

CPACE II : Authentic Problem Generation Process

A chief project objective is to introduce a series of authentic engineering problems developed in consultation with stakeholders from industry, employees, and faculty from engineering disciplines to ensure that the problems are representative of engineering practice, disciplinary context, and computing concepts. To collect these problems we are leveraging the industrial partnerships that we established during CPACE I; Advisory Board members and other employers that collaborated with us during the interview and survey stages.

Based on lessons learned from an initial pilot, the following activities are included in the Authentic Problem Generation process:

Step 1 – Employer and Authentic Problem Targets

- ◆ Determine the total number of Chemical and Civil engineering authentic problems sought and the timeframe to obtain them. [Who: MSU/LCC & CSW]
 - Ideally, seek 2-3 authentic problems from each employer.
- ◆ Identify the employers to target. [Who: MSU/LCC & CSW]
 - Tier 1 Targets: Chemical and Civil engineering employers interviewed and surveyed and AB members and any other employers they recommend.
 - Tier 2 Targets: Employers and engineering professionals that are part of other networks, associations, societies, and coalitions such as those groups we sent the industry report to.

Step 2 – Employer Outreach

- ◆ Make first contact via e-mail communication that will include 1-page project summary. Communication content will include purpose of the outreach, articulate what we are seeking from them, who we would like to speak to such as chemical or civil engineering *practitioners* (this could be management and professional staff), and ask to arrange time for follow-up call. [Who: CSW]
 - If this is a contact we know well, we can call directly if it makes sense to do so.
- ◆ Two sample authentic problem sets are developed and updated as needed. [Who: MSU/LCC]
- ◆ Hold follow-up call with employer to clarify things as needed and set up first in-person meeting. [Who: CSW]
- ◆ Send e-mail confirmation of date/time of meeting immediately after call include sample problem(s). [Who: CSW]
- ◆ Identify 2 main points of contact – 1 MSU/LCC and 1 CSW; CSW – meeting coordination and relevant follow-up; MSU/LCC – Authentic problem clarification and follow-up exchange.
- ◆ Prep and hold meeting Authentic Problem meeting with employer (ideally in-person, but conference call maybe back-up option). [Who: MSU/LCC & CSW]
 - Packet materials assembled put in MSU folders (PPT handout, 1-page project summary, sample problems, business cards, etc). [Who: MSU/LCC]
 - Meeting attendees include: Jon Sticklen, one civil or chemical engineering faculty, and one CSW representative, and employer representatives.

- Meeting content includes: packet of relevant project materials, discussion will include: overview of project, clarification of our data collection need, role clarification – ours and theirs, timeline expectations, clarify employers preferred method of follow-up (i.e., e-mail, phone), and identification of main employer contact(s).

Step 3 – Analysis of Authentic Problem

- ◆ The faculty analyses the problem(s) to determine if :
 - it can be used in the targeted courses
 - it exemplifies relevant industrial scenarios within the discipline
 - the solution requires the application of computational concepts
 - Ideally, several problems can be identified that permeate all levels (freshman to senior). The applications in the different disciplines would change.

[Who: MSU/LCC]
- ◆ After the analysis, a set of specific follow up questions are prepared to make sure that we have a ‘complete problem’ ready to be used in the instructional design. The questions and the requests (e.g., demo materials, types of data) to each employer are expected to change depending on the type of industry, the courses where the problem can be used. [Who: MSU/LCC]
- ◆ Final e-communication is sent to employer thanking them for their time and providing an update on how their problems have or will be used. [Who: MSU/LCC or CSW]