

Lyn Torres, Tomas Zahora, Steven Yates, Anne Young (Monash University)

Georgina Willets & Loretta Garvey (Swinburne University)

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



Facilitating curriculum transformation

Lyn Torres Georgina Willetts Loretta Garvey Tomas Zahora Steven Yates Anne Young





SWINBURNE UNIVERSITY OF TECHNOLOGY

Overview - The whole story

Background: Evidence based process for curriculum mapping

Aim: Present two case studies that apply elements of the RSD to inform an approach to map skills within curricula

Method: Used NVivo qualitative analysis software for mapping

Results:

Case study 1: A first year biology practical unit - RSD for mapping students' research skills and autonomy Case study 2: Master of Nursing Practice - Using Bloom's taxonomy for the first mapping phase

Discussion & Conclusion (in brief):

deling in the service in the service

Case study 1: Mismatch between the instructional autonomy in the curriculum document and the practical application

Case study 2: Mismatch between educational language v professional language

Case study 1: Identifying students' research skill development in BIO1022

Mapping BIO1022

• Education Masters Research project, qualitative study

Guiding question:



With reference to the Research Skill Development (RSD) framework, which research skills and associated levels of autonomy, are students developing whilst undertaking practicals in BIO1022.

- 5 Practicals (3 recipe-driven and 1 IOL inspired over two sessions)
- Document analysis of BIO1022 laboratory handbook content
- Student observations in 5 consecutive practicals of the same 8 students
- Interpretive analysis of events and interactions between students and TA coded in alignment with the RSD Facets and autonomy using NVivo qualitative analysis software

Making coding decisions in alignment with the RSD

Fig 1: RSD Coding categories in NVivo

RSD Facets of Research

- Embark and Clarify
- Find and Generate
- Evaluate and Reflect
- 🗄 🔵 Organise and Manage
- Analyse and Synthesise
- 🗄 🔘 Communicate and Apply

Student Autonomy

- Level 1 (Prescribed Research Closed inquiry highly structured directions)
- Level 2 (Bounded Reserach Closed inquiry limited direction from educator)
- Level 3 (Scaffolded Research Closed inquiry student choose from provided structures)
- Level 4 (Self-actuated Research Student initiated guided by educator)
- Level 5 (Open Research Student self-determined and structured guidelines)

RSD Facets of Research

Embark and Clarify

- Familiarises, clarifies, contextualises topic, scientific concepts using text, diagrams, observation, visuals
- Clarifies purpose, objectives, steps and design of the experiment
- Determines and plans processes, procedures required to undertake the experiment, task
- Asks questions for clarification
- Defines key concepts, terms, ideas and theories
- Predicts and formulates a hypothesis
- Plans and sets a time management strategy
- Assigns team member roles or tasks to contribiue to team objectives
- Considers the scientific issue in relation to ethical, social, team considerations
- Aware of and complies with laboratory health and safety requirements including laboratory protocols

Find and Generate

- Applies procedures, calculations, techniques, strategies to find, generate needed information or data
 - Finds and identifies required information, data within resources or finds materials and uses scientific instruments
 - Selects and uses information and data or experimental procedures based on identified needs, observations, parameters
 - Collects required information or data form a variety of sources or scientific processes, methods

Evaluate and Reflect

-

- Check, review processes, steps, methodology, information seeking strategies
- Critique and judge credibility of information or data (accuracy, reliability, validity, authority, relevance)
- Consider results in information retrieved or data collected, generated by observing, predicting, calculating
- Asses processes, completeness, adequacy, omission of information or data, bias, error
- Consider and detect reasons for contradictions in evidence
- Review and revise hypothesis, predictions
- Evaluate team structures, reponsibilities, goals, effectivness

Fig 2: RSD Facets and sub-skills – emerged from the process of analysis

Results

BIO1022 Learning Aims



<u>Fig 1</u>: Analysis of BIO1022 learning aims in the BIO1022 Laboratory Handbook for each of the five practicals examined.

Results concur with the literature that: laboratory practicals tend to focus on students practicals skills and content knowledge rather than developing students cognitive skills for researching. (Trapani & Clarke, 2012)

Research skills have been largely overlooked as an outcome of learning in this unit. The IOL inspired IDEA Practicals also neglect research skills in the learning aims despite IDEA Practicals aiming to;

"..align with the fundamental principles of a tertiary science education, in which students build upon prior knowledge, refine skills and apply higher order learning such analysis, evaluation and synthesis to their critical thinking and problem-solving skills" (Rayner et. al., 2014., p. 8).

Results



<u>Fig. 4</u> Number of instances each Facet of Research and corresponding level of autonomy was noted in the laboratory handbook for Practicals 1 to 5.



<u>Fig. 5</u> Number of instances each Facet of Research and corresponding level of autonomy was observed in Practicals 1 to 5.

