



# **Routes to success**

# **Digital badge**

# **implementation**

## **Report A**

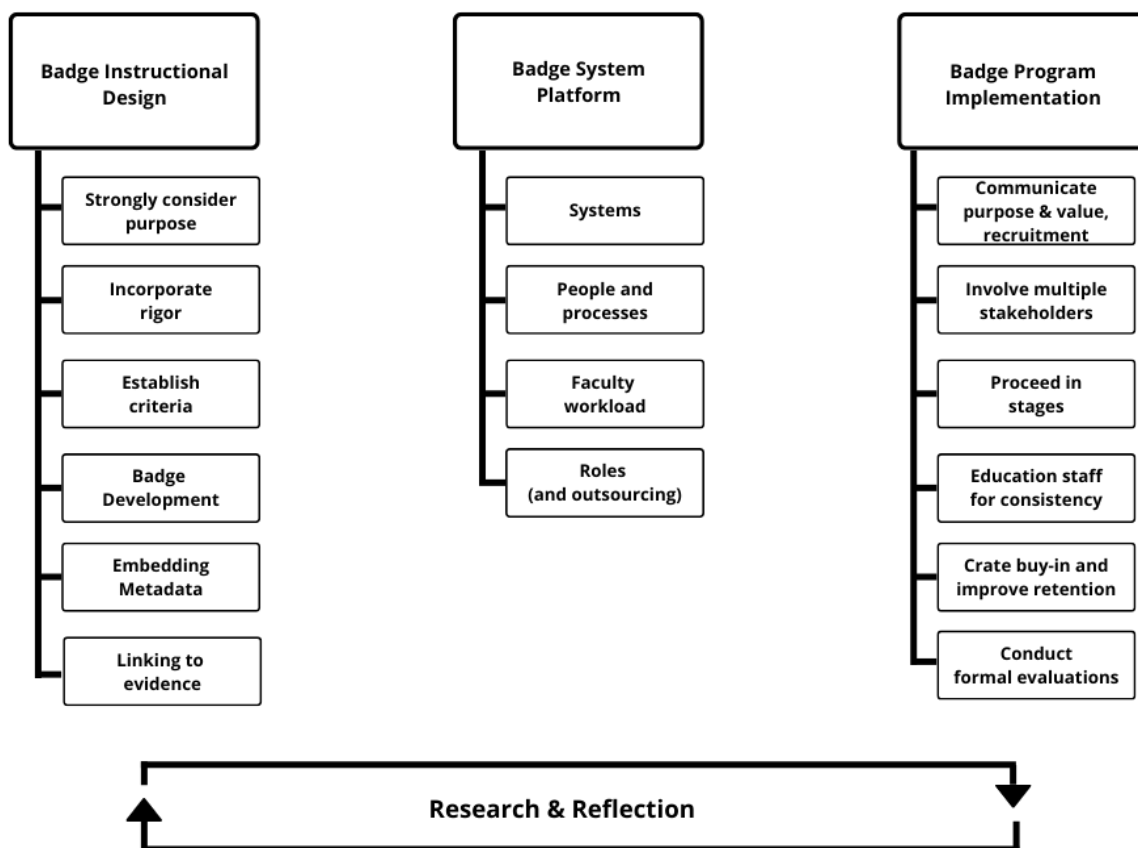
# Introduction

This is the first of two related reports (A and B). This report outlines the design, development and implementation of the first stage of a digital badging project at a university in Eastern Australia. The project consisted of six phases. Phases 1 to 4 focused on the issuing of badges for assignments within courses. (Level 3 badges). In the light of the research findings from Phase 4 the final two phases were adapted so that they investigated the impact of withholding marks/grades and badges, but providing students with feedback on the assignment rubric.

The second report (B), which will be completed in the first quarter of 2023, will focus on Stage 2 of the project that spanned Phases 5 & 6 - on exploring the implementation of Level 1 and 2 badges that students could use when applying for teaching posts.

