



Motivating & Developing Research Skills in Undergraduate Students - Selecting, Evaluating and Using Print and On-Line Resources for Optoelectronic Technology Profiles

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Abstract: Macquarie University introduced a three year Bachelor of Technology (Optoelectronics) degree as one of a program of BTech degrees in 1990. The 1st group of students completed the degree in 1992. The graduates of this degree are targeted to employment in the photonics industries of Australia. Thus, components of the degree have to address development of skills and capabilities in several key areas such as: knowledge and understanding of appropriate content; problem solving skills; comfort and confidence with sophisticated photonics and optics related instrumentation; communication skills; time management; and research skills. One key assessment task to develop the latter three is that students have to research and write a Technology Profile of an area of optoelectronic/photonics technology of their choice from a comprehensive list. This is one of the assessment tasks in the unit of study "Optoelectronic Systems and Devices II", a third year, second semester unit. They also give a seminar to the class and teaching staff, drawn from the content of their Technology Profile. After ten years of this offering, teaching staff noted that the engagement by students with this assessment task, was waning. Also, the quality of the technology profiles submitted was perceived as diminishing and there was an increase in use of "cut-and-paste". These changes were not judged as being correlated with any identifiable change in the ability or background of the student cohort. Instead it was concluded that a process of renewal of the task should be undertaken with the aim of increasing student motivation, increasing student engagement and learning, decreasing plagiarism, increasing the value the student's gave to completing the task, and increasing the real and perceived benefits by the students. To assist the students to develop the necessary research skills they are given an example of an Optoelectronic Technology Profile written by the author, along with a "how to/ where to" find the information that will be needed for different types of technology profile. Examples are reviews of a mature technology, or a state-of-play of an emerging technology. Students are assisted to use their "brief" as a tool to manage the reference set that needs to be assimilated and synthesised to adequately address their chosen topic in the relevant context. They learn about time, content, and project management, as well as the technology, via this task design. To further build student motivation an annual volume of the technology profiles from the class as a whole is produced and has been a successful motivator for most students. However, plagiarism is still an issue for a small number of students. The paper will discuss the task and its support resources, student engagement and outcomes. The importance of the dialogue between the "teacher" and each student as an individual, around the task emerges, as a key driver of deep learning.