A Systematic Method for Facilitating Curriculum Renewal and Transformation: Two Case Studies

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Abstract

Background: The mapping of curriculum is particularly important for skills-based degrees with both internal and external accreditation. The MELT (Models of Engaged Learning and Teaching) frameworks, which have a theoretical foundation in Bloom's Taxonomy, are proposed to provide a platform to assist in the process of curriculum mapping.

Aim: This paper presents two case studies showcasing a systematic process of mapping curriculum in respect to students' research skill development and professional standards of practice.

Method: A qualitative design was used to collect and analyse data from two curricula. Data was coded in NVivo and themed according to elements of the MELT frameworks.

Results: Combined, the case studies detail (1) research skills identified and associated levels of student autonomy, (2) mapping process to assist curricula design, evaluation and renewal, and (3) the alignments between curriculum and professional standards of practice.

Conclusion: An evidence-based approach to mapping curricula can be achieved through the application of MELT frameworks in conjunction with NVivo qualitative data analysis software.

Background

Higher education curriculum increasingly operates within a regulatory environment. Educational quality standards, graduate outcomes and professional skills are defined by national qualifications frameworks and

the values of each higher education institution, and by accrediting professional bodies (Tertiary Education Quality and Standards Review Authority, 2012). This results in a substantial and diverse range of skills to be evidenced and aligned across a curriculum. Systematic methods, tools and processes are required to guide educators to efficiently and effectively renew and transform curriculum that is inclusive of the skills students require to engage with disciplinary knowledge.

Monash University has been exploring innovative ways to map the skills curriculum using MELT (Models of Engaged Learning and Teaching) frameworks as a way to better connect the library's research and learning skill programs within disciplinary curricula. The method applies MELT frameworks in conjunction with NVivo qualitative data analysis software to offer an evidence-based approach to mapping curricula.

The aim of this paper is to present two case studies that contribute to the evolving literature on curriculum design by presenting a systematic, evidence-based approach to mapping curriculum in respect to students' research skill development and professional standards of practice. The case studies presented were informed and underpinned by MELT (Models of Engaged Learning and Teaching) frameworks. Case study one presents an approach to mapping students' research skills in a first-year biology practical unit (BIO1022) at Monash University. This study applied the Research Skill Development (RSD) framework (Willison and O'Regan, 2006/2013), now part of the MELT suite. Case study two was influenced by the mapping process applied to the biology unit and drew on this exemplar to map skills in the Master of Nursing Practice (MNP) at Monash University. Inspired by the RSD and Work Skills Development (WSD) frameworks (Bandaranaike & Willison, 2009; 2016), case study two suggests the benefits of using MELT to map curriculum to the National Professional Standards of Practice (NPSP).

This paper builds upon well-established collaborations between library staff and discipline academics at Monash University using the RSD and WSD frameworks (Pretorious, Bailey & Miles, 2013; Torres, Bandaranaike & Yates, 2014; Torres and Jansen, 2016). The collaboration using MELT for mapping the skills curriculum brings together educators across the university with an interest in enhancing curriculum design and the student learning experience by explicitly developing students' research skills as a critical element of learning.

The Initiative

Reporting on students' development of discipline-specific skills is difficult to achieve systematically and coherently due to a lack of convenient, broadly accessible, standardised procedures and methods that accommodate the variety of disciplinary demands (Sumison & Goodfellow, 2007). Recent skills mapping
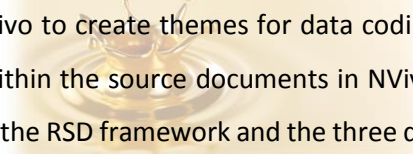
initiatives presented in the literature indicate that current methods for mapping coursework curricula, generic skills or professional outcomes are largely reliant on time-intensive paper-based approaches (Sumison & Goodfellow, 2007; Oliver, 2010; Spencer, 2011). Such approaches to mapping skills use a reference such as university graduate capability statements, or professional standards of practice. These references generally describe skills and capabilities as outcomes of university learning. This overlooks the potential of curriculum mapping to demonstrate how students' skills can be progressively developed across a curriculum.