This report has been structured around an adapted version of Stefaniak and Carey’s (2019) Badge Implementation Framework (Figure 1). This framework was adopted as it provided a useful structure for defining the processes undertaken so far in a systematic way. However, it was adapted by the research team to fit more closely with the key implementation elements and to include a ‘research and reflection component’, highlighting the iterative way in which feedback and project data fed forward to modify and fine-tune implementation in the phases that followed.

**Figure 1: Adapted from Stefaniak & Carey’s (2019) digital badge implementation framework**



Following from this, this report is sub-divided into:

- 1.1 Badge Instructional Design** - focussed on issues related to the conceptualisation of the project and the key issues that needed to be addressed in terms of the design of the badges and associated assessments.
- 1.2 Badge System Platform** – focuses on issues to do with technical aspects of implementing the project in practice. As such it looks at how issues addressed in Section 1 were actually implemented within the University systems and processes.
- 1.3 Badge Program Implementation** – focuses on the human aspects of implementing the project, including informal feedback and formal survey data, as well as the emerging outcomes for the project.

Each section contains a **Research and Reflection** component detailing how the project developed iteratively in response to feedback, challenges, and various constraints.

The research and its findings are discussed more fully in the associated project report.

# Contents

1	Badge Instructional Design .....	6
1.1	Strongly Consider Purpose: Project Rationale and Aims .....	6
1.1.1	Rationale.....	6
1.1.2	Aims.....	7
1.2	Incorporate Rigor.....	7
1.2.1	Background Research .....	7
1.3	Establishing Criteria .....	8
1.3.1	Assessment Frameworks .....	8
1.3.2	Levels within Assessment Frameworks .....	10
1.3.3	Progressions and Levels .....	12
1.3.4	Rubric Development .....	13
1.4	Badge Development .....	15
1.4.1	Badge Design .....	15
1.4.2	Badge Types.....	16
1.4.3	Badge Levels .....	18
1.4.4	Badge Awarding.....	18
1.5	Embedding Metadata.....	18
1.6	Linking to Evidence .....	19
1.7	Research and Reflection .....	21
2	Badge System Platform .....	24
2.1	Systems .....	24
2.1.1	University systems .....	24
2.1.2	Badging systems .....	24
2.1.3	Learning Management System .....	25
2.1.4	Intermediary System .....	27
2.2	People and processes .....	28
2.2.1	Key stakeholders.....	28
2.2.2	Overview of processes .....	28
2.2.3	Setting up the assignments .....	29
2.2.4	Setting up the badges.....	30
2.2.5	Marking assignments .....	30
2.2.6	Awarding badges.....	30
2.2.7	Autogenerating marks .....	33
2.2.8	Uploading marks .....	33
2.2.9	Faculty workload .....	33
2.2.10	Roles (& Outsourcing).....	33
2.3	Research and Reflection.....	34
3	Badge Program Implementation .....	35
3.1	Recruitment: Communicating Purpose and Value .....	35
3.2	Proceed in Stages .....	35

3.3	Education staff for Consistency .....	37
3.4	Create Buy-in and Improve Participant Retention .....	37
3.4.1	Phase 2: Small Pilot (EDUC1048) .....	37
3.4.2	Phase 4: Large Pilot (IntroToEd) .....	39
3.4.3	Phase 6: Withholding marks vs issuing badges.....	40
3.5	Conduct Formal Evaluations .....	40
3.6	Research and Reflection .....	40
	Reference List.....	41

# 1 Badge Instructional Design

Section one of this report considers the overarching purpose, rationale and aims of the project, as well as development of the first set of digital badges, including standards frameworks, criteria, badge design, and naming conventions.

## 1.1 Strongly Consider Purpose: Project Rationale and Aims

### 1.1.1 Rationale

Traditional methods of assessment (such as exams and academic essays) are unable to assess the full range of competencies (knowledge, skills, and dispositions) that students have (Bassett, 2015; Robinson & Aronica, 2015).

Moving away from awarding marks/grades to using competency based digital badges could help to address this issue because such micro-credentials can be used to assess skills and dispositions as well as the application of knowledge in practice. They can also contribute to a more holistic and detailed record of students' achievements (Elliot, Clayton & Iwata, 2014). Where digital badges are being used to enhance skills that are relevant in the academic context this is likely to motivate students and enhance their outcomes (Oxley & van Rooyen, 2021).

