

The relationship of teacher-student interpersonal behaviour and degree specialisation in Engineering Education.

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BACKGROUND

There is an established relationship between classroom environment and student achievement (Tobin & Fraser, 1998) that has been investigated using many learning environment instruments by researchers in school level education. These instruments are beginning to find application in tertiary learning environments and in particular, in Engineering Education.

This study endeavours to validate one such instrument in a specific university Engineering Education context. In particular, a focus for this study was to examine the perception that students have of their learning environments across different Engineering specialisations. The literature has not to date revealed many studies that have investigated student perceptions of their Engineering learning environments. This study is unique in the New Zealand context in that it examines one site in detail, with support from staff at that site.

The outcomes of this study may be of interest to those developing and delivering undergraduate Engineering programs more globally and to all who are interested in improving Engineering Education.

PURPOSE

The purpose of this study is to establish whether there is a relationship between a student's perception of their learning environment and their Engineering specialisation. Because both lecturers and students were asked to participate in this study, each of their observations and experiences in the same learning environment were reported. This allows the study to capture information about ways that student and teacher perceptions of the same learning environment may differ.

This study is trying to better understand the nature of the relationship between Engineering specialisation and student perceptions of the learning environment. The study aims to improve student learning outcomes and student engagement in their learning activities.

DESIGN/METHOD

An on-line questionnaire was used to gather data from students and lecturers in the Faculty of Engineering at the University of Auckland. The questionnaire was an implementation of TROFLEI, an established instrument for measuring Technology-Rich Outcomes-Focused Learning Environments (Aldridge, Dorman, and Fraser 2004). A distinctive feature of this instrument is that for every question, within a number of categories, the participant is asked to indicate the frequency at which a particular activity or behaviour occurs and then to indicate their preferred frequency.

INTERIM FINDINGS

The online TROFLEI survey was completed by 840 students and staff of the Faculty of Engineering. The survey has now closed and initial analysis of the data is currently being undertaken. As a first step, reliability and validity testing of the data was performed. Questions were grouped into ten scales (for example: Student Cohesiveness, Teacher Support, Involvement, Equity, and Computer Usage). Cronbach Alpha reliability results are

showing that data from all ten scales appears to be reliable and valid when compared to previous uses of the TROFLEI in other environments (Aldridge, Dorman, and Fraser 2004).

Early analysis is starting to reveal a more detailed picture of how both students and lecturers view their learning environment in each specialisation. In addition, differences in teacher-student interpersonal behaviour across specialisations are emerging and will be presented in the conference session.

FURTHER RESEARCH

Quantitative analysis of the questionnaire data is currently being undertaken. Once this analysis is completed a set of follow-up interviews will be conducted to further explore results arising from the data analysis. It is intended that wider engagement with other similar institutions may occur to share and expand understanding of themes arising from this study.

During the conference session the authors hope to engage with the audience to see whether there is interest in sustaining further research in this topic within engineering education.

CONCLUSIONS & CHALLENGES

As is often the case with research, a significant challenge was to ensure a sample size that is deemed representative of the area under investigation. This study utilised a large sample within one institution in an attempt to meet this challenge. Although data analysis is not yet complete, the findings are encouraging and this may well be due to the high level of support that was forthcoming from teachers and academic leaders within the institution.

Findings to date are tending to suggest that there are less favourable perceptions of the learning environment in some degree specialisations. A careful analysis and review of these complex relationships between learning environment and specialisation should allow this study to offer individualised ways in which each specialisation can improve its learning environment. It is expected that if particular engineering specialisations show a less favourable perception of any aspect of the learning environment then this knowledge can be used to review affected programs or courses. Significant gaps between actual and preferred frequencies will also yield useful data for course organisers, as will significant differences in reported perceptions between lecturers and students.

A major benefit from this study may be that a tailored approach can be taken by organisers in each specialisation to improve learning outcomes. It would be expected that as a result students will have a more positive experience in those specialisations.

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KEYWORDS

Engineering Education

Learning Environment

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