At Monash University, research skill development contributes to the learning experience, and it is recognised as part of the suite of skills students require to engage with learning, future study and the workplace (Better Learning Better Teaching agenda, 2016). To this end, Monash University Library's strategic goals include collaborating with academic staff to embed research skills in the curriculum. The lack of a developmental view towards mapping skills in the published literature suggests that educators lack a method to map curriculum that also acknowledges the role of students' research skills and how such skills might be progressively developed as part of a holistic learning experience. Furthermore, gaining an understanding of how students learn through skill development might provide the depth of insight required to better align intended learning outcomes within a given curriculum.

Method and Analysis

A qualitative research design applying interpretive analysis techniques was used to determine which research skills are implied in the curriculum relevant to each case study presented. Interpretive analysis of the curricula was underpinned by the MELT frameworks. In particular, the RSD framework was the conceptual framework informing the case studies presented.

Similar inductive and iterative processes were applied to the two case studies described. Curriculum documents were the data sources for both studies. Data were gathered during students' five practical experiences for Case Study 1. These data were then triangulated with the relevant laboratory handbook for each practical examined. Case Study 2 analysed documentary sources from curriculum documents from the Masters of Nursing Practice (MNP) and the Registered Nurse Standards for Practice. During the analysis, it became clear that the complex process of making sense of the Registered Nurse Standards for Practice, for mapping purposes, required an additional layer of interpretation. It was evident that the nursing standards were not written for curriculum design, resulting in an inability to comprehensively map these to the curriculum. The team decided to apply Bloom's Taxonomy as the theoretical framework to inform the initial analysis of the curriculum documents, as Bloom's Taxonomy also underpins MELT frameworks.

Project team members used NVivo to create themes for data coding, which is a process involving reading, interpreting and marking text within the source documents in NVivo, matching them to identified themes. These themes were informed by the RSD framework and the three domains of Bloom's Taxonomy (cognitive, affective, psychomotor). Multiple coding episodes took place for each project. This allowed the means to compare and contrast the emergent research skills identified in the data sources and to interpret how these skills aligned with the RSD Facets of Research and Levels of Student Autonomy (Case Study 1) or Bloom's Taxonomy (Case Study 2).

Importantly, Case Study 2 harnessed the expertise of library and academic staff who worked in skill coding teams to examine, interpret and cross reference each other's coding decisions for each learning outcome within the curriculum. Coding category challenges and lively discussions took place to clarify skill interpretations through examples from everyday life. Referring back and forth to the RSD and Bloom's Taxonomy assisted in interpreting the standards of practice to come to shared agreement amongst team members for each coding decision.

Results

Case Study 1: Mapping Students' Research Skills in First Year Biology Practicals

The purpose of this skill-mapping study was to determine which research skills first year biology students might be developing by undertaking a first-year biology practical unit. Science educators generally focus on the manipulative and technical skills students require for experimental processes in the science practical rather than the higher-order thinking skills related to researching in the laboratory (Di Trapani & Clarke, 2012). The underlying research question was: *Which skills are students developing in first year biology laboratory practicals?*

To guide the interpretation and analysis of students' research skills, descriptive observations of students (N=8) undertaking five biology practicals and the corresponding laboratory handbook were analysed. The application of the RSD framework to this context provided an opportunity to also determine which skills students were developing, as well as how independently students were performing skills in alignment with the RSD's Facets of Research and Extent of Student Autonomy. The broad skill categories or Facets of the RSD were broken down into sub-skills to gain a deeper understanding of the range of skills students were learning in this context. This process, enabled through the RSD, revealed the cognitive skills and processes of researching that were relevant to the students' experience of the practical. Associated levels of student autonomy were also interpreted for each sub-skill identified.
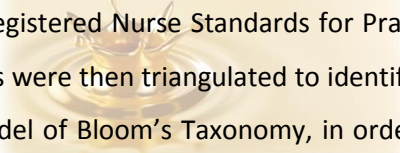
NVivo enabled the means to code and analyse content from the laboratory handbook and the events and interactions recorded between the student and the Teaching Associate in the descriptive observations. NVivo nodes or coding categories were informed by the RSD skill facets and the RSD levels of student autonomy.

