

Association for Information Systems

AIS Electronic Library (AISeL)

Proceedings of the 2021 AIS SIGED
International Conference on Information
Systems Education and Research

SIGED: IAIM Conference

12-13-2021

DESIGN FOR INDIGENISATION OF THE IT CURRICULUM

Rosetta Romano

"School of Information Technology & Systems University of Canberra, Australia",
rosetta.romano@canberra.edu.au

Blooma John

School of Information Technology & Systems University of Canberra, Australia,
blooma.john@canberra.edu.au

Dale MacKrell

School of Information Technology & Systems University of Canberra, Australia,
dale.mackrell@canberra.edu.au

Peter Copeman

University of Canberra, Australia, peter.copeman@canberra.edu.au

Tamsin Kemp

Education Innovation Team, Learning and Teaching University of Canberra,
Tamsin.Kemp@canberra.edu.au

See next page for additional authors

Follow this and additional works at: <https://aisel.aisnet.org/siged2021>

Recommended Citation

Romano, Rosetta; John, Blooma; MacKrell, Dale; Copeman, Peter; Kemp, Tamsin; Martiniello, Marina; and Radoll, Peter, "DESIGN FOR INDIGENISATION OF THE IT CURRICULUM" (2021). *Proceedings of the 2021 AIS SIGED International Conference on Information Systems Education and Research*. 8.
<https://aisel.aisnet.org/siged2021/8>

This material is brought to you by the SIGED: IAIM Conference at AIS Electronic Library (AISeL). It has been accepted for inclusion in Proceedings of the 2021 AIS SIGED International Conference on Information Systems Education and Research by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Authors

Rosetta Romano, Blooma John, Dale MacKrell, Peter Copeman, Tamsin Kemp, Marina Martiniello, and Peter Radoll

DESIGN FOR INDIGENISATION OF THE IT CURRICULUM

Rosetta Romano
School of Information Technology & Systems
University of Canberra, Australia
Rosetta.Romano@canberra.edu.au

Blooma John
School of Information Technology & Systems
University of Canberra, Australia
Blooma.John@canberra.edu.au

Dale MacKrell
School of Information Technology & Systems
University of Canberra, Australia
Dale.Mackrell@canberra.edu.au

Peter Copeman
University of Canberra, Australia
Peter.Copeman@canberra.edu.au

Tamsin Kemp
Education Innovation Team, Learning and Teaching
University of Canberra
Tamsin.Kemp@canberra.edu.au

Marina.Martiniello
Education Innovation Team, Learning and Teaching
University of Canberra, Australia
Marina.Martiniello@canberra.edu.au

Peter.Radoll
School of Information Technology & Systems
University of Canberra, Australia
Peter.Radoll@canberra.edu.au

Abstract:

Following an institution-wide mandate by the University of Canberra to Indigenize the curriculum in all courses, this descriptive case study reports on a pilot redesign of the subject unit outline of an Information Technology (IT) unit that previously had no Indigenous-related content. The study experimented with different designs to embed Indigenisation holistically in a unit that is mandatory for students undertaking IT Degrees at the University of Canberra, Australia. With support from educational design specialists, the curriculum was redesigned to integrate Yankaporta's (2009) 8 Ways of Indigenous learning framework into the content, teaching methods, and assessment as expressed in the unit outline to integrate Indigenisation and build a design that can be adapted applied in other IT units over time.

The study applied a Design Science Research (DSR) methodology to evaluate the previous unit outline, design its replacement and observe and reflect on the successes and challenges of its implementation over one semester with one cohort of students. This methodology can also be applied in future iterative cycles of continuous adjustment and improvement of the unit's curriculum by designers such as conveners, lecturers and program directors, to inform the designs for other units that have no Indigenous-related content.

Keywords: Indigenisation, curriculum, IT, design science research, unit outline

I. INTRODUCTION

Indigenising the Curriculum is an institution-wide initiative of the University of Canberra to draw upon informed insights into the worldviews, lived experiences and diverse cultures of Aboriginal and Torres Strait Islander peoples, to embed Indigenous ways of knowing, being and doing into the curriculum at the cultural interface between Indigenous and Western knowledge systems. (Hauser et al., 2009). In this context, Radoll et al. (2019) pledged to move the Indigenous education beyond a bolted-on content approach to a built-in process model, whereby Indigenous ways of knowing, learning, and connecting based on Yunkaporta's (2009) 8 Ways model could be embedded in curriculum design and delivery in all disciplines across the University. Their findings indicated that the learning experience for all students, both Indigenous and non-Indigenous, might be holistically enriched by such an approach (Radoll, et al., 2019).

