Chemical Engineering LTC Case study

Improving the student experience and learning from small group scenarios

Engineering courses have always included project work, often carried out in small groups. The UCL Chemical Engineering (UCL-CE) course includes six week-long scenarios as well as a capstone design project in year three and academics are keen to ensure that all students have the same opportunities to contribute to and benefit from all aspects of a team based project.

Many students enjoy the social aspect of shared and collaborative learning and see it as a chance to get to know a greater number of their course colleagues. A number of issues can obstruct this aim including:

- Students complain of having to work alongside a team member who is lazy, perhaps late for meetings or simply doesn't contribute to the same level as others.
- Recent research from a large study in the USA, across four institutions, highlights the differential experience of male and female students.

UCL-CE set out to improve the overall quality of the team experience and learning for students. This included providing opportunities for students to develop greater self-awareness through self-reflection and practice in giving and receiving feedback; a vital career skill. This aligns with recommendations in the Wakeham Report[1] description of the need for STEM graduates to have a broader set of skills that go beyond their technical expertise and know-how. The scenarios offer an authentic learning experience and this new approach to managing team learning aims to help students set themselves apart when they go for interviews. UCL-CE is also building on the use of Clifton Strengths for Students in the Year 1 Challenges.

Drawing on the literature and good practice in supporting under-represented groups to have a sense of belonging a small number of team rules have been defined:

- Never have a single gender in a team.
- Students don't get assigned to the same team twice.
- Never group alphabetically as it will tend to cluster nationalities – the aim is to mix up nationalities and helps improve English and accelerates cultural exchange.
- Team roles are not assigned; this helps avoid stereotyping.

What we did

In year 1 students are introduced to the importance of feedback and how to give it so it is received with the intent it was given. During the scenarios 10% of the marks are reserved for a feedback coursework in addition to the 90% that is allocated for technical content.

Students must read their feedback, comment on it and are allowed to challenged what has been given. The primary aim of the feedback though is to help each student develop an informed personal action plan. This develops over the six scenarios until scenario 6 when students must set their learning goals for the Year 3 year-long project.

---

[1] https://goo.gl/NDL9dC

Within each of the 6 scenarios the Scenario Leaders change the formation of the team selection:

- Academic ability (grades)
- People's Choice (ie friends) – feedback is always mixed for these
- Random – always a favourite (in hindsight)
- Course grades from term before
- Repeat a team – students hated (tried in scenario 2 in 2016)

Feedback is collected after each scenario in two ways:

- Assessed self-reflection by each students
- On-line survey tool

The team selection criteria are still evolving based on survey analysis and direct feedback to Tutors. Two relevant findings so far to emerge are:

- In 2016, scenario 2 the teams were kept the same as for Challenge 2. The feedback was very negative with students preferring to be mixed up.
- The 'People's Choice' option is repeated, but always receives very mixed reviews.

The main finding is that students like to be mixed up as much as possible to learn about as many different people and get to know a wider number of course colleagues.

Other feedback has suggested that a maximum number of 6/7 students works best, preferred by 82% of students. Teams of 8 received widespread negative feedback.

Messages to others

The scenario time frame as a week is too short to learn much about a team. Scenario or project leaders ideally need to introduce something before and after the scenario – perhaps add in, for example, an optional workshop around team learning - the challenge is to make it attractive. The aim is to help students prepare better for the scenario. Scenario is a training and graded tool for the students to immerse them in an industrial experience.

Additionally a further optional reflection session would take place after the scenario to give more detail and in depth review of learning. Shade already undertakes this with her tutees, helping them set personal goals, but it may not be something every tutor does as it will strengthen the connection between the student's academic learning and work place learning (dimension 4 of UCL Connected Curriculum).

Other learning

UCL-CE have a self-assessment framework and another format exits on the IEP Central Moodle site. UCLE-CE suggest to students that they could use CliftonStrengths that is used in the IEP Challenges in Year 1 for the self-reflection as a discussion point and the Strengths Reports could inform action/ goal settings.