



International Institute for Developing Engineering Academics

Post - Workshop Report: 2015 Tsinghua – IIDEA Workshops

Overview

During the second week of July, IIDEA facilitators from Canada, the USA, Puerto Rico, Malaysia, and China offered a two-day workshop series to faculty and administrators from across China as part of the fifth Tsinghua Center for Engineering Education – IIDEA meeting. The workshop series, entitled “Authentic Learning in Engineering Education”, drew over 100 attendees from a variety of institutions across China. A key challenge during the engineering education process is to provide experiences that replicate “authentic engineering situations” and prepare students to operate in real situations with diverse collaborators. This year’s two broad topics of professional competence and situated learning addressed the challenge of preparing professionally competent, well-rounded engineers and creating learning activities that put students in “real world” situations. The topics of professional competence and situated learning were placed along an industry-university spectrum. The first day’s workshop on professional competence covered engineering ethics (including how this can be addressed within the university) as well as global competence (and how this can be addressed in practice). The second day’s workshop on situated learning covered Problem-Based Learning (and how faculty can facilitate this in their institutions) and outcome-based education (and how industry can meaningfully partner in providing outcome-based opportunities). Finally, we took this wonderful opportunity to celebrate the first year of successful workshops, reflecting on the thoughtful origins of the workshop series and looking forward to growth and national and international collaborations in the future.

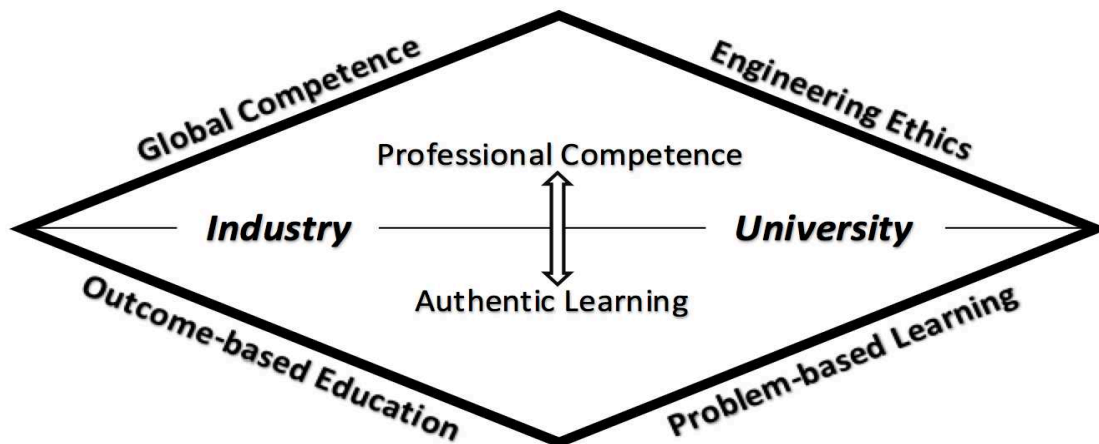


Figure 1. Diagram of topics and broad themes for 2015 workshop series

We include the workshop overview and intended learning outcomes below for reference in this report.



清华大学
工程教育研究中心

Hosted by CEE, Tsinghua University

主办：清华大学工程教育研究中心



Presented by IIDEA workshop leaders

主讲：国际工程教育发展研究院专家

Workshop Overview and Intended Learning Outcomes

BROAD TOPIC 1: TRAINING FOR PROFESSIONAL COMPETENCE:

The first day's topic deals with two “non-cognitive” skills that are recognized as crucial for engineers in training. These non-technical skills are key components of the PETOE program and the development of well-rounded, highly prepared graduates.

FOCUS TOPIC A: Engineering ethics [Kevin Passino]

Ethical competence is a crucial component of engineering professional practice, but it is infrequently dealt with in the traditional engineering curriculum. By the end of this session, attendees will: *have an ability to reason through an engineering ethical dilemma*

FOCUS TOPIC B: Global competence [Jennifer DeBoer, Dato Lee Yee Cheong, Rovani Sigamoney]

Graduates are increasingly asked to participate in multicultural and multinational work environments. By the end of this session, attendees will: *Be able to describe what global competence means for their discipline and create a learning activity that supports the development of global competence*

BROAD TOPIC 2: SITUATED LEARNING STRATEGIES:

Situated learning strategies provide an authentic learning experience to train students in preparation for induction into industry.

FOCUS TOPIC A: Facilitating problem-based learning in engineering classrooms [Khairyiah Mohd Yusof, Syed Ahmad Helmi]

Problem-based learning in the classroom is a useful teaching and learning approach, but it poses complex challenges for instructors new to the approach. By the end of this session, participants should be able to:

- 1. Identify possible real world or work place problems that can be used for learning in classrooms.*
- 2. Explain the need to use problems in engineering courses.*
- 3. Craft problems to meet learning outcomes for an engineering course.*

FOCUS TOPIC B: Industry opportunities and outcomes-based learning [Lueny Morell, Paul Gilbert]

Industry opportunities (dual-supervision programs, internships, etc.) offer real world case-based learning challenges. This topic will be introduced in the context of outcomes-based learning.

