

# Benchmarking Engineering Dissertations

Gratton, Petra<sup>a</sup> Gratton, Guy<sup>b</sup>

<sup>a</sup>Department of Mechanical and Aerospace Engineering, Brunel University London, Uxbridge, UB8 3PH <sup>b</sup>School of Aerospace, Transport and Manufacturing, Cranfield University, College Road, Cranfield, MK43 0AL

*Corresponding Author's Email: [petra.gratton@brunel.ac.uk](mailto:petra.gratton@brunel.ac.uk)*

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## SUMMARY

The engineering dissertation project is an important milestone in the training and education of nascent professional engineers. This workshop will explore what a gold standard of conducting the dissertation project might look like, and through facilitated discussions, give participants the chance to reflect upon and benchmark their institutions' current practice.

## AIM OF WORKSHOP

The aim of the workshop is to benchmark current practice in the running of dissertation projects, from the perspective of education leadership, management and supervision, in consideration of their contribution to developing professional

engineers. Starting from the experience of participants in the workshop, facilitated discussion will be used to induce a common understanding of various aspects of running the 'major project', and agree amongst participants what identifies a range of quality in practice for a pre-defined list of issues. The output from the workshop may then be used by individuals to self-evaluate their own learning and teaching practice.

The nominal maximum number of participants is 40, but the workshop can be scaled up or down.

## BACKGROUND ISSUES

The 'dissertation' is a means of reporting critically on the major (sometimes referred to as capstone) project that is undertaken at the conclusion of a degree course. It is traditionally the most highly weighted assessment element in the award. All candidates for Bachelors and Masters degrees in the UK education system are expected to complete a significant personal project in order to "apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge" (QAA, 2014). Similarly, project work, as part of an engineering degree, is expected as a way of delivering a number of learning outcomes concurrently (ECUK, 2014, p10).

The dissertation project contributes to engineering education as an exercise representing, or replicating, possible activities of an engineering workplace, thus preparing candidates for future employment. It tests "hard" (technical) skills as well as "soft" (professional) skills (Gattie et al, 2011; Uziak, 2015), both of which, it is argued, are required to achieve success. Some students appreciate this, and anecdotes, as well as evidence (Cachia et al, 2018) (albeit from a Psychology Department) exist of students balancing opportunities to develop those skills valued by employers against working for the grades they anticipate will 'open

doors' to employment. One of the most important of these life-skills is about dealing with uncertainty (ECUK, 2014).

The dissertation project also provides an opportunity to collaborate with industry and other stakeholders, through working with a 'project client' on industry-based projects (Uziak, 2015), thus students can be introduced to prospective employers and improve their employability. Care is needed in managing the expectations of all parties: student, supervisor and client, especially with regard to timeframe (Abdullah et al, 2012). It helps if there is congruence between research interests of all parties.

In general terms, whatever is considered in either undertaking or organising the individual dissertation project may also be applied to the group project, where there is the added complexity for the student of working with a team of peers engaged in similar work. Whilst much guidance exists for writing up projects (e.g. Van Emden and Becker, 2018), and even conducting projects in specific fields (e.g. Naoum, 2012), there is very little guidance about exploiting the engineering dissertation project for career development. *Achieving Success with the Engineering Dissertation* (Gratton and Gratton, 2020) addresses this and acknowledges the wide variety of engineering projects, including those inspired by industry.

## WORKSHOP SCHEDULE

The workshop will commence with a brief introduction of what the authors believe (Gratton and Gratton, 2020) to be important in the dissertation project to the formation of engineers. Our approach encourages students to strive for success, defining *success* in terms of personal, professional and career development, as evidenced by outputs, such as having more confidence in dealing with uncertainty,

building professional skillsets and gaining a desired post-graduation job.

(maximum of 10 minutes)

The audience will then be divided into several teams, and set the challenge to identify within their teams (in 30 minutes) what a gold standard of engineering dissertation project might look like, through addressing a number of issues, including:

1. preparing students
2. matching projects, students, supervisors and project clients
3. commencing the dissertation project
4. conducting and reporting
5. assessment
6. helping bridge to the future.

The teams will then be invited to provide feedback on their discussions by systematically addressing each of the issues (30 minutes in total). This will be followed by a short summary (10 minutes maximum), and an invitation to the audience to attest their current practice (10 minutes).

## WORKSHOP OUTPUTS AND OUTCOMES

The outcomes of this workshop will be a list of identified best practices for dissertation project organisation compiled amongst the participants, which will permit each participant to score their own, or institutional, experience against the benchmark, thus permitting them to identify where there are possible areas for improvement.

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