Analysis of the data collected from the student observations and the corresponding laboratory handbook indicate that although research skills were mostly an implied element of learning in the practicals, students were engaging with the skills and processes associated with research as articulated by the RSD framework. However, the results suggest that the relationship between learner autonomy for students' research skill development was an overlooked element in the design of this curriculum. Students remained in a highly prescribed learning environment across practicals with little opportunity to move to increased learner autonomy. Interestingly, the results show that two of the practicals that were informed by an inquiry-oriented learning approach intended to develop students' thinking skills for scientific investigation (Rayner, Charlton-Robb, Hughes, 2013) were among the most prescribed practicals examined. Patterns in the data also offer insights into students' research skill development across related themes such as teaching practice, contrasting pedagogical approaches and influences on student learning in the practical experience.

After gaining some understanding of how students learn through skill development, we were in a better position to undertake Case Study 2, which focused the mapping of skills to a curriculum.

Case Study 2: Mapping Nursing Competency Standards to the Master of Nursing Practice

The curriculum of a graduate entry nursing program, the Master of Nursing Practice, was evaluated. Initial scoping for this mapping project revealed that there was no empirical evidence on processes that facilitate the alignment of professional standards governing vocational professions to the curriculum. The underlying research question was: *What are effective ways to evaluate a curriculum for both pedagogical appropriateness and professional practice appropriateness?* The Models of Engaged Learning and Teaching (MELT) were used in the early phases of this project as conceptual frameworks with which to undertake a mapping of curriculum. However, the preliminary mapping processes revealed a mismatch between the professional language of the standards and educational language in the curriculum documents and MELT frameworks. The process of mapping using the MELT frameworks was not sufficient to capture the skill range students need to acquire in a nursing learning context. In order to resolve this, the project team made the decision to go back to basics by deconstructing the Registered Nurse Standards for Practice (NMBA 2016) and MNP overall curriculum statements and learning outcomes through the lens of all three of Bloom's Taxonomy domains (the cognitive, affective and psychomotor). All domains of Bloom's Taxonomy were

aligned with the MNP and the Registered Nurse Standards for Practice to better reflect the range of skills students need to gain. The results were then triangulated to identify the scope of alignment of professional standards to the educational model of Bloom's Taxonomy, in order to inform future curriculum mapping, renewal, and design.

This process resulted in a deep analysis of the intended learning outcomes of the MNP and the Professional Standards of Practice, reinforcing the justification to further analyse the curriculum through the MELT frameworks. The application of MELT frameworks to interpret the curriculum will add the additional layer required to identify students' research and work-related skills in the nursing curriculum as the next phase planned for this project. Future work will then focus on integrating MELT into these processes of curriculum design.

The results from this case study include (1) details of the mapping process to assist other curricula in design, evaluation and renewal, and (2) reporting the alignments, as well as the gaps, between the curriculum document and the Registered Nurse Professional Standards of Practice.

Summary

This paper presents two case studies, one which details an approach to mapping students' research skills. This incorporated not only skill analysis, to determine what skills are embedded in a given curriculum, but also an approach that considers the degree to which students are able to independently engage with the skills identified. Deconstructing the RSD framework as nodes in NVivo has enabled the means to map curriculum holistically. This has led to new understandings of how to make research skills explicit to students, bringing the opportunity for curriculum renewal. Case Study 2 built upon this holistic approach to mapping with the use of the three domains of Bloom's Taxonomy in NVivo to deconstruct the professional standards of practice in order align them to curriculum. The collaborative approach (using MELT) for mapping the skills curriculum brought together educators across the university to develop a systematic process for curriculum mapping informed by both Bloom's Taxonomy and the MELT frameworks. This approach has the conceptual power to create a systematic process for curriculum mapping, overcoming a major obstacle, the mismatch of professional and educational language. Importantly, this project demonstrates that the RSD brings a common language and understanding amongst educators. Outcomes of these case studies will inform the emerging evidence on curriculum design by contributing to program evaluation, facilitating curriculum transformation and pedagogical practice.

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