- Practicals 1 to 3 regular recipe-driven practicals TA uses sophisticated questioning techniques
- Practicals 4 & 5 IOL inspired Practicals (IDEA-Design-Explore-Answer) Highly guided teaching approach

Outcomes

Skills

- Facet B: Find and Generate highest occurring skills Facet E: Communicate and Apply least occurring (*products of assessment not included)

Autonomy

- Predominantly Prescribed autonomy in handbook and practical experience Instructions in the handbook that were at higher levels of autonomy needed
- more guidance in the lab

Curriculum design

- Research skills in BIO1022 is generally implied and haphazard rather than coherent
- The method applied suggests that the RSD provides a language to assist with enabling research skills

Teaching Practice and pedagogy

- TA training questioning techniques using research skill vocabulary
- Quality teaching techniques are vital in moving students to increasing levels of autonomy
- Recipe-driven practicals are also able to enable students cognitive skills



"The TA keeps asking students questions at the fume cupboard while they wait in line. "What have you already added?" she asks. "What is the difference?" "Why? Why add different solutions? What are you looking at? Why? So what do you think?" The TA persists with questions. One student turns excitedly to her partner. "I know!" she says and explains to her partner what could happen when....." Practical 3: Metabolism, Observations)

Case Study 2: Master of Nursing Practice

Problem

A New Curriculum bringing:

 Need for pedagogical evidence based decisions on curriculum design & development

That also considers:

• Requirements of a profession-based curriculum with multiple frameworks



Achieving a process for this has not been demonstrated in nursing curriculum

Research Questions

How do we meet the requirements of a pedagogically sound learning & teaching environment?

Whilst...

Meeting the requirements and expectation of the regulating professional body



Achieving a process for this has not been demonstrated in nursing curriculum

Getting started

- Expertise sought from the Library curriculum mapping experience using MELT frameworks
- 2015 multi-professional project team established to collaboratively work on the problem

... but which pedagogical framework?

RSD			of Students' Auto			a	
Characterise Tes all New Yor Schwart Source T sports? I litra savatting and searchite tites is juit a "siggenerat?" Searce th	evel 1 (Prescribed Research)	Level 2 (Bounded Research)	Level 3 (Bcalfolded Research	Research)	Level 5 (Dpen Research)		
in students	nodeling from educator prompt Judent research	Boundaries set by and innied dividient from educator channel skalent research	Scaffolds placed by educator shape student independent rescently	Elucerts while the research and the a suided by the educator	Budents research within self- determined quidelines that are accord with discipline or context	t.	
Emberk & Clerify speed to an initiate research closify or determine what excluding to required, heading isolativations and apolativeam saterations.	Inscend to oursitent-Masko enteino aplicity frein a classic inquity, las a provided structured approach a starthi questionen, terrer, aquinaments and expectatione.	Record to cateliansheats required to and implicit in a decad implier. Chase from several provided shuthers to derify cuestions, terms, requirements and repetitations.	Respond to acceleration asis provided from a closed inquiry. Choose from a range of provided structures or approaches to clerify quarteria, terma, requirements an expectations.	"Openate aventomolerns" hosebease transd votes sincevent gastelikes"	"Donma to curcalitonala/era/ hypol*esse Based on accemente, expertise and Recalues*		
Ind & Generate I and generate needed matter/data using repriete methodology.	Collect and record required internation or data using a rescribed source in which the internationalism is clearly wident.	Collect and record reasted internationidata using s possestad netholokityy han persident sourcob in which the information clate is not dearly widers.		Collect and receast setf-determined information dots from sall-selected saurces, shooting an appropriate excitositicitics based on structured guidelines.	Colect and record self-determined information/self-termined sources, chaosing or devising an accreastical methodology with self- structured patientime.		
ivaluate & Roflact entries and critique the degree 27 rodbibly of ealected accurace of data generated, and reflect fer research processes used.	inakuase informationstolata and effects on anauna process soma imple preparities onterts,	Evaluate information/dats and reflect on the Induity process white given orders.	Funkate interrutionistata and inputry process using offenia related to the same of the inputry. Reflect insightfully to improve our processes used.	Funkate internationstate and the local process comprehensively using poli-distancement of silveral developed within structured addetines. Petited imagittable to addetines. Petited imagittable to addetines.	Evaluate manufacturation and Mask's process factorizes and and generated criteria based on experience, experies and the Resture, Reflect inside fails to mean intervent into constitutions		
inganites & Manage anise information and data to \$ 10 patients and thereas, and tage teams and thereas, and teams.	Nganteo informationetato using rescriberi atructure. Maringe Incon rescasa previded.	Ceganise Information/Jaca Leing a choice of given situatives. Manager a process which has alternative pathways.	Orçanise informationitate using economended silvuctums. Me nage self-determined processes with multiple possible pathways.	Creamer information/bats using shallow-determined abustures, and manages the processes, while the parameters can by the guideline.	Organiza internationaliza using statemi-effernished stratumes and management of processes.	e	
	nalyse and systems	Analyse and synthesise information/data to recegarize existing innoviation in alandard	Analyse and synthesise information/date to construct emorgent knowledge, "Ask	Analyse and create Informationizate to Willingtonizate case stated to without	Analysis and crease information/sets to 18 studies- identified gaps or extend	-	
rahyse & Synthesise lyse information/data adly and synthesise new velasificam understanding	niermeliemidielie in represiaan staling ienawiedge in praechied	externations/data to receptions existing knowledge in standard	emergent knowledge, "Apk	page stated by others.	information/data to fill student- identified gaps or extend		
communicano anel Apply r, present and perform the contant, understandings and bacters of the research, an ond is fosoback, account findust, social and cultural C) asses.	Cinkal	Reflective Skills Con	stgrant annot		5.00	casi ¢ <u>con</u> um	
C) boxes. Init Relight the local, adding degre and discoverse (as they dig and it	1 22.225	International Page of Street	And an or other states	test and the second second	and Property	and the local division of the local division	
and dispersent in Sey (i) and i	* Statistics Statistics Antipolitics Statistics	Non-ro-an-romer restriction	No No. 1 August and an and a second secon	Service of the local division of the local d			
	1 (0.1 "Name Of Analisis of Analysis Analysis of Analysis	ini murran arang, ar ing nada rigation tre argentia ini analisian argenti chanasa	oth of alleges from a forming structure ages ingeless a for any particular distances when any particular distances	an oper tip of the set is the first and a second a result of the second and the second and the second interest of			
	C. Lawrin Life arms Dear result and result and result from and result from and result from and result from	Annual sector of the sector of	And a second second	NAME OF TAXABLE			
	1 B. Barranser Ballingen Philip period	Sectors and a sector of the se					
	4 Page 2 Strate Count gallings and models for 1 class protect in sugar 2 class under	Name of the other states	Interior of Augustations applications a second memory features have of priority frames in compression of priority frames in compression of priority (in the priority in compression of the priority of th				
	Work Skill Development Framework						
		I Greens		in the local sector	And I will be a company of the local data and the l	Section and	Last 1
		4 INTROVE	- Marth	And the second s	Second and second second second	Read again to be appropriate to bring to evaluate and the again and the approach	State or a long of a
		4 TEINGLOOP					
		E LOAMER		Contractor and	-	Annual Contract of	-
		Constant of the latter of	-	and a product of the second se	and a part of a part of	and the second s	
		5. BLT SAMUERS		Andread and a state of the second sec	and an other states	And an inclusion party of	Abbi an shina and a shink a sing and a shink a singer
		a reason in income		And the second second			10.7200
				Para and a second se		NAMES OF TAXABLE PARTY.	Concerns of the local division of the