By the end of this session, participants will be able to:

- Evaluate current program outcomes and compare with current/future industry needs (E)*
- Recognize the steps of developing and managing an outcomes based curriculum (K)*
- Understand how outcomes can be developed and measured (U)*
- Formulate a plan to develop and manage an outcomes based curriculum at your institution (C)*
- Identify a concrete way in which they can connect with industry partners*
- Describe how industry collaborations can create situational learning/identify outcomes together*

Title of workshop(s):__ Authentic Learning in Engineering Education__

Session Date: _July 10 – 12, 2015_____

Name(s) of Host: __ CAE – Tsinghua Center for Engineering Education, IIDEA _____

Name(s) of Corporate Sponsor (s): __Mathworks, Quanser_____

Names of University Sponsor(s): __ CAE – Tsinghua Center for Engineering Education

Other Sponsors:_____

Name(s) of facilitator(s):__Jennifer DeBoer, assistant professor, Purdue University, co-director, IIDEA; Kevin Passino, Professor of Electrical and Computer Engineering and the Director of the Humanitarian Engineering Center at The Ohio State University; Dato Lee Yee Cheong, Prof. and Malaysian Chairman, Governing Council, International Science Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO; Khairiyah Mohd Yusof, Professor and Director of Universiti Teknologi Malaysia (UTM) Centre for Engineering Education (CEE); Syed Ahmad Helmi, senior lecturer in the Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM); Lueny Morell, Founder and CEO of Lueny Morell & Associates and Director of InnovaHiEd; Charles Cao, Mathworks; Paul Gilbert, Quanser.

Number of Participant(s): __100_____

Countries Represented: __ China (national level meeting with approx. 25 institutions) _____

Concurrent Meetings and Future Work: at the workshop, plenary sessions concluded with a 30 minute presentation on upcoming events, including the upcoming IFEEES World Engineering Education Forum, the upcoming Global Engineering Deans Council meeting, and the upcoming IPHEX meeting in Malaysia; notably, both the 2015 and 2016 events were discussed so that concrete plans could be put into place to prepare for Chinese colleagues to join the 2016 events; as standard practice Tsinghua and IIDEA leaders and facilitators met for half a day following the workshop series to discuss for the next year; three potential themes were discussed, key areas of feedback were shared, and the groups highlighted steps to showcase previous attendees' work at upcoming global events _____

Sessions' Feedback Reports and Outcomes assessment summary

Participants were broadly pleased with the workshop series, noting the importance of the topics covered and the need for addressing them in the context of Chinese engineering education. These participants represented a variety of engineering disciplines and came from both faculty and administrative (e.g., department chair) positions. Attendees in the workshop included some groups of multiple representatives from the same university. These groups had very concrete, actionable discussions applicable to their home institution. A portion of attendees and groups of attendees were returning after having attended a Tsinghua—IIDEA workshop in a previous year. These groups shared insights on their own evolving practice relevant to the topics presented at this year's series.

Participants forged useful connections with individual facilitators, making connections on specific topics of interest for potential followup workshops. In post-workshop evaluations, attendees were highly satisfied with the workshop series, in particular with the clear objectives of the presentations and the positive learning experience of the workshop series. Interestingly, this high level of satisfaction and perceived utility were observed even though participants had a high level of previous knowledge of the topics.

Participants cited important requests for future workshops, many noting that they would like more time to cover the large amount of useful material in the workshops. They found specific examples helpful and are interested in seeing more case studies in future workshops. Participants greatly appreciated the passion of the presenters and the relevance and amount of material covered. Finally, they would like to see the workshop series expand throughout the year.

Table 1. Evaluation scores for 2015 workshop series

| Question | Ave. (1 – strongly disagree, 5 – strongly agree) |
|---|---|
| The objectives of the presentations were clearly stated | 4.65 |
| The sessions satisfied my expectations | 4.42 |
| I had previous knowledge of the topics | 4.56 |
| The content and organization of topics were satisfactory | 4.39 |
| The level and frequency of hands on activities were appropriate | 4.39 |
| Physical facilities were satisfactory | 4.54 |
| Supplemental information and tools for future use were provided | 4.19 |
| I gained useful knowledge that I will be able to apply | 4.39 |
| As a result of this session, I am more confident and motivated to initiate change at my institution | 4.41 |
| The session was a positive learning experience | 4.75 |
| The overall quality of the session was excellent | 4.5 |

Select comments from attendees:

"Good topic selection. The response and information and reply is also very good."

"I not only learnt a lot of methods and view points, but also made some new friends with common interests."

"I'll be back next time."






"...very useful knowledge and thinking methods that will help my teaching work..."

"...good organizing for this workshop."



This year's facilitators and the Tsinghua leadership team (clockwise from top); CSEE president and Prof Yu Shouwen and Tsinghua Vice President and Prof Yuan Si provide the Tsinghua leadership perspective on the 5 years of IIDEA workshops, Prof Yu interacts with a collaborative group, international facilitators enjoy wonderful hospitality, IIDEA co-founder and head of InnoviHiEd Lueny Morell and a graduating student celebrate.

Address of Workshop Location: _ *Reception Hall, Main Building, Tsinghua University, Beijing, China* _

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| Hosted by CAE-Tsinghua Center for Engineering Education 主办：中国工程院-清华大学工程教育中心 | Facilitated by International Institute for Developing Engineering Academics (IIDEA) 主讲：国际工程教育发展研究院专家 |
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