The learning outcomes that students must achieve to qualify are often prescribed by professional bodies in the form of professional standards. Within a programme of study that spans several years and involves multiple courses that have been developed and are taught by different staff there is a danger that the standards may be interpreted inconsistently and that the learner journey may lack continuity. Due to the lack of clear mapping between specific assignments on individual courses and the professional standards it can be difficult for students to understand how they are progressing in meeting the standards and which courses they need to take to 'fill any gaps' in their profile. Developing a digital badge framework aligned with the standards would help address these issues by:

- providing a consistent set of criteria that could be applied across courses within the programme;
- explicitly mapping courses against the standards – so staff and students can see which standards are addressed in each course;
- clearly indicating to students what they need to achieve and where the gaps are in their current learning journey that need to be addressed (Hannah, 2018).

By making it clear to students what credentials they need to achieve to meet the standards, and which courses will enable them to meet particular aspects of the standards digital badges can enhance learner agency (Selvaratnam & Sankey, 2021).

Summative assessments should have a formative element to them (Twining, 2020), but when presented with the marks/grades on assignments students often do not look at the other feedback (Gibbs & Simpson, 2005; Wotjas, 1998). Butler (2011) found that whether grades were presented on their own or with written feedback they generally undermined students' interest and performance. Where marks are not provided Black and William (1998) found that students pay greater attention to the written feedback. We envisage that replacing the grade with a set of digital badges would result in students gaining greater insights into their performance, because marks/grades tell you very little about what you have achieved (Martin, 2020).

Whilst digital badges seem to address many of the issues with traditional forms of assessment and the use of marks/grades, there is a “dearth of available academic research on micro-credentials” (Selvaratnam & Sankey, 2021, p.3). This pilot aims to fill that gap.

On a practical level the pilot aims to enhance our provision and our students’ learning outcomes. This will involve providing professional development for staff as well as understanding how to navigate University policies and systems which are predicated on the awarding of marks/grades. It will result in the development of digital badge frameworks and guidance on the process of moving from marks/grades to digital badges.

**To summarise, the pilot should impact directly on our students’ learning and indirectly on provision in other programmes and institutions.**

### **1.1.2 Aims**

Following from the rationale, the pilot has two primary aims:

- A. Implementing the use of digital badges in our provision within the School of Education
- B. Researching the implementation process and the impacts on staff, students, and the institution’s systems, policies, processes, and practices.

## **1.2 Incorporate Rigor**

### **1.2.1 Background Research**

To assist with planning and implementation, research on the use of digital badges in both educational and in gaming settings was undertaken by the project team. Key findings, include the effect that digital badges had on learner motivation and self-efficacy (Hamari & Eranti, 2011; Hamari, 2017), the quality of feedback provided to learners (Hamari, 2015), and guidance on the successful implementation of badging programs (Stefaniak & Carey, 2019).

With respect to **learner motivation and self-efficacy** research (Hamari, 2017) indicates that badges have a positive impact due to factors such as:

- anchoring our performance expectations higher (through providing a visual picture of what competency looks like)
- goal setting, goal commitment, and goal completion
- social proof (having a visual record of achievement that can be shared)
- motivating social comparisons

With respect to **feedback**, digital badges can act as:

- guidance mechanisms (having clear visual representations of what learners are working towards) and,
- facilitate psychological flow through contextualising feedback on specific tasks within their degree as a whole.

As digital badges have their origins in games, the use and effects of badging in gaming was also considered. Of particular interest was the development and use of achievement systems within games (Galli & Fraternali, 2014), including guidelines on developing achievement criteria, a tangible marking of achievement, linking achievements to user profiles, and grouping or nesting of achievements.

Research on the implementation of badging programs was used to develop an appreciation of the various factors (technical, motivational, institutional) that need to be considered when planning for success, as well as providing structure for program evaluation and reporting. The framework developed by Stefaniak and Carey (2019) for implementing

badges in higher education – framed around 'Badge Instructional Design', 'Badge System Platform' and 'Badge Program Implementation' – provided particularly valuable in this respect.

