The Progressive Learning Platform for Computer Engineering

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Learning Activities and Materials
PLP has been used in a number of courses. The PLP website: http://plp.okstate.edu links to some of the courses and to the PLP development site on google code.

PLP = PLPhardware + PLPTool + curricular materials

Details can be found in the papers listed below.


Major Issues to Resolve
Classic mistakes: Collected too much data (shown above), did not have a clear experimental design, research questions were too broad.

Original Research Questions- we have data/results for those in green.
1. How effective is PLP in changing student motivation?
   a. How does PLP change student mindsets, and what are the underlying reasons for its success/failure?
   b. Does PLP enhance students’ academic efficacy?
2. How does PLP improve student learning?
   a. How effective is PLP as a material anchor, and why?
   b. How well does PLP facilitate a Community of Practice?
3. How does examining students’ language in written and oral reports help to explain their conceptual understanding and their attitude/mindset?

Coding the reflective essays and other qualitative data has taken an inordinate amount of time, and the data analysis has been a bottleneck. We did not have time to even look at Spring 2013 data, which is the only data point which has student in a PLP-based course who have been in a prior PLP-based course. This is a critical data point for our study. At FOEE, I would like to get feedback on our current methods and findings to see how we can improve the experiment and methods. Specifically, it has been hard to separate PLP’s impact from all that PLP facilitates- the active learning, the instructor’s enthusiasm etc. Are we just asking the wrong questions? What questions should we ask?

I would also like to find potential collaborators interested in conducting research with PLP as the vehicle. This will generate more data on PLP’s impact on students’ acquisition, assimilation, and retention of knowledge in computing, but we will budget for it through an NSF REE grant.

Discussion: Conclusions and Future Work
Research: Initial results show that students perceive PLP to create an authentic learning experience which promotes a high level of engagement. Results also show that students are independently drawing on concepts from different courses and connecting them to apply in their projects. As an instructor, it is a joy to practice contextualized just-in-time teaching using PLP. The TAs have also enjoyed teaching with PLP.

I expect that broad adoption of PLP will have its own set of challenges. While it is crucial that we demonstrate PLP’s effectiveness in the classroom through rigorous well-designed experiments, and publish our results in high-impact journals, we could still face the valley of death. To facilitate adoption, we are working on a new, well-organized website to host curricular material for each course that PLP supports. In addition, I will reach out to potential collaborators for early adoption, as they could also become part of the research experiment. I will present PLP at various venues such as this one, ASEE, FIE etc., and to pursue collaborations through joint funding ventures similar to TUES-2 or Cyberlearning diffusion. It will be interesting to study what barriers we face for adoption.

Spinoffs: 1) Tie-up with a foundation or start an LLC to provide low-cost new texts and learning modules based around PLP. 2) Tie-up with a foundation and with Digilent to distribute FPGA boards in developing nations and to the financially disadvantaged in the US. 3) Collaborate with IUCEE and other such organizations to run webinars teaching faculty how to use PLP and explaining the advantages of using it.

PLP is open source and distributed under GPL 3.

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