However, the Radoll et al. (2019) research was an initial pilot study, limited to units in which there was already an Indigenous content focus, and therefore a likely 'sympathetic predisposition' (p. 122) towards Indigenisation of its design and processes of learning. The present research builds on that study by investigating whether such model can be built into a unit that has no such predisposition - for example, in Information Technology (IT) disciplines. It comprises a descriptive case study responding to the mandate for further pilot exploring whether contemporary modes of learning in those disciplines could be beneficially adjusted by blending them with Indigenous ways of learning and connecting, as part of similar actions more widely across the university (Radoll, et al., 2019).

The specific aim of the present research is to provide IT unit conveners with an exemplar of a changed unit outline with its curriculum altered to accommodate Yunkaporta's (2009) 8 Ways of Indigenous learning. If so, what benefits might ensue, and what risks?. To answer this question, this paper addresses two research questions:

1. Is it possible to embed Yunkaporta's 8 ways of learning framework to a unit such as Contemporary IT&E Issues unit (part of the Information Technology and Systems (IT&S) course) that currently has no Indigenous-related content?
2. Which components of the unit curriculum, and represented by the unit outline, can be Indigenised by design?

As the researchers are conveners, lecturers, program directors, education advisers, and teachers themselves, they are also interested in identifying instances of choices that potentially result in a "bolted-on" - rather than built-in - Indigenisation.

This descriptive case study responds to the mandate to pilot a small number of undergraduate subject units to investigate whether contemporary modes of university learning and connectedness could be beneficially adjusted by blending with Indigenous ways of learning and connecting and generating recommendations for further action more widely across the university (Radoll, et al., 2019). The focus of this research is 'Could Indigenous ways of knowing, learning, and connecting be beneficially applied more widely in mainstream courses and units across the university?'. To answer this question, this paper investigates '*Whether it is possible to embed Yunkaporta's 8 ways of learning framework to a unit outline that has no Indigenous-related content such as the Contemporary IT&E Issues, of the Information Technology and Systems (IT&S) course?*'

II. DESIGN SCIENCE RESEARCH

For this study, design science research (DSR) is established as the frame of reference to investigate the design and evaluation of the Indigenisation of a model unit outline in a Faculty at the University of Canberra. Design, the act of creating an explicitly applicable solution to a problem, is an accepted research paradigm in engineering disciplines (Peppers et al. 2007). In recent years, design science has entered the Information Systems (IS) research field, successfully integrating design as a major component of research.

The value of design science as an IS research approach is demonstrated in DSR research (Hevner, March, Park, & Ram, 2004; March & Smith, 1995; Walls, Widmeyer, El-Sawy, & El Sawy, 1992). Hevner et al. (2004) developed the Design Science Research Framework to represent the DSR cycles. The Design Science Research Framework, which has evolved over time and continues to evolve, is used as an overarching frame to conduct DSR. There are three components: Environment, Design Science Research and Knowledge Base. See Figure 1 for an illustration of Design Science Research Framework as a conceptual frame.

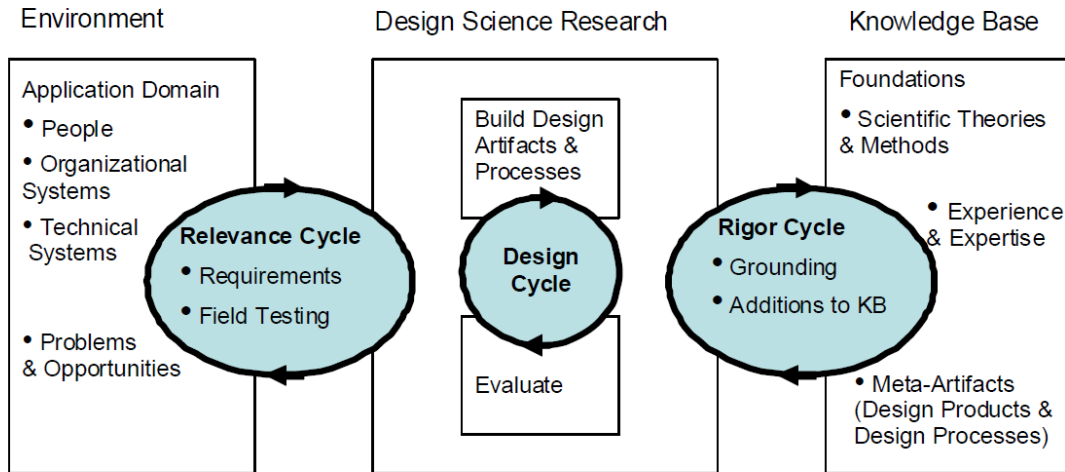


Figure 1: Design Science Research Framework (Hevner, 2007)

The Design Science Research Framework is accepted as a socio-technical lens suitable for use in an educational community. As Laurillard (2012, p. 1) explains, teaching is like a design science “because it uses what is known about teaching to attain the goal of student learning and uses the implementation of its designs to keep improving them”.

