

Department of Chemical Engineering

Curriculum Transformation: Phase 1 Summary

As a vanguard programme for the University of Bath's Curriculum Transformation, in November 2017 the Chemical Engineering department began the process of reviewing, refreshing, and revising their curriculum offer in line with the core objectives of the University's Education Strategy.

From November to December the core Programme Development Team identified to lead the Department's transformation process met regularly to undertake associated work.

Stakeholder engagement

Internal stakeholder engagement began with a whole-department session and an all-student session to introduce the curriculum transformation. The Associate Dean (Learning & Teaching) also attended an SSLC meeting and gave an introductory presentation. The whole-department session was well attended by staff from across the department and the Centre for Learning and Teaching. A Moodle page was set up and made available to both staff and students. However, the introductory all-student session was poorly attended, for reasons discussed later in this report.

To ensure comprehensive internal stakeholder engagement, three staff focus groups and one student focus group were held, facilitated by the Business Insight Manager in Marketing. The three staff focus groups were attended by 20 Chemical Engineering staff in total, grouped by experience and time in post. The focus groups aimed to identify some of the current key requirements and skill sets required by chemical engineers, to understand the trends and challenges in chemical engineering, and to consider how the University of Bath's chemical engineering offer could best respond to opportunities and threats. The student focus group was attended by four final year students, three second year students, and one first year student. The focus group aimed to identify individuals' reasons for choosing chemical engineering at the University of Bath, their perception and experiences of the subject, and their future goals after completing the degree programme.

Engagement with external stakeholders included consultation with alumni, industry, the Institute of Chemical Engineers (IChemE) accrediting body, and academic contacts at other institutions.

An alumni survey was sent out to all students who graduated from BEng and MEng Chemical Engineering (with or without placement) in the last five years. This questionnaire aimed to gather information on what alumni have valued most from their degree, key technical or transferable skills, and any challenges they had faced in their transition into onwards careers. Thirty responses were received from graduates across the last five student cohorts.

Placement providers were contacted just before Christmas with a questionnaire about their experience of taking University of Bath chemical engineering placement students, with responses received by the end of January. The providers who responded included four multi-national companies from across sectors. The highly complementary responses shared similarities, for instance, that University of Bath chemical engineering students were viewed as technically competent and able to apply their understanding to different scenarios. Good communication skills and interpersonal skills were also noted, however one provider articulated nicely that the biggest challenge, once in industry, would be "...to use the data they gathered and analysed [to] bring people with them [and] portray that information to technical and non – technical stakeholders".

Employer engagement was undertaken by Dr Alfred Hill, a current academic with links to industry, who questioned four senior engineers around key skills for industry. The comments received were overwhelmingly focused on transferable skills, in particular problem solving, but also the ability to identify problems and deal with ambiguity. Engineering judgement was also noted as an area where new recruits lacked confidence.

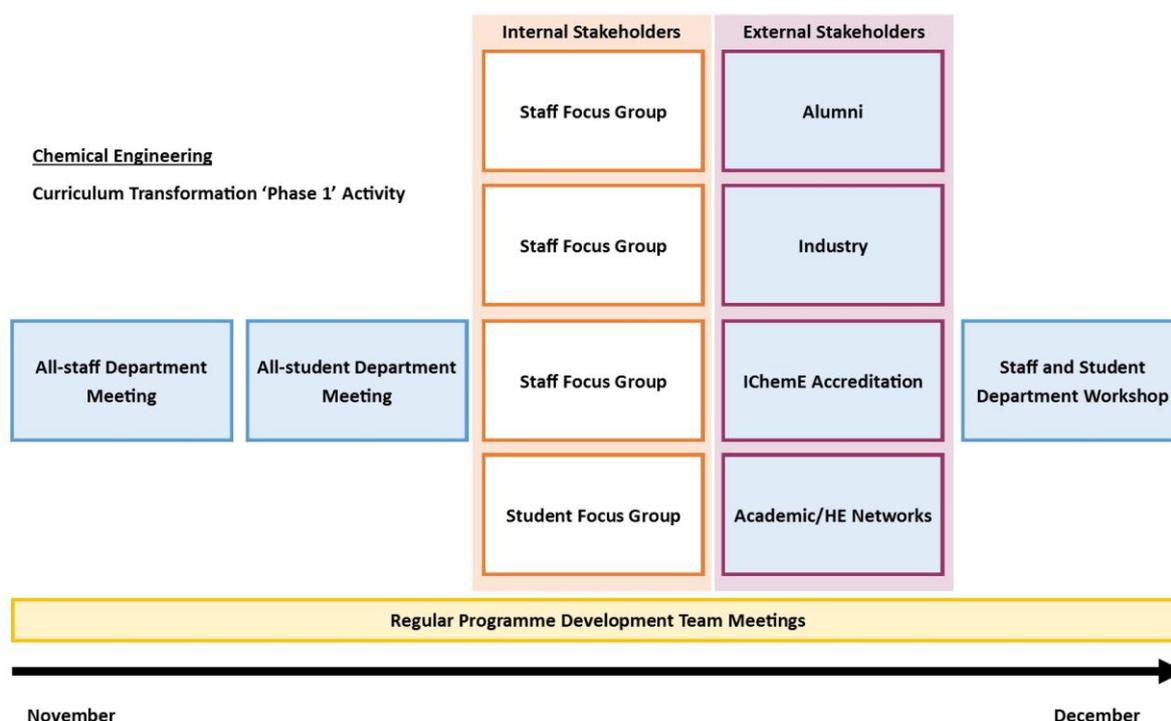
In order to ensure that accreditation is maintained, the Head of Department has liaised with the IChemE to keep them updated on the Curriculum Transformation process, and a visit has been agreed. Initial comments received from the IChemE were supportive of changes so long as learning

