

■ Australian Capstone Appendix: Research Methodology

This appendix provides a brief overview of the methodology used in the research supported by the Australian National Senior Teaching Fellowship regarding undergraduate capstones in Australia and the analyses regarding academics' views of whether capstones should focus on development of skills in research or readiness for employment (more information on the fellowship can be found at www.capstonecurriculum.com.au). The research components included desktop research of publicly available information on capstones, and following approval of the Victoria University Human Research Ethics Committee, formal interviews with capstone coordinators, collection of case studies, and a national survey exploring the nature and purpose of capstone subjects in undergraduate education.

Case Studies

Capstone cases were volunteered through the survey and a website invitation. Final cases were selected with the goal of elaborating on a variety of approaches to capstone curricula across diverse disciplines. There are currently 13 published capstones, with more in development. Each of the published case studies provides a detailed outline of the capstone unit, including information about delivery format, assessment, resourcing, and outcomes.

In-depth Interviews

In-depth interviews tapped the perceptions of coordinators of Australian capstones regarding the challenges, benefits, and strategies for success important in implementing, developing, and delivering capstone models in higher education. Thirteen interviews were undertaken. Designed to complement the survey results, these interviews drilled further into the topics raised in survey responses, predominantly covering the nuances of individual capstones. Interviewees were identified through the survey invitation and purposely selected to provide a wide range of disciplinary views. Interviews were undertaken by Nicolette Lee, audio-recorded, and later transcribed. Most interviews lasted between 30 minutes and one hour. They were semi-structured and included approximately sixteen questions covering context, purpose, key features, student cohort, institutional structures and resourcing, disciplinary influences, challenges, and benefits. Results were thematically analysed.

Survey

In late 2013 an online survey was created, piloted, and then advertised nationally to faculty and institutions, and via

social media. The advertising focused on Australian higher education, but the survey was opened to international participation following some international interest. The survey questions were based primarily on characteristics identified as important in the key literature on capstones, with particular emphasis on the Australian sector. The survey included quantitative items exploring capstone characteristics and qualitative elements eliciting the perceptions of faculty who work with capstones. The questions explored a range of capstone characteristics, including:

- How they are structured, such as longevity, intake, scope, delivery format, timing, proportion of full-time studies, and faculty-student ratio;
- How students work and how they are assessed, including how contact and independent working time is directed to different learning environments, types of assessment and who conducts what types, and utilization of assessment products;
- Key purposes, from a list of 28 different purposes of capstones derived from the literature;
- Key characteristics of possible capstone typologies, including project- or problem-based, work-integrated, multidisciplinary, and international capstones; and
- Support mechanisms needed and already available from institutions, professional bodies, and elsewhere.

The open-ended component of the survey focused primarily on clarifying and confirming quantitative responses, with most survey items including the option to add further explanation to any categorical or numerical selection. These were examined in order to clarify or alter quantitative responses in preparation for analysis. Beyond that, the open-ended responses also tapped further into the benefits, challenges, resources, and structuring of capstone units in more depth. The quantitative analysis is primarily descriptive, with the presentation and inspection of statistics for trends and patterns, but inferential analyses were used when many comparisons were undertaken or to identify the most striking differences or relationships.

Survey Sample

There were a total of 216 responses to the survey, including 171 responses from the Australian university sector and 45 responses from capstones located outside of Australia. Each survey response represents a capstone. In total, 88 percent of Australian universities were represented in the sample, with

a heavy bias toward public rather than private providers. Two prominent cohorts were included from New Zealand (n=20) and the United States (n=17), with smaller cohorts from elsewhere including two from Canada, one from the Czech Republic, two from Hong Kong, one from Singapore, and two from the United Kingdom.

Disciplines

Disciplines were mapped to the eight disciplinary groups identified in the Australian Learning and Teaching Academic Standards (LTAS). In terms of disciplines, the total sample revealed a balanced representation, led by social sciences, business, health, and engineering and information and communication technology (ICT), in that order (see Table 1 in the print issue). While smaller, a substantial number of capstones were also captured in the disciplines of creative arts, science, architecture, and law. Four capstones were also identified as discipline-free, in that they accept and cater to students from a wide range of disciplines and their content does not focus on a particular discipline.

Analysis

The full analysis of the survey data, including discipline-based analysis of purposes, is included in the fellowship report, to be published in 2015. However, the complete analysis pertaining to the discussion of the professional and research foci of capstone curricula, as discussed in the article in the Summer 2015 edition of the *CUR Quarterly*, is presented here. Statistical analyses were undertaken in IBM SPSS Version 22.

Several purposes of capstones were analysed in the overall sample and the average rankings are presented in Table 2 in the print issue. Items that specifically tapped into professional and research foci are detailed in a cross-tabulation in Table 3 in the print issue. The overall sample shows a favouring of industry experience over research training and an inverse relationship between respondents' rankings of the two items.

Purposes of capstones were also compared across the four largest disciplinary groups within the sample—arts, social sciences, and humanities (n=49), business, management, and economics (n=49), health, medicine, and veterinary science (n=43) and engineering and ICT (n=28). Other disciplinary groups had sample sizes of less than 13 in total and are not included in this analysis. The results are presented in Table 4 in the print issue.

Inspection of the distributions for the items in the whole sample, and across the disciplines, indicated they were highly negatively skewed and non-normal. Formal tests of normality confirmed this in each disciplinary grouping (Kolmogorov-Smirnov and Shapiro-Wilk $p < .01$ for all items). As such, the Kruskal-Wallis one-way analysis of variance was undertaken to identify the items regarding the primary purpose of capstones that were ranked significantly differently by the four disciplinary groupings, followed by pairwise comparisons to identify which specific groups differed.

Both items related to purpose considered in this article differed significantly across disciplines according to the Kruskal-Wallis test ($p < .05$). However, average rankings of importance for these purposes did not differ across disciplines much more than one response range point. Capstone training for research careers was least important for the group of respondents from business disciplines and most important for respondents in the social sciences. Business faculty ranked this purpose as significantly less important when compared to faculty in health and the social sciences. Engineering faculty also ranked this purpose significantly lower than faculty in the arts. Preparation for industry/employability had less of a spread in mean ratings, but was ranked lowest by respondents in the social sciences and highest by those in health. Respondents in the social sciences ranked this purpose significantly lower than those in health.

Participants were also asked to provide additional qualitative comments regarding the purposes of capstones. Comments largely reflected the purposes provided, but with additional, contextual narrative or further explanation regarding the way in which the purposes were interpreted. 

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CUR Dialogues 2016

February 18-20, 2016,

Hyatt Washington in Washington, DC

CUR Biennial Conference 2016

June 26-28, 2016,

University of South Florida, Tampa, FL