EngFocus: Engineering alternative entry program for non-TEE students at Rockingham

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Abstract: EngFocus is an alternative entry program that has been presented over the past three academic years by the School of Engineering Science at the Rockingham Campus of Murdoch University. High school students in the Kwinana/ Rockingham/Peel region have traditionally low levels of University participation and overwhelmingly do not complete a Tertiary Entrance Exam (TEE) qualification. Many students who start off in the TEE system change their enrolment prior to their final exams. Most of the rest complete Tafe certificate Vocational Education & Training (VET) programs or graduate with a Certificate of Completion. As such these students have little to support their application if they decided that University study was their best option, particularly if they wanted entry into a professional School such as Engineering. In 2002 this program for non-TEE students was proposed within the School and a pilot program for 12 students from regional high schools ran over the summer of 2002/3 with six completed and enrolled into Engineering. In 2003/4, 13 students were enrolled into EngFocus and all enrolled into Engineering. In 2004-5, eight students enrolled into EngFocus and seven subsequently entered Engineering at the start of Semester 1 this year. EngFocus exposes students to the background of the Engineering disciplines taught at Rockingham as well as providing an evaluation of their maths skills while at the same time, introducing them to the generic skills required for success at University.

Keywords: Flexible entry pathways; teaching innovation; learner centric education

Background

Murdoch University's Equity programs

Murdoch University has developed and sustained a variety of alternative entry programs since the Commonwealth Government's paper Fair Chance for All came out in 1989. Coordinated and presented by Murdoch University's Teaching Learning Centre (TLC),

alternative entry programs such as UniQuest and UniAccess provided pathways for non-traditional students from identified Equity groups into study at Murdoch University. Currently Murdoch has alternative entry programs that focus on both general and specific academic Schools. Both the School of Veterinary Science and Law School have designated bridging courses for Aboriginal and Islander students. The Kulbardi Centre provides bridging courses for Aboriginal and Islander students. UniFocus, first presented in 2001 by the School of Education at the Rockingham Campus, focuses on the needs of potential students in the region who come from low SES (Socio-Economic Status) backgrounds.

One of the key strategic elements in Murdoch University's strategy for the development of the Rockingham Campus was to raise the participation rates of high school students from the region in University study. With this in mind the then Dean of Engineering Science at Rockingham, Associate Professor Maurice Allen encouraged me to see if such a bridging program was feasible for the School and to suggest a structure and budget. I had both taught in and coordinated UniQuest and UniAccess when working with the TLC and involvement with the School of Education. I suggested that a version of the School of Education's successful UniFocus program could, quite readily, be adapted from a generic entry bridging course into one introducing students to the discipline of Engineering.
It was agreed between the two Schools that adapting UniFocus to Engineering's needs should be explored and Dr Jane Pearce and I put together a proposal that we believed would form the fundamental shape of the nascent program.

Participants in the program were to be Year 12 Vocationally Education and Training students drawn from regional high schools. These students would be recommended for the program by their high school VET coordinators and principals. As our School has no set pre-requisites for Mathematics or Physics with our TEE applicants it was accepted that these non-TEE students should be treated the same and as such it was accepted that the mathematical skills of these students would need to be actively developed throughout the program. As has been noted, EngFocus was designed to run for 5 weeks across summer with two weeks in mid-December with a three break and the last three weeks of January.

Assessment of the students was to be continuous with priority given to the quality and continuity of participation of the students. Rather than devising an exam-based format it was agreed to enable the students to self-select out of the course. It was felt that students withdrawing from the program voluntarily if they found that they weren't interested was a better outcome for all concerned.
A provisional budget approved by the Dean was the basis for progressing the program. This enabled some of the practical steps to be taken, such as contacting high schools and explaining the program, first, to their VET coordinators and then, the students and their parents.

Preliminary discussions with the School of Education were held as it had been notionally agreed that EngFocus was to be an offering under the aegis of both Schools as we

manage the majority of the resources at the Rockingham campus. The conjunction of UniFocus and a bridging program for VET students in the School of Engineering was the initial vision of the structure of EngFocus. Unfortunately, while fully supporting the intention of the program, the School of Education had to withdraw from its participation in developing EngFocus.
Approval to present the program had to be obtained from the University's Committee for University Entrance (CUE) that needs to give endorsement to all new programs. The Academic Planning Committee (APC) and then the President of Academic Council finally agreed the program could run as a trial in the first instance.