For the purposes of this paper, DSR works in the following way, illustrated through the concepts of the Design Science Research Framework (Hevner, 2007). The researchers conduct the study in an Environment, namely ‘the Faculty of the University’, and draw on the domain experience and expertise of academics and educational designers as the Knowledge Base to develop the DSR artefact, ‘the unit outline’. The Design Cycle supports a tight loop of research activity for the build and evaluation of design artefacts and processes in an iterative manner. The Relevance Cycle connects DSR and the Environment, responding to the recent mandate to blend Indigenous ways of learning and to generate recommendations for further action across the university. The Rigor Cycle connects DSR and the Knowledge Base, providing applicable theories, specifically the 8 Aboriginal Ways of Learning Aboriginal Pedagogy, thus answering the research question and generating new knowledge.

Evaluation is an important but often overlooked aspect of DSR. Each build of the elements in the unit outline that involves Indigenisation, such as including story telling in assessments, is evaluated, and each evaluation informs changes to any successive unit outlines in an iterative manner.

For the purposes of this study, curriculum is defined as what is taught in the individual unit or subject. The unit outline summarises and maps the unit curriculum by describing the content and the depth of what will be covered. It is used by conveners to inform students about what will be covered in a unit, as well as the learning outcomes, flow of the content, the assessment requirements, grading policy, learning expectations and processes, and how the unit will contribute to students' graduate attributes. The paper describes how Yankaporta's 8 Ways of learning framework has been used to convert a non-Indigenised unit outline for the Contemporary

IT & Engineering Issues (CIT&EI) into an Indigenised unit outline. Details of the Yunkaporta 8 Ways are elaborated in Section III of this paper.

CIT&EI is a unit delivered to cohorts from undergraduates and postgraduates simultaneously. It aims to prepare students for encounters with topics that they know little about but may be expected to know about because they have an IT qualification. Students are required to research a topic and apply a thinking method to tell a story about it. Through this, they are introduced to professionalism and develop their communication and independent scholarship skills, with a focus on their use in the information technology field.

III. AN EDUCATIONAL DESIGN LENS

The unit redesign process began with an educational design review conducted by an independent Educational Designer whose role is to collaborate with subject matter experts and support them with advice related to teaching and learning theory and praxis, including analysing and developing content, delivery and assessment approaches. Such curriculum development and evaluation can span a range of methodologies and strategies, with the student experience at the core of any design model. In this instance, in addition to the routine review, opportunities to Indigenise the curriculum were also identified. For the reference of future researchers, the original unit outline (UO0), and the revised Indigenised unit outline (UO1) are available on request.

There are, of course, many contemporary ways of thinking. The unit explores five of them:

- conceptual (or big picture) thinking;
- computational (or pattern) thinking identifying what can be completed by a computer;
- design thinking to consider changes that may be required, imagine a new design, build and then evaluate the change;
- systems thinking to consider connections between components of a whole system; and,
- ethical thinking to consider whether an action and its anticipated outcome meets professional and social standards of conduct.

There are also many different ways of learning, but the review focused specifically on two elements: the application of Yunkaporta's 8 ways (described in more detail later in this paper); and a change in the format and conduct of tutorials to an Indigenous method of group story-sharing and decision-making - the yarning circle. In yarning circles, participants traditionally sit in a circle, where an artefact is passed from member to member to signal when it is their turn to speak, until everyone in the circle has had a chance to contribute at least once. Participants cannot talk without the artefact, and there can be no conversation across the circle. All must await their turn, even if they want to address something just said (Radoll et al 2019, p.125).

To provide an example of yarning, a 'Yarning About' series produced by the University of Canberra was provided as a resource for students. The producers of the series sent an all of university message asking for anonymous questions about being Indigenous, the culture, or anything else they would be too afraid to ask an Indigenous person (YA, 2021). The questions would be posed to a panel of Indigenous people who would discuss the answers. The call-out resulted in enough questions to warrant the 'Yarn about' series. The CIT&E students were provided with the link to 5 episodes in the series throughout the semester.

The educational designer review made recommendations about the unit learning outcomes and the assessment items. These are discussed in the following sections:

Unit Learning Outcomes: The unit learning outcomes would remain unchanged however they would now be linked to new University of Canberra graduate attributes demonstrating Aboriginal Torres Strait Islander ways of knowledge. These attributes state that UC graduates can:

1. use local Indigenous histories and traditional ecological knowledge to develop and augment understanding of their discipline.

2. communicate and engage with Indigenous Australians in ethical and culturally respectful ways.
3. apply their knowledge to working with Indigenous Australians in socially just ways.

