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What should we Teach?
Defining your discipline to drive curriculum renewal: an environmental engineering case study

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Conference Topic: Curriculum Development
Keywords: Graduate capabilities, Engineering curriculum, Stakeholder consul-tation, Curriculum design, Environmental engineering

In Australia, the federal government, employers, and accrediting bodies, such as Engineers Australia, are calling for more clearly defined *program outcomes* or *exit standards* for engineering programs [1-3]. Engineering Schools are therefore under increasing pressure to more clearly define what graduates from four or five year engineering programs should *know* and be able to *do*.

This paper describes a simple, but elegant stakeholder process that can be used to define the capabilities of a graduate who could claim in-depth techni-cal competence in their discipline. The Defining Your Discipline (DYD) Process [4] may be used by educational institutions and industry organisations to develop practitioner-authenticated sets of *graduate capabilities* for their disci-pline. Environmental engineering was the test case for this new process.

At the heart of the DYD process is the definition of tasks, in this case the tasks which a graduate from a program should be able to do in their first two or three years after graduation. Stakeholders are given a set of large sticky notes on which they are asked to write, on each note, one task that they would expect a recent graduate to be able to perform in their company. For academics, this is an imaginary task, while for industry representatives, who usually have considerable experience in supervising young graduates, it is more authentic as they know the sorts of tasks that a recent graduate should be able to complete.

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After about 20-30 minutes, most participants come to a stop. They can't think of any more tasks. Sometimes, it is helpful for them to talk to people around them for more ideas. This might last another 10-15 minutes.

So, within 40-50 minutes participants are ready for the next stage, which is to *cluster* the tasks into meaningful groups. This takes another 20-30 min-utes. There is usually quite a bit of discussion about the names of the clus-ters, and when negotiating the cluster into which an individual task belongs.

The outcomes for environmental engineering are shown in **Figure 1**. In this case, the clusters are shown along the right hand side of the cube (investiga-tion, modelling & analysis, integrated design, assessment of impact, environ-mental planning, audit etc. The other two faces of the cube represent techni-cal domains (water, soils, etc) and generic skills (teamwork, communication, etc).

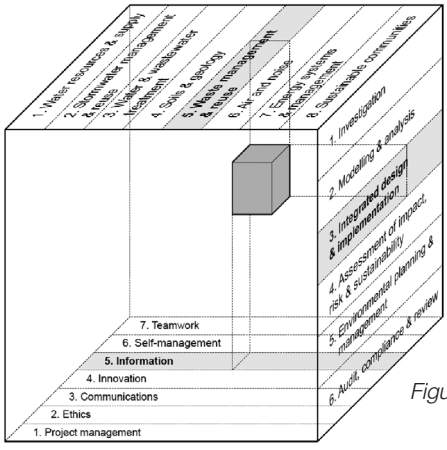

Figure 1 – The Environmental Engineering Capability Cube

The paper demonstrates an efficient process for determining the graduate outcomes for an engineering degree. The same process is also being tested on non-engineering programs. The process is efficient in terms of stakeholder time, taking about one and a half hours to collect 100-200 tasks to be ac-complished by a young graduate, depending on the attendance. The partici-pants categorise these tasks into clusters and these can then be synthesised with the results from other workshops. ■

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