outcomes continue to be met appropriately. Conversations with two other chemical engineering departments within the UK who have undergone similar substantial reviews of their programmes indicated that they had found the IChemE to be supportive and a provider of positive feedback in regards to the changes they have implemented.

Academic staff in the Programme Development Team made use of their contacts at institutions such as Cambridge, Edinburgh, Sheffield, and Newcastle to learn about programme development processes and ideas. For instance, Newcastle have just completed the roll out of synoptic assessment approaches introduced in 2009, whilst Sheffield are currently undergoing a significant review of their curriculum. This subject-specific UK-wide learning and teaching community is providing, and will continue to provide, invaluable support as critical friends, and a forum in which to share ideas.

To conclude Phase 1, following the internal and external engagement activities, a whole-department staff and student workshop was held. The workshop took the themes emerging from the internal and external engagement activities and focused on summarising what chemical engineering is, how it is different to other subjects, and the unique selling points of both the department and the University. The information produced in the workshop fed directly into the revised programme specification and prospectus content, in order to meet the January deadline for changes to the print prospectus.

Phase 1 process overview



Towards Phase 2

A wide range of views and information were collected during the internal and external stakeholder engagement activities outlined above. The following emerging themes were identified as key considerations for Phase 2 of the Curriculum Transformation process:

- Core chemical engineering knowledge and skills must remain central to the curriculum
The importance of maintaining programme accreditation with the IChemE is a priority and of significance to both staff and students, but was not brought up by employers. It is essential that the learning outcomes outlined in the IChemE accreditation standards continue to be embedded across the programme.

- Problem-solving, adaptability, and collaboration are fundamental to chemical engineering
The importance of problem-solving was a strong theme in the alumni questionnaire responses, with a third of respondents referring to its importance, both as something they had valued and gained experience of in their degree programme, and as an area which could gain more prominence. The staff focus groups highlighted the wide range of sectors and changing environment in which chemical engineers work and the need therefore for graduates to be adaptable. They also noted that the interdisciplinary nature of the subject meant that collaboration with experts in different fields and the ability to communicate effectively with a range of audiences is essential.
- Priorities for Curriculum Transformation
The staff focus groups highlighted that it was important to sustain and enhance the quality of the student experience that had been maintained throughout the recent period of growth in student numbers. In addition, attention is needed to ensure that the already heavy workloads of staff are not further increased and, where possible, are eased, for example through a reduction or change in assessment patterns. The student focus groups questioned the significance of exams and highlighted inconsistency with lab work experiences.
- Alignment between current research expertise in the department and programme content
The link between biochemical engineering and chemical engineering at the University of Bath is perceived by staff and students to be a unique feature. There were mixed views on whether this is valuable and should be maintained and enhanced, or whether the programmes should be more distinct and diverse.

Lessons learned and advice for other departments undertaking Phase 1

The following lessons learned are included to help colleagues in other departments in undertaking Phase 1 Curriculum Transformation effectively and efficiently:

- A core Programme Development Team who meet regularly is essential for both the coordination of stakeholder engagement activities and evaluation of the information generated.
- Administration and facilitation support is required in order to deliver activities such as focus groups and questionnaires and to gather and interpret findings. The potential bottleneck to Phase 1 is the time it takes to collate the stakeholder data into a format that can be used to review the programme specification and the prospectus text.
- The initial all-student introductory meeting held at the start of phase one was poorly attended. The department made use of Wednesday 12.15 for this meeting as it was the only time slot with no teaching scheduled for any cohort, was around two hours before most home sports matches would begin, and was directly after lectures for most years. Thus it was hoped that students would come along before going to their matches or taking advantage of an afternoon with no lectures. However, despite this, attendance was poor, leading the Programme Development Team to conclude that it had been held too early in the process to garner sufficient interest, with too little incentive for students to attend. We therefore recommend: timetabling the session early so it is in the student's diaries; putting on lunch or coffee and snacks; splitting the meeting into years so that there are less time constraints; better utilising SSLC and the academic representatives.
- Conversations with other universities who have carried out a similar exercise can provide support and reassurance, and provide a community to share ideas.
- Involvement of CLT and Academic Registry, and Faculty Marketing, has been essential to the successful completion of Phase 1.