Assessment Items:

1. Individual fortnightly submission and peer reviews comprising 50% of the total assessment. Recommendation is to consider decreasing to 40% in UO1). During lectures over a fortnight, students are provided with an overview of a contemporary IT and Engineering topic and a way of 'thinking'. Examples of topics include quantum computing, Internet of Things (IoT), and the digital divide. While the five thinking methods are: ethical; systems; computational, conceptual and design thinking. The students are asked to apply a thinking method to a topic, and to present this as a written story. Once the story is submitted, up to three of the student's peers apply a rubric to mark the story and provide feedback to the student. The opportunity here is possibly the posts may be guided by provocations or direct questions – and these could include Indigenous perspectives, or Theory of Knowledge perspectives that intersect with decolonizing discourse and practice.
2. Group or Individual Report – 'Thinking' about Contemporary IT & Engineering Issues (40%) where students are asked to apply different ways of 'thinking' to a contemporary IT or Engineering issue of their choice. This report provides an opportunity for the students to work as a group (up to five students) to consider a contemporary IT and Engineering Issue. One student in the group assumes the role of 'storyteller', while the others are required to a particular way of thinking to the issue. From the summaries provided by the different group members about a thinking method, the storyteller must then draw out the outcomes provided by following the different ways of thinking. The recommendation is that there is an opportunity here to include three of Yankaporta's 8 ways of Aboriginal learning alongside of the other five ways of thinking: ethical; systems; computational, conceptual and design thinking. The opportunity to apply Graduate Attributes demonstrating Aboriginal Torres Strait Islander ways of Knowing, Being and Doing are applied.
3. Individual Presentation: UO0 had a 10% weighting, and the recommendation was to change this to a 20% weighting because of the complex cognitive engagement. In UO0 students were asked to record a five-minute presentation describing one way of thinking. The feedback was that this could easily include Indigenous Ways of Knowing, Being and Doing alongside of the other five ways of thinking: ethical; systems; computational; conceptual; and design thinking.








After receiving this review, the Convener might be tempted to offer a sixth way of thinking, making the adjustments to the weightings of the assessment items, and incorporating the changes to require the students to meet Graduate Attributes 4.1 and 4.3. That is, to adopt the suggestions and perhaps adopt a bolted-on approach to Indigenise the unit outline. However, in the following sections of this paper, these suggestions are used as only the foundation of the approach to Indigenise a unit outline. By adopting the 8 Aboriginal ways of Learning Aboriginal Pedagogy, hereafter referred to as Yankaporta's, or 8 ways Learning framework (Yankaporta, 2009), the researchers aim to develop a unit outline that embeds Indigenisation.

IV. YUNKAPORTA'S 8 WAYS OF LEARNING FRAMEWORK

In this section, each of the eight ways is applied to describe how learning and teaching could build in foundations for Indigenising the curriculum. The descriptions of the 8 ways are taken from the Radoll et. al (2019), but it is acknowledged that these were adapted from Yankaporta, (2009), pp. 4-7.



Story Sharing – the killer boomerang. A story starts with normal life (the handle end) then builds to a climax (the elbow), but at the end (the boomerang tip) when things return to normal, life is never the same.

-  *Learning Maps* – the winding path represents a journey. These can be drawn as a map with points of understanding indicated along the way rather than at the end. Learning journeys never take a straight path but wind, zigzag or go around.
-  *Non-verbal Learning* – the symbol of the hand represents all knowledge that can be acquired or understood without words, including gestures, inference, expressions, eye movement, kinaesthetic learning, images and revealed knowledge such as dreams, insight, inspiration and reflection.
-  *Symbols and Images* – this symbol represents people sitting at a meeting place yarning. It is a simple image that represents deeper information and understandings. Symbols and images can be used to represent words and concepts, or even learning processes.
-  *Land Links* – this symbol represents a river. All the animals, plants and geographic forms in land and water contain deep knowledge. They also provide metaphors for concepts. Knowledge of local land and place is central to Indigenous ways of knowing.
-  *Non-linear Processes* – the symbol represents circular logic at the centre, and the lines on either side show the interface between opposites. Opposites meet to create something new, with symmetry and balance concepts valued above oppositional thinking. Learning does not go straight from one side to the other. It bends out to the side, bringing in knowledge that might seem to be off topic, but that creates deeper understandings and richer learnings.
-  *Deconstruct/Reconstruct* – The symbol of the Torres Strait Islander drum represents the way knowledge can be learned by back-tracking through the concept and the whole in supported stages, then reproduced independently. The shape shows the balance between independence and support.
-  *Community Links* – the knowledge spiral shows how creation patterns at the local level are repeated at the non-local level throughout the universe. It also shows how non-local information is viewed and used from local standpoints for community benefit, with all learning returned to the community

For the present study the 8 Ways were considered from the perspectives of the students and of the teachers, because the framework offers a pedagogical framework in which “teaching through Aboriginal processes and protocols, not just Aboriginal content, validates and teaches through Aboriginal culture, and may enhance the learning for all students” (Yunkaporta 2009, p. 46). Both perspectives were canvassed by means of the yarning circle method described previously in this paper.

