A Gentle Introduction to Learn By Doing Workshop

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Abstract

We believe Carnegie Mellon Silicon Valley's MS in Software Engineering program to be unique in that it is entirely team-based and project-centered. Students learn by doing as they are coached just in time by faculty in the context of authentic projects, and they are evaluated based on what they produce. Student satisfaction is high: 87% believe that the program has given them a competitive advantage with respect to their professional peers, and their promotion and salary histories bear out this belief.

This workshop introduces the attendees to our learn-by-doing instructional approach through participation in a learn-by-doing-experience, performing a usability analysis of a commercial website, followed by discussion to highlight what we believe to be important principles of teaching.

1. Topic, theme and goals

Cognitive Science research on how people think and learn suggests the properties of an effective educational approach:

- The approach should center on active problem solving to promote the acquisition of usable knowledge rather than a collection of memorized facts

- The approach should situate learning in a realistic context, highly similar to the environment in which students are expected to apply the knowledge, thus promoting transfer

- Instruction should be "just in time," when the problem solving situation provides a context for processing new information and storing it mentally in a useful form

- The context for learning should be a simulation of the real world to ensure that targeted knowledge and skills are required for successful problem solving and to enable the appropriate ordering of their acquisition

- Knowledge and skills should be taught holistically, as they will be applied, rather than separated into academic silos

- The learning experience must equip students with the fundamental skill of self-directed learning.

- A key part of effective learning should occur when direct mentoring is delivered by experts in the context of authentic problem-related interaction

In this workshop the attendees will experience these properties as implemented by Carnegie Mellon Silicon Valley by performing a usability analysis on a commercial website.

As a result of completing this workshop attendees will be able to:

- Organize and/or perform a usability analysis as a member of a team
- Apply learn-by-doing principles to their own teaching

2. Intended audience and the preparation required of them

The intended audience is software engineering educators.

Attendees are asked to read a nine-page article in preparation for this workshop.

Attendees need to bring their laptops (so they can get to the website to be evaluated and to create their final presentations).

3. Activities and format

This workshop is choreographed as shown in Table 1.

Table 1. LBD Workshop Choreography

Presenter	Attendees
	Read material in advance
Introduces workshop goals and agenda	
Briefly describes CM SV pedagogy, why it is unique and how it works	
Assigns the task (a heuristic evaluation of a commercial website) that each team is to complete	
Asks the attendees to describe what a heuristic evaluation is and how it works.	Participate in discussion
Asks students "why do a heuristic evaluation?", and other key questions to prepare them for their task.	Participate in discussion
Gives attendees the url of the website to evaluate, evaluation criteria and a recommended report format	
	Attendees self-organize in teams and complete the task
Teams present their findings	
The group reflects and discusses effective pedagogy	

4. Anticipated time requirements

This workshop is 3 hours long: 2 hours for the learn-by-doing activity, and 1 hour for pedagogical discussion and reflection.

5. References

R. Bareiss and M. Radley, "Coaching Via Cognitive Apprenticeship," submitted to SIGCSE 2010, Milwaukee, WI, March 2010.