Role of the School and Division

The support of the Dean was fundamental to getting the development EngFocus started. Staff from the School of Engineering prepared a range of developmental programs for the prospective students. These workshops were related to the four major discipline areas in which the School specialises. Engineering staff responsible for the four workshops had to develop a series of activities for their workshops. These programs were largely self-managed and contained their own assessments according to the academic staff's evaluation of the students.

The programs had to be somewhat refined at the second iteration due to staff changes, budgetary constraints and alterations to their workshops based on the previous year's experiences.

In 2003-4 and 2004-5, the Executive Dean provided funding for the EngFocus program from Division of Science and Engineering funds. The Executive Dean has established a prize for the most successful EngFocus student at graduation.

Non-TEE Students

It was decided that EngFocus would be established to identify and introduce Year 12 graduates from non-TEE backgrounds to University study and for them to become more aware of the School's teaching program and facilities. As graduands of the program were to be enrolled into the School of Engineering it was accepted that their transition to University study would have to address their academic needs rather than seeking out only those students with the school based skills already in place.

This focus on non-traditional students supported the University's Strategic Plan, especially those key indicators relating to increasing University participation in this region and creating closer links with the community.

Structure

EngFocus was designed as a 5-week full-time enabling course that would be run across the summer non-teaching period. The overall timetable comprises two discrete periods,

the first being two weeks in mid-December and the second running for the last three weeks in January.

Each day followed a consistent pattern whereby students would arrive for a start at 8.45 in their 'home room'. This would be the venue for the tutorial and lecture components of EngFocus. These sessions would last until lunchtime.

Mathematics evaluation workshops would also be run during these sessions at a specific time. These sessions would occur weekly until Week 5 when the Engineering workshops were replaced by a series of student focussed Maths developmental programs. In the afternoons, the students would go to their designated Engineering workshop to continue their orientation to Engineering. The day would finish at 3.45.

Academic skills

This component of the program was designed to give the students a strong introduction into University study skills and practices. This 'home room' approach gives students a constant focus at the start of each day and a forum where they could raise and discuss issues that came up during the previous day. The tutor of this group is a vital resource in this program as the students are encouraged in this setting to bring up any questions, seek clarifications or just to vent themselves while they try to learn the new skills.

The development of pragmatic life-skills is a key component in this program - students need to be introduced to the expectations of academic study: time management, self-organization, as well as critical thinking, research, essay writing and oral presentation skills. The students were given specialised lectures throughout the program with tutorials to complement and extend the ideas within the lecture structure.

Academic skills also present another theme of the morning sessions. Students are introduced to the generic academic skills of essay writing: planning, researching, drafting and completing a 1000 word essay; oral presentations: planning, preparing and presenting a research topic to the tutorial group.

Skills/home room tutor

The role and function of the homeroom tutor is fundamental to the program's success. This role is responsible for providing students with ongoing and continuous support as well as providing the academic skills necessary for successful participation at University. The students demonstrably benefit from having a constant person with whom they can discuss a broad range of issues that might arise for them during the program. The tutorial structure has a 'house-keeping' component before the start of the day's coursework. As noted the tutor is responsible for guiding the students through the program of academic skills development.

Engineering workshops

The Engineering workshops are designed to enable the students to gain an understanding of the activities and specialisations that are represented within the School. It was agreed that giving students the chance to engage, albeit at an introductory level, with the processes and equipment used within the School would be a valuable component of the EngFocus program. The students are introduced to the particular facets of each of these programs through engaging in specific tasks over the week with a presentation on the final day of each week.

Three of the School's main programs of study were selected to provide five-day workshops for EngFocus students. The workshops focussed on Software Engineering, Instrumentation and Control Engineering and Industrial Computer Systems Engineering. The afternoon sessions each week was spent in one of these three Engineering workshops with the cohort proceeding through each of the workshops together.

Mathematics workshops

One of the priority areas that needed to be incorporated into EngFocus was in the provision of Mathematics support and training. In the first presentation of EngFocus, a Mathematics workshop was presented in one morning session each week for the first four weeks and then the afternoon sessions of the fifth week were dedicated to Mathematics skills-development. In the 2004-5 EngFocus, it was decided that 2 weeks of Mathematics workshops as these skills were identified as being of most importance to the Engineering component of the program.

As these students had taken different academic pathways in completing their high school careers (most arrived with an mix of VET, WSA and some TEE backgrounds) it was decided to run these sessions as primarily evaluative processes. In the first instance the Mathematics workshops were focussed on assessing each student and establishing their levels of mathematical competency and then designing a program for each of them according to their mathematical abilities in later workshops. The fifth week of the program has a significant Mathematical component in order to prepare the students for the units of study they will undertake in their first semester. Having established the level of each student's Mathematical skills, the balance of the program was designed to bring them towards the base level needed for the School's first Mathematics unit, ENG165, Engineering Maths 1.

