

An Analysis and Interpretation Framework for Student Engagement Benchmarking Data

Michael Morgan (michael.morgan@monash.edu)

Matthew Butler (Matthew.Butler@monash.edu)

Jane Sinclair (J.E.Sinclair@warwick.ac.uk)

Chris Gonsalvez (Chris.Gonsalvez@monash.edu)

Project Overview:

This project provided a framework for analysing benchmark data to improve student engagement in Computer Science. Currently there is no widely used systematic process to evaluate and interpret student engagement data. This project developed an analysis framework which Computer Science departments can apply to their own data sets. Dr. Morgan's team analysed the data set for the Australian Student Experience Survey from 2012 to 2016, comparing the performance of Monash University Computer Science courses against the performance of Computer Science courses at other universities in Australia. Results were interpreted through the lens of relevant student engagement literature. By performing this analysis, the project aimed to provide other Computer Science educators with a framework for the analysis of benchmarking data such as the North American National Survey of Student Engagement, the United Kingdom Engagement Survey and similar instruments.

Expected Outcomes:

There were two main outcomes to this project.

1. The project used detailed Australian SES data to obtain more detailed insights into the engagement performance of CS at Monash University relative to other fields of study within Monash and also relative to other CS departments across Australia
2. The project also produced a step by step procedure with a detailed description of each step of how to carry out this process using student engagement survey data. This procedure was presented such that it could be used by other CS departments across Australia with SES data, or adapted to be used with other engagement data such as that in NSSE or UKES.

Use of Funding:

The funding was used to support the use of an RA on a part time basis. This RA was involved with cleanup of the obtained Australian SES data, as well as undertaking different analyses. They were also involved with documentation of the analysis procedures.

Project Findings and Outcomes:

The researchers obtained access to the data set for the Australian SES from 2013 to 2016 comprising over 540,000 data points. This included all Australian universities and the responses to all individual questions. Data concerning students' rating of their engagement for all CS degree programs (courses) in Australia was present in the dataset. There is a general agreement across all Australian institutions represented in the dataset that all data be made available to researchers in order to inform and improve teaching practice nationwide.

The research team, with the support of the RA, began by cleaning the data for analysis. This involved the removal of incomplete records and converting Likert-type responses into values for ease of analysis. It also involved the creation of subsets of the data to allow faster analysis. This included subsets based on just CS, as well as a subset based on the case study of the project: Monash University.

Analysis of the cleaned data was then conducted by the RA and research team. This was undertaken in a semi-formal manner, in which a number of different perspectives were adopted in order to explore the potential of the data. This included:

1. Conducting a comparative analysis of performance between CS nationally and other disciplines, to identify broad areas of concern.
2. Conducting a comparative analysis of performance between CS at our case study institution and other disciplines, to identify local best practice.
3. Conducting a comparative analysis of CS at our case study institution versus CS at other institutions, to benchmark against other institutions and to identify best practice by other programs.
4. Conducting a detailed question analysis on the case study institution's CS data to identify questions that show improvements or declines, to highlight areas requiring urgent focus.
5. Using the national CS data to examine specific demographic factors, such as gender, international status or intention to leave, to identify factors that disproportionately impact groups.

A framework detailing the process followed and how it could be adopted by different Australian institutions (and even international institutions using data such as NSSE and UKES) was formally written up for publication, and submitted to SIGCSE 2019. Unfortunately, it was not accepted and as such will be reviewed and revised for submission at another venue.

The research team is very grateful for the support provided to undertake the work. These analyses uncovered many different lines of inquiry that could inform improvement of CS education programs and contribute to improving the performance of CS in surveys such as the SES.