The yarning circle sessions would, however, be virtual rather than face-to-face. For each session, the teacher provided a short summary of the lecture and then led a group discussion to agree - by show of hands in the virtual classroom - on a virtual artefact that would represent the lecture topic or the way of thinking for that week. After that, the artefact would be 'passed' to each student in turn, and they would be required to say something about the topic or the way of thinking. The topics to yarn about included:

- Week 2, story sharing and the best storyteller you know.
- Week 3, maps and avoiding the feeling of being lost.
- Week 4, deconstruct/reconstruct following instructions.
- Week 5, symbols and images that are important to the students.
- Week 6, land-linked ethical thinking about rivers.
- Week 7, reflection about the learning so far.
- Week 9, non-verbal clues and signals to stop or to continue.
- Week 10, non-linear learning being used in preparing for the group report and

presentation.

- Week 11, community links in practice as group members completed their own part of the assignment and contributed it to the group report and presentation.
- Week 12, reflection on the overall curriculum experience from this unit.

Week 1 was used to explain the overall unit curriculum approach, and Week 8 was mid-semester break, so neither of these had a yarning circle topic. All students who attended the tutorials had a chance to yarn. However, as tutorials are not mandatory, not all students participated. In future, a grade for tutorial participation will be implemented to incentivize attendance and participation in the yarning. The following section describes the deployment each of the 8 Ways from both learning and teaching perspectives.



Learning Maps

Learning – Previously, connections between ways of thinking were provided to students after the material was delivered. For example, if the computational thinking (about patterns) was followed by the conceptual thinking (big picture) topic, then the comparison between the two would more likely be delivered to the students after conceptual thinking was discussed - often in the summary of a lecture - with the students reminded that a way of detecting and reusing patterns is one approach to understanding computational thinking. Subsequently, at the beginning of the next lecture, the students would be reminded that we had covered computational thinking (patterns) last time, before then being introduced to design thinking (big picture) this time.

In the first lecture, the learning map shown in Figure 2 was used to represent the planned journey for the 12-week semester, showing students where they are up to, where they have been, where they are going, and if necessary, how what they are doing reconnects or traces back to where they need to return to, even if momentarily. All connections were also purposefully revisited in reflection session in weeks 7 and 12. Students reported informally that they found the learning map a useful visual tool to plan their assessments items.

There are many ways of thinking. The unit only explores five ways of thinking. Conceptual thinking or big picture. Computational thinking or patterns, identifying what can be completed by a computer. Design thinking to consider changes that may be required, imagining a new design, building the change, and then evaluating the change. If no change is required, then the build is used, but if a change is required then the cycle iterates through the build and evaluate phase. Systems thinking considers connections between components of a whole system. Ethical thinking considers the topic of even it is possible, should it be done. The learning map introduces each of

