHECK to make sure they were used appropriately

- Another dynamics example, air drag. Start with basic neglect air drag when solvng a projectile problem. Allows to seperate x y motion and easy to solve by hand. Move into using air-drag to combine the x and y motion which may not be solvable by hand, but allows the student to setup the problem and begin to analyze concepts
- Sticking with dynamics, finding real-world situations to APPLY the dynamics conecpts (again projectiles, slingshot spring constants, etc.) which they have remembered and hopefully understood. Have the students calculate how far they need to pull back a slingshot in order to hit Rick with a waterballoon. Do you neglect air resistance, account for it (and how to account for it), etc.
- Have students not only numerically solve problems, but write about their answers to show they are able to evaluate their results. Are they reasonible, etc.

Group 4

- relearning definitions of familiar words in a mechanics context
- defining new things like centrifugal force
- simple experiments to help students visualize new concepts
- using short short quizzes, exams, finals, and design courses to address different levels of the matrix
- exams typically used to address higher order thinking skills
- # some at the higher order may come together over multiple classes

Group 5

- We have selected method of sections
- The lower level is remember and recognize.
- The upper level is applying.
- Must be familiar with the vocabulary and the assumptions.
- Level one: Reading the text book onTruss member is a 2-force member.
- Level two: Lecturing Trusses are composed of multiple 2-force members.