

The University of Queensland's faculty of Engineering, Architecture and Information Technology (EAIT) recently undertook a review of the engineering curriculum to study and report on the nature of the UQ Engineering experience. According to the results, 'UQ engineering students are not satisfied with their learning experience, despite an acknowledgement that the teaching is good' (Schaffer, 2010, p. 11). In particular, it was noted that engineering 'fails to meet the minimum expected standards for the provision of helpful, timely feedback; a sense of belonging to a group of students and staff engaged in inquiry and learning; achieving graduate attributes; helpful course material and resources; course administration; and course workloads' (p. 11). The report concluded that a new curriculum should be developed which should make extensive use of pedagogies based on engineering design, build and test; that are engaging and relevant, authentic, technically rigorous and incorporate professional behaviour outcomes.

It was decided that the reorganisation of a first year course, ENGG1200, would be a first step towards trying to address some of the concerns. This course is the focus of this project. Of interest is to establish its efficacy in addressing the student experience issues noted in the surveys. The course is a second semester course taken by a cohort of 1000 first year engineering students. Prior to 2012, the material in this course was taught in a traditional lecture format. In 2012 a change has been introduced in which the design-and-build concept is employed to infuse engineering practice into the first year curriculum, provide authenticity as well as provide opportunities for students to identify themselves as engineers at this early stage. It is hoped that as well address the concerns mentioned above, the change will allow students to develop professional engineering identities. In relation to the above then, the aims of this project are:

Aim 1: to establish the gains made by an active, authentic design pedagogy along the lines of course design, delivery and support;

Aim 2: to understand how students maintain ownership of their learning while navigating the particulars of a delivered curriculum. So, for example if the course fails to meet a student's expectations, what do they do, what 'extra' resources do students draw on in order to succeed?

Aim 3: to understand how their actions, in relation to the curriculum, shape their experience and what identities are developed in the process. The data from the surveys and the review means there is baseline data from which to compare.

While some approaches to investigating the student experience incorporate only surveys, the current project intends to go beyond this in understanding how students reconcile the short comings. In other words, knowing that an institution falls short in a number of areas in terms of teaching and learning is instructive; it is important however to also understand how students recover to still ultimately realise their goals. Because the study is qualitative, there is potential for a deeper understanding of diverse student views, a point which will be crucial amidst the Australian government's aspirations to diversify the student body in higher education.

The project is based on a realist philosophy. Archer (2003) notes that all people at all times are confronted with three orders of reality: the natural, the practical and the social. She argues that each of these has its own sets of related concerns. Archer defines concerns as 'commitments constitutive of who we are, which are an expression of our identity' (Archer, 2000, p. 4). Emotions emerge from these concerns which mutually affect each other. Our task then becomes to re-evaluate, correct and prioritise our emotions to navigate our way through the three orders simultaneously. She argues that this process happens through the Internal Conversation, a mental activity that involves silent self-talk that all normal people engage in. She has defined this process as reflexive deliberation which involves the following stages.

'...Structural and cultural properties objectively shape the situations that agents confront involuntarily and inter alia possess generative powers of constraint and enablement in relation to, ... subjects' own constellations of concerns emerge as subjectively defined by the three orders of reality: natural, practical and social, ... Courses of action are produced through the reflexive deliberations of subjects who subjectively determine their practical projects in relation to their objective circumstances' (Archer, 2003, p. 135).

The interface between the situations subjects face and actions they embark on represents the start of the Internal Conversation. Therefore, the Internal Conversation culminates in the specification of actions by active agents.

Archer (2003) argues that the final stage of the model captures the process of mediation without which there can be no 'explanatory purchase' (2003: 143) on what subjects do. She notes that it is only in the light of actors' personal projects that situations prove to either be constraints or enablements. This model of agency incorporates the realist notion that students, indeed all individuals, operate within contexts or environments which while outside of their control, are still causally efficacious and cannot be ignored if they prove to be a constraint in terms of a person's declared goals. The person is then obliged to design courses of action to navigate their way through whatever situation they are in.

A range of methods including questionnaires, focus groups and interviews will be used to collect the data. The approach to the qualitative data analysis will be partly a grounded approach in which categories emerge from the data (Charmaz, 2006). A predetermined coding framework will also be used based on Archer's reflexivity 'categories'. Bernstein's (2003) ideas around the properties of an instructional discourse will also inform the study. Overall, it is necessary to understand whether active and authentic pedagogy, characterised by open-ended problems and integrative activities allows for coverage of core technical content while giving the space for students to develop their professional engineering identities, and whether this enriches the student experience. Is this the solution to improving an otherwise 'outdated' and 'rigid' curriculum? The new course runs from July to the end of October 2012. This will be the data collection phase.

References

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