In summary, the preliminary background research both confirmed the rationale, aims and purpose of the project, as well as providing ongoing project guidance in terms structures of reporting and evaluation.

## **1.3 Establishing Criteria**

The section to follow will detail the process of establishing criteria (and by extension evidence) for the awarding of digital badges in Stage 1 of the pilot. The section will begin by considering relevant standards and assessment frameworks before discussing global measures of student understanding (taxonomies of thinking). Finally, and as a product of these processes, the development of assessment rubrics will be discussed.

### **1.3.1 Assessment Frameworks**

When considering the assessment frameworks that would form the basis of the criteria for which badges would be awarded, two broad assessment frameworks were relevant - one linked to professional competencies in teaching and the other linked to general academic competencies.

#### **Graduate Teaching Standards**

With respect to professional competencies in teaching, the Australian Professional Standards for Teachers (APST) was selected. This framework has different levels aligned with different stages in a teacher's career. For this pilot the focus was on the Graduate Level within the APST – henceforth to be referred to as the Graduate Teaching Standards (GTS). The framework contains seven standards that were developed to capture various facets of teaching practice (Education Services Australia, 2011):

1. Know students and how they learn
2. Know the content and how to teach it
3. Plan for and implement effective teaching and learning
4. Create and maintain supportive and safe learning environments
5. Assess, provide feedback and report on student learning
6. Engage in professional learning
7. Engage professionally with colleagues, parents/carers and the community

Each of these seven standards is further divided into elements that detail what specific evidence of achievement against that standard should look like at the beginning and end of their pre-service education. An example of the descriptor for GTS 1.1 has been included in Table 1.1 below.



**Table 1.1: Descriptors for GTS 1.1**

1	Know students and how they learn	The teacher education student ...	
1.1.1	Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning.	<ul style="list-style-type: none"> <li>• Seeks knowledge of students' specific physical, social and intellectual learning needs in an appropriate manner</li> <li>• Identifies achievable learning goals for students</li> <li>• Demonstrates a developing awareness of differences in students' learning styles and needs</li> <li>• Responds to differences in students' learning styles and needs through approaches to lesson planning and teaching</li> </ul>	<ul style="list-style-type: none"> <li>• Identifies students' specific physical, social and intellectual learning needs</li> <li>• Communicates and interacts in ways appropriate to students' development stages</li> <li>• Makes modifications to delivery depending on students' physical, social and intellectual development</li> <li>• Considers and makes modifications to the learning environment depending on physical, social and intellectual development</li> <li>• Uses a variety of resources to account for the learning style and needs of students</li> <li>• Plans differentiated work for students (modified and extension)</li> </ul>

The GTS are the key criteria that students have to meet in order to graduate as teachers and they underpinned much of the assessment that students were undertaking as part of their degree; thus the GTS were a natural choice. However, even if students are able to demonstrate meeting each of the GTS in isolation that is not sufficient. They need to be able to integrate the standards into their practice. To ensure that this is the case they are formally assessed at the end of their final placement to ensure they can integrate key standards in their practice. This subset of the GTS are referred to as the NTPS (See Implementation Report B which focusses on badges linked to the NTPS).

Students are also expected to develop a range of other competencies (which some might refer to as graduate attributes) which are not addressed by the GTS or NTPS. Thus, another framework was required to complement the GTS.

### Other competencies

There are a wide range of 'general competency' frameworks. Based on a review of literature on general competencies (which some refer to as meta-skills, 21<sup>st</sup> Century skills, soft skills, the 4Cs, the 6Cs, etc.) a set of competencies were identified. To help provide some coherent structure to these, they were mapped onto the CAPRI Framework which was developed at the University of Technology Sydney (Thompson, 2016). The CAPRI framework consists of five categories of competencies:

- **C**ommunication and Collaboration
- **A**ttitudes and Values
- **P**ractical and Professional
- **R**esearch and Critical Thinking
- **I**nnovation and Creativity