The students identified as not being to the standard required for ENG165 are directed into one of two preliminary units, Fundamentals of Mathematics (MAS164) and Introduction to Physics (PEC120). This pathway is not specifically designed just for EngFocus students, in fact as the School has no pre-requisites for entry, many students are directed through these courses to prepare them for the higher-level maths required in the full degree program. This preparatory work can have the consequence of delaying a student's completion of their degree, however, the opportunity provided through this approach is seen by participants as being worth any delay in their graduating.

The Mathematics tutor has a key role, similar to that of the homeroom tutor, having the role of explaining technical as well as conceptual materials and issues to the students. Their task is to provide another voice for the students to hear, another resource they can readily trust and talk to about problems or seek clarification.

Assessments

While each component of the EngFocus program is assessed internally by the academic responsible for their workshop, it had been previously been agreed that the main criteria for successful completion of the program was to be primarily based on how the students participated in the program.

The key elements were compulsory Attendance, full and active Participation in the tutorials and workshops, sound Application of the topics and ideas in coursework, and Demonstrating an enthusiasm for the work. This set of ethics (APAD) ensured that the students and staff were aware that a student's success in the program was not to be totally based just on their academic qualities, rather success was predicated on their individual attitude, commitment and enthusiasm.

Library Skills

The Rockingham Campus Library provided a weekly series of presentations throughout EngFocus with each module focussing on different aspects of Library usage, Internet and computer skills, searching databases, researching material for essays and presentations. These research activities are coordinated between the Library and academic staff for the tasks undertaken through the program.

Engineering Staff Involvement

Engineering workshops

The workshops had to be physically designed so that all the students could gain from the theoretical and practical experience and develop their knowledge and understanding of the disciplines practices. Most of our labs are in a modular format so staff could fairly readily set up the equipment for their workshops. Typically, one academic staff member and one or two undergraduate students employed for the sessions would manage the group.

Staff responsible for developing the workshops generally implemented a consistent structure whereby the students were introduced to some of the core themes of the discipline in the first instance and given the means to develop an algorithm, a measurement or a program, depending on the focus of the workshop.

Administrative issues

It is relevant here to discuss the policy/administration elements that emerged as the program developed.

In its first iteration the School of Engineering funded EngFocus as a pilot program. Following the University's standard practice with alternative entry programs, the students were nominally enrolled into the University for the duration of the program. One consequence of this approach is that students who successfully completed the program could have their enrolments continued with their enrolment details and status already recorded on the University system.

This process also enables the Division to fund these programs internally, as opposed to making them only available to fee-paying students. Therefore the students enrolling into EngFocus were registered as University students from Day 1, complete with Student numbers, Library card and Internet access.

One issue that has come up in both iterations of EngFocus has been difficulty with complying with University enrolment practices. The University's (former) Office of Student Services was concerned that, in effect, students were being enrolled into the University without proper evaluation or achievement. Clearly a sound understanding of the University's enrolment procedures needs to be in place with all such programs (or having senior administrative support) as conflicts such as these can mar the first day of any new program.

Future Prospects

2005-6

Planning is in progress for EngFocus 2005-6, however there are many key issues that still need to be addressed, however that is as it should be for a program that has only gone through three cycles. We have only had three years of students enrolling into Engineering through the program and no clear numbers for evaluation at this stage although the University's enabling and bridging programs have undergone an external Review at the moment and there have been many positive recommendations coming out from that process.

Currently the School is considering whether the numbers of students participating in the upcoming EngFocus could be doubled, with up to 24 students, and all that would entail. EngFocus is also being considered as a program that could work well with the School's mature-aged Tafe articulation students in bridging them into University study. Funding is always a point to be considered especially as EngFocus relies heavily on the goodwill of the School's academic and general staff. Costs are dependent on the need to employ specialists such as the homeroom and mathematics tutor, as well the specialist academic support, materials and student helpers.

Conclusion

Following Murdoch University's Review of Enabling Programs, the development of EngFocus for 2005-6 will be accelerated. It may well be that this program will be further amended to incorporate a broader cohort of students, with these cohorts operating in parallel over the summer break. As Universities around Australia are all under pressure to identify and enrol more students, this program seeks to enable students who have not taken an academic stream at high school yet feel they could cope with studying Engineering at University. The focus on entry into Engineering provides particular difficulties when compared to other generic entry programs, however the outcomes could provide enormous benefits for Schools of Engineering and students who might otherwise have not attempted University study at all.

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