Self-Directed Learning

To learn is human . . .

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What is self-directed learning?

- Individuals take initiative and responsibility for learning
- Individuals **select**, manage, and assess their own learning activities
- Motivation and volition are critical
- Independence in setting goals AND defining what is worthwhile to learn.
- Teachers provide scaffolding, mentoring, advising.
- Peers provide collaboration

http://www.selfdirectedlearning.com
Why self-directed learning? Why not?

• Positive outcomes for the learner: self-directed learners are motivated, persistent, independent, self-disciplined, self-confident and goal oriented.

• Challenges for the learner: no external validation for content or assessment since the individual is in charge of ALL aspects of learning from deciding what should be learned to the methods and resources used to the evaluation of the success of the effort.
Isn’t all learning self-directed?

- Teaching as an Imposition: an unnatural act, an incursion on another person’s learning-in-progress, a sustained redirection of another curious creatures’ voracious cogitation (Jeff Kerssen-Griep)
Remember your first self-directed learning experience
Isn’t all learning **other-directed**?

- From kindergarten on, teachers tell students what to study and learn.
- Teachers set goals and evaluate learners’ mastery.
Remember your first other-directed learning experience
So, is learning ALL self-directed or ALL other-directed?
Whither the middle ground . . .

• Experts set the agenda for learning, especially in the professions
• Learners are motivated by intrinsic and extrinsic rewards
• To be successful, learners must learn to give themselves feedback and to understand their own cognition

learn to self-direct
Can you teach “self directed learning”?

• Help the learner identify a starting point
• Be a manager for the learning experience rather than an information provider
• Teach inquiry skills, decision making and self-evaluation of work
• Learners transition from “reactive” to “proactive”
12-100 Intro to Civil and Env Eng

- Freshman engineering students
- 50-100 students per class
- 3 team-based projects with unstructured, open-ended problems make up the bulk of the course
- Supporting lecture material and homework problems
- Instructor and TA ‘advise’ and ‘consult’
Example Project: Can we stock Fish?

- Based on “water on the web”
- Data from sensors in Minnesota Lakes
- Initial introduction to project is brief
- Students begin to work with the data before they even know what they should be considering
Example Project: Can we stock Fish?
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• As they try to structure data presentation *way too early*, they realize they need to do research
  – into what conditions fish like,
  – what the conditions are in their lake,
  – how conditions change with season and time of day and sometimes specific locations in their lake,
  – how statistics can be used to support conclusions.

Just in time learning
Role of Instructor

• Just in time lectures on statistical analysis, data presentation, water quality parameters that affect fish
• Problem assignments that build individual skills that can be applied to the project question
• Teacher and TA are information sources, advisors, resources, but have never solved this specific problem and don’t know the answer!
Revised Project: Will golden algae bloom?

• Based on 2009 Dunkard Creek event near Pittsburgh (largest fishkill in US history)

• Evaluate data for other streams in Pennsylvania to determine the risk of a golden algae bloom induced fish kill

• Unlike the fish stocking problem, there IS no consensus on how to answer this question.

• More open ended, less structured, even better for self-directed learning!
12-252 Environmental Engineering Laboratory

- Water quality techniques taught through self-directed project on local water body restoration.
- Panther Hollow Lake.
- What’s wrong with it?
- How can we fix it?
Reflections on the Process

- Stage 1: Students seeks direction; advisor dodges.
- Stage 2: Students begin to frame the problem; advisor models successful structuring of other problems.
- Stage 3: Students are actively doing – solving the problem, designing the system, creating the product; advisor is encouraging and keeping focus on the doing.
- Stage 4: Students are evaluating, employing meta-cognition to understand not only what was learned but how it was learned and how this fits into future learning needs; advisor models self-analysis and interpretation.
How do I learn to do this?

• You already have the skills to use this approach.
• You are a self-directed learner.
• How did you become one?
• What is the purpose of the Ph.D.?
Challenges for the teacher

• Give up center stage!
• Give up any part of the stage!
• You don’t have to give the answer to prove you know it. **You** are not being evaluated!
• Cultivate uncertainty and try NOT to solve the problem/project ahead of time. Answer honestly that you don’t know the best approach
• Be confident that the process is more important than the product
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• Water on the Web Project and Site. http://www.waterontheweb.org/