The Competency Framework that resulted thus consisted of the five CAPRI categories, each of which included up to ten descriptors of evidence of achievement. The example listed below details the descriptors for 'Research and Critical Thinking':

- R1 Has a questioning attitude
- R2 Asks good questions
- R3 Can frame a problem in order to help solve it
- R4 Can analyse a problem
- R5 Can solve problems
- R6 Generates evidence (inc. finding information)

- R7 Evaluates evidence (inc. information)
- R8 Is sceptical
- R9 Considers multiple perspectives
- R10 Forms reasoned arguments and judgements

It was at the level of individual descriptors (e.g. R7) that criteria were drawn from The Competency Framework (TCF) to inform rubric development (to be considered in the next section).

### 1.3.2 Levels within Assessment Frameworks

Both the Graduate Teaching Standards (GTSs) and The Competencies Framework (TCF) are divided into levels. The number of levels depends upon the granularity required and how components of a framework were divided up. For example, the GTS could be seen as different numbers of levels as illustrated in Figure 1.1.

**Figure 1.1 Different ways of assigning levels within the Graduate Teaching Standards**

#### 1.1a Five levels

<b>Level 1</b>	<b>The Graduate Teaching Standards</b>
<b>Level 2</b>	<b>1. Know students and how they learn</b>
Level 3	1.1 Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning
Level 4	1.1a Demonstrate knowledge and understanding of physical development and characteristics of students and how these may affect learning
Level 5	1.1a/1 Demonstrate knowledge and understanding of physical development and characteristics of students
	1.1a/2 Demonstrate knowledge and understanding of how physical development and characteristics of students may affect learning
Level 4	1.1b Demonstrate knowledge and understanding of social development and characteristics of students and how these may affect learning
Level 5	1.1b/1 Demonstrate knowledge and understanding of social development and characteristics of students
	1.1b/2 Demonstrate knowledge and understanding of how social development and characteristics of students may affect learning
Level 4	1.1c Demonstrate knowledge and understanding of intellectual development and characteristics of students and how these may affect learning
Level 5	1.1c/1 Demonstrate knowledge and understanding of intellectual development and characteristics of students
	1.1c/2 Demonstrate knowledge and understanding of how intellectual development and characteristics of students may affect learning
Level 3	1.2 Demonstrate knowledge and understanding of research into how students learn and the implications for teaching
Level 4	1.2a Demonstrate knowledge and understanding of research into how students learn
	Etc..

## 1.1b Four levels

### Level 1 1. Know students and how they learn

Level 2	1.1 Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning
Level 3	1.1a Demonstrate knowledge and understanding of physical development and characteristics of students and how these may affect learning
Level 4	1.1a/1 Demonstrate knowledge and understanding of physical development and characteristics of students 1.1a/2 Demonstrate knowledge and understanding of how physical development and characteristics of students may affect learning
Level 3	1.1b Demonstrate knowledge and understanding of social development and characteristics of students and how these may affect learning
Level 4	1.1b/1 Demonstrate knowledge and understanding of social development and characteristics of students 1.1b/2 Demonstrate knowledge and understanding of how social development and characteristics of students may affect learning
Level 3	1.1c Demonstrate knowledge and understanding of intellectual development and characteristics of students and how these may affect learning
Level 4	1.1c/1 Demonstrate knowledge and understanding of intellectual development and characteristics of students 1.1c/2 Demonstrate knowledge and understanding of how intellectual development and characteristics of students may affect learning
Level 2	1.2 Demonstrate knowledge and understanding of research into how students learn and the implications for teaching
Level 3	1.2a Demonstrate knowledge and understanding of research into how students learn Etc..