Curriculum Transformation Phase 1

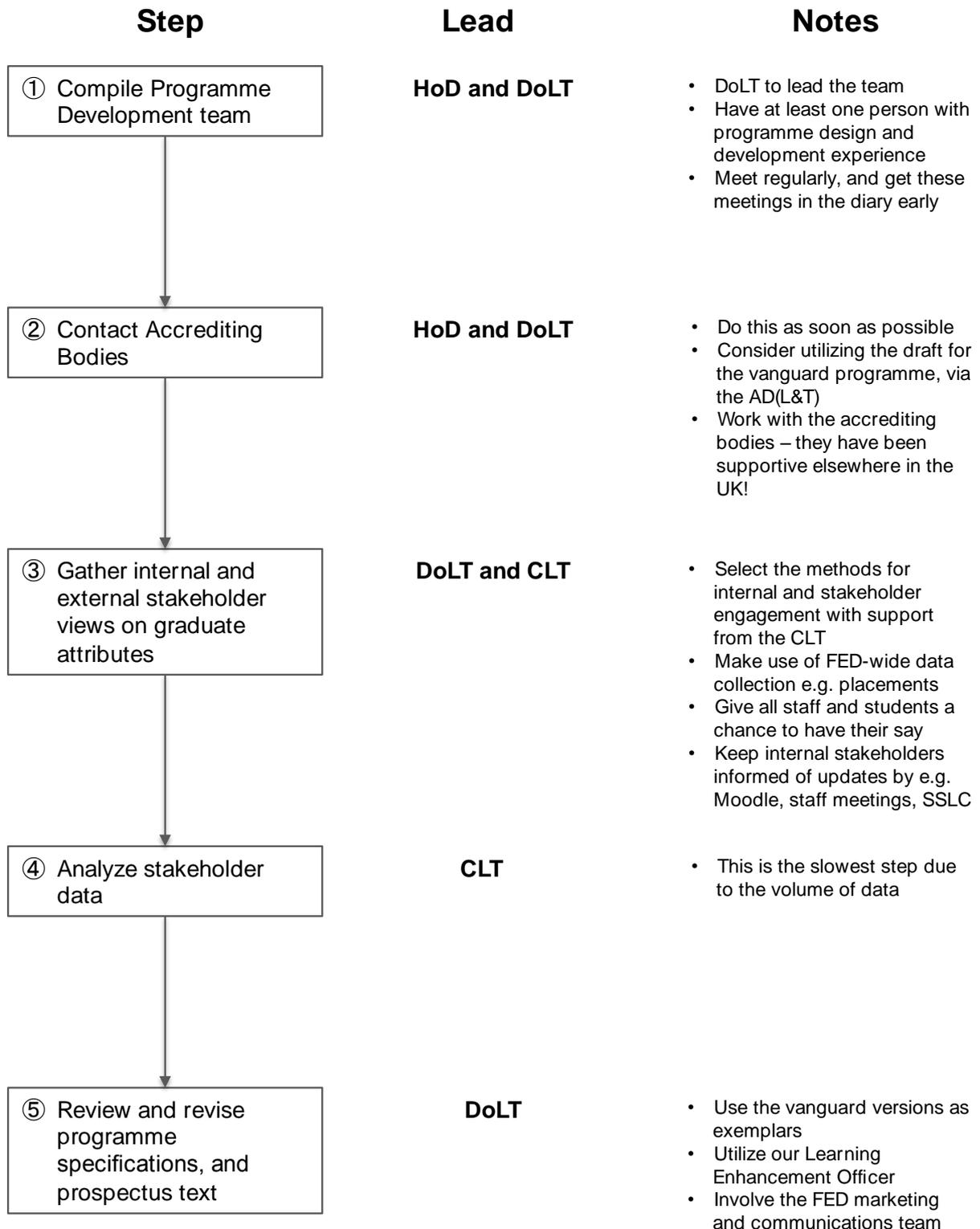


Figure 2: Organisational flowchart of curriculum transformation in the Faculty of Engineering and Design