Exploring MELT- which framework?

Workshop facilitated by library staff using scenario-based exercises

We discovered:

All 3 frameworks emphasized

different professional and learning domains and could contribute to inform a new curriculum.

RSD – Cognitive skills for research and learning
WSD - Professional and psychomotor skills
CRS - Reflective practice and critical thinking.



Back to basics

Mapped Bloom's Taxonomy to:

- 1. Professional standards of practice
- 2. Curriculum document

Triangulating the results

What resulted was a complicated map that did demonstrate alignment of the standards with the curriculum

Project phases



Phase 1

Using NVivo qualitative data software:

Map a pre registration Master nursing curriculum to the professional standards of practice

Phase 2

Map the curriculum to appropriate pedagogical frameworks

Phase 3

Identify if the Professional standards of practice in nursing can be mapped to pedagogical frameworks



Table 1: Professional Nursing Standards against Bloom's Taxonomy



Table 1: Professional Nursing Standards & Nursing Curriculum Documentagainst Bloom's Taxonomy



Outcomes



Identification of language mismatch between the education and professional spheres

Developing an awareness of how to create a systematic process Potential for curriculum transformation... the next step

Where to from here

Case 1:

Consider the outcomes for informing professional development of TA's
 How to better represent autonomy in the curriculum document.

Case 2

1. Overlay the MELT frameworks to the Nursing Curriculum

2. The MELT frameworks will ensure professional curriculums are underpinned by pedagogy and the development of students autonomy in the learning process

References

Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory Into Practice*, 41(4), 212-218. doi: 10.1207/s15430421tip4104_2

Torres, L., Bandaranaike, S., & Yates, S. (2014). 'What skills do I have? What skills will I need?'- Building an employability skills profile through an online reflective practice tool. Paper presented at the Paper presented to the 10th International Symposium on Cooperative & Work-Integrated Education, University West, Trollhattan, Sweden. June 2-4, 2014. <u>http://www.waceinc.org/uwest2014/proceedings/Australia/Lyn%20Torres%20-%20Australia.pdf</u>

Torres, L., & Jansen, S. (2016). Working from the same page: catalyzing university-wide library-faculty partnerships to enhance students' research skill development. *Council for Undergraduate Research (CUR) Quarterly., 37*(1), 26-33. doi: 10.18833/curq/37/1/9

Willison, John and O'Regan, Kerry(2007)'Commonly known, commonly not known, totally unknown: a framework for students becoming researchers'. Higher Education Research & Development, 26:4, 393 – 409. DOI: 10.1080/07294360701658609

Thank you

Questions?

Ms Lynette Torres Lynette.Torres@monash.edu

Associate Professor Georgina Willetts gwilletts@swin.edu.au

> Dr Loretta Garvey lgarvey@swin.edu.au