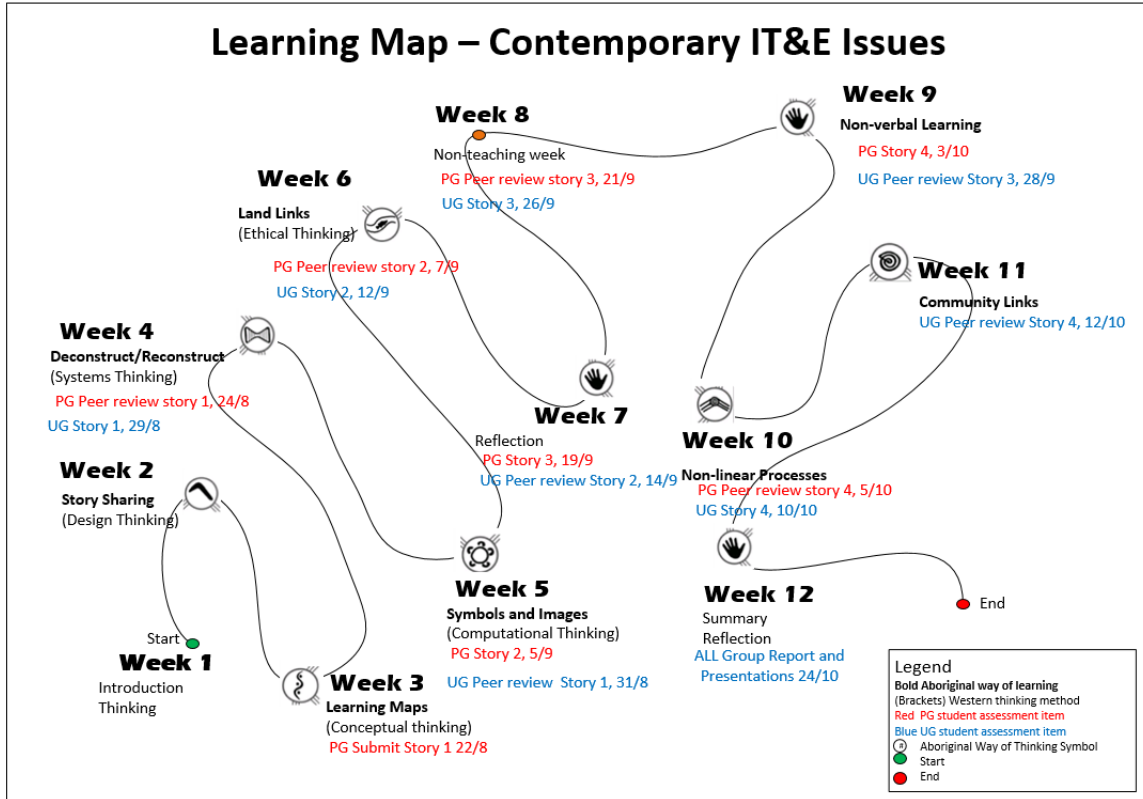


Figure 2 Unit Learning Map (Icons from Yankaporta, 2009)

the five thinking methods over five weeks as depicted in the Unit Learning Map, Figure 2.

There are also many different ways of learning, and many different ways of Aboriginal learning, but this unit is only using Yankaporta’s 8 ways of Aboriginal learning. These eight ways are considered in the 8 weeks marked in Figure 2 Unit Learning Map.

In the first lecture, the convener constructed the learning map shown in Figure 2, to represent the planned journey for the 12-week semester. The learning map depicts how content (the Aboriginal way of learning and the Thinking method) is delivered over the semester. The learning map is annotated with the weeks when assessments are due for PG and UG students i.e., four stories, and a final Group report and presentation. The learning map is deliberately presented as a winding path. At each lecture, the journey up to that week is revisited. Using the learning map, the lecturer shows students where they are up to, where they have been, where they are going, and if necessary, how what they are doing reconnects or traces back to where they need to return to, even if momentarily. All connections between the weeks are presented in the Reflection of weeks 7 and 12. In addition, Story 4 asks students to use the Learning map to draw a systems map of the unit.

Teaching – Each week, the map would be used at the beginning of the lecture to recap what was learned last week, or in previous weeks, and how it would connect to the topic this week. The map was then reintroduced at the end of each lecture, to recap what had been the learning, how it connected to the learning of previous weeks, to indicate the next week’s topic, and thus to show how the topics each week were all interconnected.



Story Sharing

Learning – Previously, students were asked to write a story about a contemporary IT issue, using a particular way of contemporary thinking. Under the redesigned curriculum, they are asked to write four stories using a way of thinking and an Indigenous way of learning. In the first of these, they describe the Indigenous way of story sharing. In the second story, they describe the Indigenous way of learning deconstruct/ reconstruct, then in the third story it is symbols and images, and in the fourth it is learning maps. The main assignment provides a scenario, and the response is a group report and presentation. In their groups (from 3-6 members), the students are asked to apply any three of Yankaporta's 8 ways of learning, along with different contemporary thinking methods to a scenario based on a contemporary IT or Engineering issue chosen by the group.

Teaching – The change from the traditional 'western' approach of teaching thinking methods is supplemented with Yankaporta's 8 Ways via the reflection lectures in weeks 7 and 12. The reflection lectures draw on the learning map to show how the other weeks have provided the learning about the contemporary thinking methods and the Indigenous ways of learning. A summary is provided of the content covered in lectures, stories, yarning, and assignments that have built this knowledge.



Non-verbal Learning

Learning – Students are initially asked to consider the impact of non-verbal learning via a hypothetical scenario whereby they are at a dining table with friends and strangers when a friend starts to tell a very embarrassing story about them, and they are to use non-verbal signals to shut them down. A video called Elders is then introduced, showing a young Indigenous boy walking through the bushland with two elders. Then one of the elders indicates that the boy should no longer follow them, requiring him to retrace his steps using the sounds of the bushland to find his way home.

Teaching – The symbols that represent the 8 ways of learning are used in the lectures. The teacher facilitates a yarn about non-verbal communication in an embarrassing dinner party scenario.



