

**CONVERSATIONS ON EDUCATION**

**SECTION 4: ASSESSING EXPERIENTIAL/SERVICE LEARNING**

**Assessing experiential learning in engineering**

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Recommended citation:

Lakshminarayanan, S. (2013). Assessing experiential learning in engineering. *Journal of the NUS Teaching Academy*, 3(2), 76-79.

<https://doi.org/10.24112/ajsotl.33286>

## Assessing experiential learning in engineering

**JNUSTA:** *“Assessment of experiential learning is the least explored area in higher education and the most challenging” for many of us. Could you share with us your take on what may be a good way of assessing activities like field work, internship, or service learning?*

**Laksh:** Relatively speaking, assessing learning is not just the least explored area but perhaps also the least preferred activity for faculty members compared to activities like developing a course, presenting lectures, or leading discussions/tutorials. Therefore, I am not surprised by Amy Tsui’s comment that “assessment of experiential learning is the least explored area in higher education and the most challenging”. The challenge is perhaps due to the open-ended, authentic and complex nature of the project the student is assigned during industrial internships (which is a prime experiential learning component for the Engineering majors in my faculty) and laboratory attachments. Each project (and therefore the student experience) is unique in terms of (i) the technical and people-related challenges, and (ii) the amount of personalised learning (compared to learning in traditional, standardised courses) depending on the location, nature of the assigned problem, the support structures available on site, etc. Importantly, the industry and university viewpoints on what constitutes good work can be quite different. For example, I have experienced first-hand the mismatch in expectations of different parties, having served as Coordinator of and Faculty in the Practice School Program at the Birla Institute of Technology and Science (BITS) in Pilani, India, and through my involvement with Practice School interns from Massachusetts Institute of Technology (MIT) while working at the Mitsubishi Chemical Corporation (Japan). As a consequence of such differences in expectations, the learning outcomes for the experiential-learning modules end up being quite broad and fuzzy. Given all these considerations, it is not a surprise that the assessment of learning outcomes in experiential learning modules can be challenging.

Based on these experiences – outside and within NUS (in the Industrial Attachment/Vacation Internship Programme) – I can perhaps offer the following suggestions to improve assessment of experiential learning for students in engineering:

1. Middle-level engineers in the industry, scientists in laboratories, or leaders in non-governmental organisations (NGOs) (who typically mentor students at the respective sites) and faculty members in the university must meet, confer,

and craft learning outcomes together. Very likely such dialogues will result in learning outcomes that include the holistic emphasis of the intellectual, psychomotor, social, and personal dimensions.

2. The assessment instruments should also be multimodal and provide a clear window into the progress achieved by students on the above multidimensional learning outcomes. The assessment tasks may be manifested in the form of multimedia reports, oral presentations, physical models created by the student, journal reflections, feedback and comments from peers with whom the student has interacted on a regular basis, videos of the intern at work, and interviews conducted by the faculty and the site expert.
3. An inventory of the various aspects of the assessment of experiential learning modules (depending on the nature of the experiential learning module) would include:
  - a. Knowledge and application of fundamental principles/concepts/theories
  - b. Creativity
  - c. Problem solving and troubleshooting skills
  - d. Professional judgment and decision-making ability
  - e. Ability to see the connectivity of things (the big picture) – zooming in and out
  - f. Initiative and self-reliance
  - g. Ability to communicate and cooperate (teamwork)
  - h. Punctuality and ability to meet deadlines
  - i. Resilience in dealing with setbacks, crises and failures
  - j. Sense of responsibility
  - k. Leadership ability
4. Assessment of the learning outcomes can be facilitated by developing suitable rubrics and assessment instruments. For example, the rubrics created by the Association of American Colleges and Universities (AACU) can serve as a starting point for dialogues on the assessment of experiential learning modules.
5. Finally, tight and continual collaboration must exist among the three key players involved in delivering the experiential learning module – the site expert (from the industry/labaratory/NGO), the student doing the project, and the faculty member. Often, this tight collaboration is missing in many experiential learning programmes due to busy schedules, or individual inability to see much personal value from such collaborations. Some

universities also do not always overtly value the involvement of faculty members in experiential learning activities, as they fail to recognise that these as intellectual contributions. These challenges aside, it is critical for the team to exchange information and monitor progress and chart future plans on a periodic basis. With a good understanding of the learning outcomes and the evidence presented through the assessment tools, the faculty member and site expert should jointly synthesise a transcript that summarises the students' growth through the experiential learning module. In addition to *jointly* rating the student along the dimensions and attributes mentioned above, the transcript should also provide a summary of the specific strengths and areas for improvement for the student.

All of the above involves time and effort, but to assess and enjoy the outcomes derived from experiential learning challenges need to be overcome and such investments in collaborative and multi-perspectival assessments need to be made.