Symbols and Images

Learning – The topic of one tutorial yarning circle yarn was symbols and their importance. Students shared experiences of being overseas and being grateful that there were universal symbols for restrooms and traffic signals. They also discussed Aboriginal symbols that were presented during a guest lecture as described below.

Teaching – Dr Wayne Applebee, a Kamilaroi man from Northern NSW, presented a lecture on symbols and images based on his scholarly work on semiotics - the study of signs that communicate meaning. In his lecture, he described some basic symbols and images found in many Aboriginal paintings. During the regular lectures, the symbols used in the 8 Ways framework are presented to the students, and they are also used in the Unit Learning Map (Figure 1) so that students become familiar with them over the course of the semester.



Land Links

Learning – The yarning topic included a reflection on a guest lecture given by Professor Fiona Dyer on the river systems, and learning by linking content to local land and place. During her lecture, Professor Dyer talked about rivers' legal rights as users of water. One of the four stories that the students were asked to write was about the impact on stakeholders (including rivers) if the flow of water was deliberately reduced.

Teaching – Non-Indigenous scholars were also used to support the change in curriculum for this unit. For example, in her lecture Professor Dyer described the connection that Indigenous people have to the country including its waters, gleaned by her from conversations with the local Indigenous people who draw water from the rivers that she studies. Hearing from scholars researching in areas that impact on Indigenous people is a way to demonstrate the UC Indigenous graduate attributes in practice.



Non-linear Processes

Learning – Students are presented both the Western way of listing the order of topics in the unit outline, and the non-linear Learning Map (Figure 1). Story 4 in the assessment tasks requires the students to model the learning methods of the 8 Ways framework, together with the five different contemporary ways of thinking covered in unit.

Teaching – Here the teacher presents the learning map to the students to describe how ideas in different weeks are related. Each week shows how different ways of thinking are creating new knowledge. By showing this using a learning map draw out the similarities across the thinking methods, particularly in respect to Western and Indigenous ways of learning.



Deconstruct/Reconstruct

Learning – Students are asked to use deconstruct/reconstruct processes during one of the weekly yarns, where they recall a time when they had to undo something they had constructed because it was not working properly, and what they learned in the process of the reconstruction. They also reflect on the usefulness of instructions, and the feeling of accomplishment when they no longer need them.

Deconstruct/reconstruct is also used in the peer-review assessment tasks, using a rubric to consider (deconstruct) the marking components and assign a mark (reconstruct). These are subsequently moderated by the teaching staff.

Teaching – Actual demonstration of reconstruct/deconstruct practice is provided during the lectures, and in separate guidance videos produced to assist students with the assessment tasks. The deconstruction of the requirements of the group report and presentation tasks, and the reconstruction to determine the division of work among the group, are demonstrated, including the modelling of ways in which the work could be distributed amongst group members, and then collaboratively reconstructed into the final report for submission. Another demonstration of deconstruct/reconstruct is its application in deconstructing the 8 Ways framework and reconstructing it into the different components of the new unit outline.



Community Links

Learning – The unit requires a group report and presentation to be submitted. The roles of the group members include a storyteller whose first task is to present a scenario describing a contemporary IT or engineering issue. Other roles are then assigned among the group members to contribute ideas about how the different thinking methods and Indigenous ways of learning might be used to consider the scenario. A yarning circle asks the students to reflect on themselves as a community, and they retell how the group agreed on the topic, assigned the different roles, and comment on their own role. They also provide their opinions of how well the group is operating as a community, and whether they are confident that the community (group) members would deliver their different parts in time for the storyteller to weave them into a coherent report and presentation.

Another topic on digital divide explores the implications for people in our society who have no access to the internet because of poverty or location. Can IT providers and professionals help? How important is connection?

Teaching – In the introduction to the tutorial, the teacher explains that the process of the students each researching and completing a part of the assignment, and then bringing it back to the community for inclusion is a form of linking knowledge back to the community.

Also, as stated previously, the Indigenised redesign of the unit's curriculum and its initial deployment in one semester were conducted as a pilot to test whether Indigenous ways of knowing and learning could be synthesized with contemporary ways of thinking and learning in IT and its associated issues, in a way that would be engaging for the students, enriching for their learning, and help them develop the university's Indigenous graduate attributes. This is another form of teaching community links. The learnings from this pilot will lead to further adjustment of the unit itself and will also critically inform the Indigenisation of the curriculum of the other units in IT and engineering towards fulfilment of the university's mandate for institution-wide Indigenisation of the curriculum in all courses.

V. CONCLUSION

This paper demonstrates that the 8 Aboriginal Ways of Learning Aboriginal Pedagogy (Yunkaporta, 2009) can be embedded in a unit outline that had no previous towards Indigenisation of the curriculum. The pedagogical framework that describes the eight ways of learning has been applied to both the perspective of learning, and the perspective of teaching the Contemporary IT & Engineering unit at the University of Canberra.

Design Science Research (DSR) was used as a methodological frame of reference to design and evaluate the Indigenised unit outline, incorporating Yunkaporta's 8 Ways framework, from the original non-Indigenised unit outline. The DSR approach has merit as it recognises both relevance and rigor in iteratively developing the Indigenised unit outline as a design artefact.

The unit outline was amended to build in Indigenous ways of learning and connecting, following a consultative educational design review with the researchers to apply Yunkaporta's (2009) 8 Ways of Indigenous learning. This resulted in multiple changes to the curriculum as represented in the unit outline, including the description of the unit, inclusion of an introduction section about Indigenisation of the curriculum and what it means for students undertaking this unit, alterations to the delivery method to include yarning circles during tutorials, modification of assessment formats to include recorded submissions, content and process changes to include Indigenous ways of learning, the order of content delivery, the introduction of reflective practice, amendments to the concept and processes of peer-review.

By applying Yunkaporta's framework to the unit outline in this pilot and observing and reflecting on its implementation over one semester, the researchers have been able to identify some areas of success and also understand where others may have difficulty in applying the framework. For

example, Land Links was found to be a category that was difficult to apply since it required lateral thinking about the impact of riverine usage on various stakeholders. These outcomes will form a basis for further changes in the next iteration of the unit, and also inform the Indigenisation of the curriculum of other units in IT courses at the University of Canberra.

Evaluation has resulted in revisions to a number of features in the Indigenised unit outline. These include the description of the unit, introduction of a section about Indigenisation of the Curriculum and what it means for students undertaking this unit, delivery method to include yarning circles during tutorials, changes to assessment content to include Indigenous ways of learning, the order of content delivery, and the introduction of two reflection lectures during the semester.

VI. ACKNOWLEDGEMENTS

We acknowledge the Traditional Owners of Country throughout Australia and recognise their continuing connection to lands, waters and communities. We pay our respect to Aboriginal and Torres Strait Islander Elders, past, present and emerging. Here the term 'Country', describes the lands with which Aboriginal people have a traditional and ongoing relationship, conflated with 'Caring for Country', which is intricately linked towards maintaining cultural life, identity, individual autonomy and Aboriginal sovereignty (Ganesharajah, 2009).

VII. ETHICS

The University of Canberra HREC Reference 20219339 21 October 2021

REFERENCES

- Fraser, S. P., & Bosanquet, A. M. (2006). The curriculum? That's just a unit outline, isn't it? *Studies in higher education*, 31(03), 269-284.
- Ganesharajah, C. (2009). Indigenous health and wellbeing: The importance of country. Australian Institute of Aboriginal and Torres Strait Islander Studies.
- Hauser, V., Howlett, C., & Matthews, C. (2009). The place of Indigenous knowledge in tertiary science education: A case study of Canadian practices in Indigenising the curriculum. *The Australian Journal of Indigenous Education*, 38(S1), 46-58.
- Hevner, A., March, S. T., Park, J., & Ram, S. (2004). Design science research in information systems. *MIS Quarterly*, 28(1), 75-105.
- Hevner, A.R. (2007). A Three Cycle View of Design Science Research. *Scandinavian Journal of Information Systems*, 19(2), 87-92.
- Laurillard, D., (2012). Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology. *Teaching Business & Economics: Hassocks* Vol. 16, Issue 3, 31-32.
- March, S. T., & Smith, G. F. (1995). Design and natural science research on information technology. *Decision support systems*, 15(4), 251-266.
- Peppers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of management information systems*, 24(3), 45-77.
- YA EP4 Part II Mythbusting REV, 2021, online video, 7 October, viewed on 19 October 2021, <<https://www.youtube.com/watch?v=bl65XDG-eAk>University of Canberra, 2021>.
- Radoll, P., Copeman, P., Heyes, S., Walsh, M., Byrnard, S., Egloff, B., Bartram, L., Cameron, K., Coffey, F., Falusi, S., Hales, V., Liesagang, R., Jolley, D., Lampe, C., Lutan, N., Naivalurua, J., Platt, C., Rigon, T., Wallace, C and Project Elder: Aunty Roslyn Brown, University of Canberra

(2019). Indigenous perspectives on connected and networked learning. In R. Bridgstock, & N. Tippett, *Higher Education and the Future of Graduate Employability*. Edward Elgar Publishing.

Walls, J. G., Widmeyer, G. R., & El Sawy, O. A. (1992). Building an information system design theory for vigilant EIS. *Information systems research*, 3(1), 36-59.

Yunkaporta, T. (2009). *Aboriginal pedagogies at the cultural interface*. Doctor of Education PhD thesis. James Cook University.