## 1.1c Three levels

### Level 0 The Graduate Teaching Standards

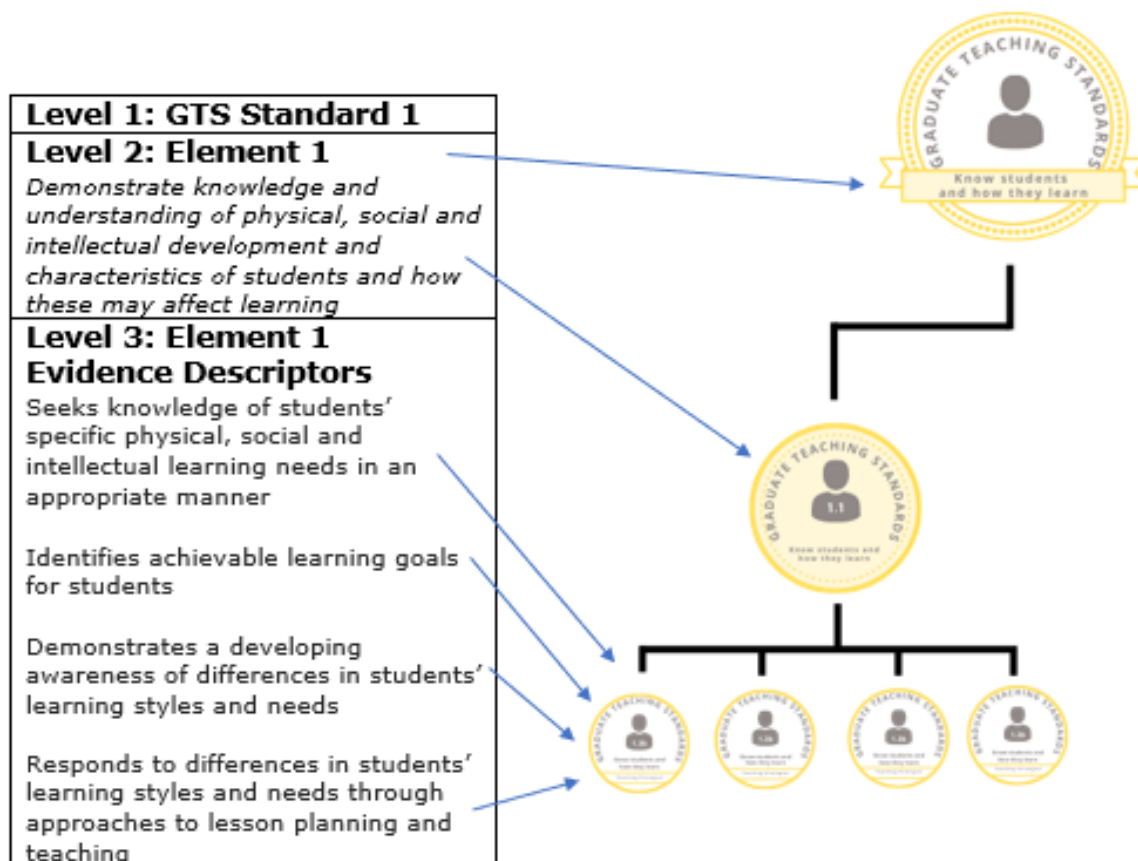
#### Level 1 1. Know students and how they learn

Level 2	1.1 Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning
Level 3	1.1a Demonstrate knowledge and understanding of aspects of student development and how they may affect learning
Level 2	1.2 Demonstrate knowledge and understanding of research into how students learn and the implications for teaching
Level 3	1.2a Demonstrate knowledge and understanding of some research into how students learn and the implications for teaching
Level 2	Etc..

This raises a question about the level at which one should award badges. Initial discussions focussed on three levels of badges:

- **Level 1 badges**, or mastery badges, would be awarded at the level of a standard (i.e. GTS 1: knowing students and how they learn), and would be awarded once the student had demonstrated evidence (i.e. earned the badges) that relate to each of the 'elements' within each standard (for example GTS 1, Element 1.1: *Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning*). These elements are represented by Level 2 badges.
- A **Level 2 badge** would be awarded when students had demonstrated evidence of achievement against the specific evidence descriptors within that element (for example: *Seeks knowledge of students' specific physical, social and intellectual learning needs in an appropriate manner* – as per Table 1.1 above).
- These evidence descriptors are represented by **Level 3 badges**, which are awarded on the basis of demonstrated competencies within assignments.

**Figure 1.2 Example of badge hierarchy**



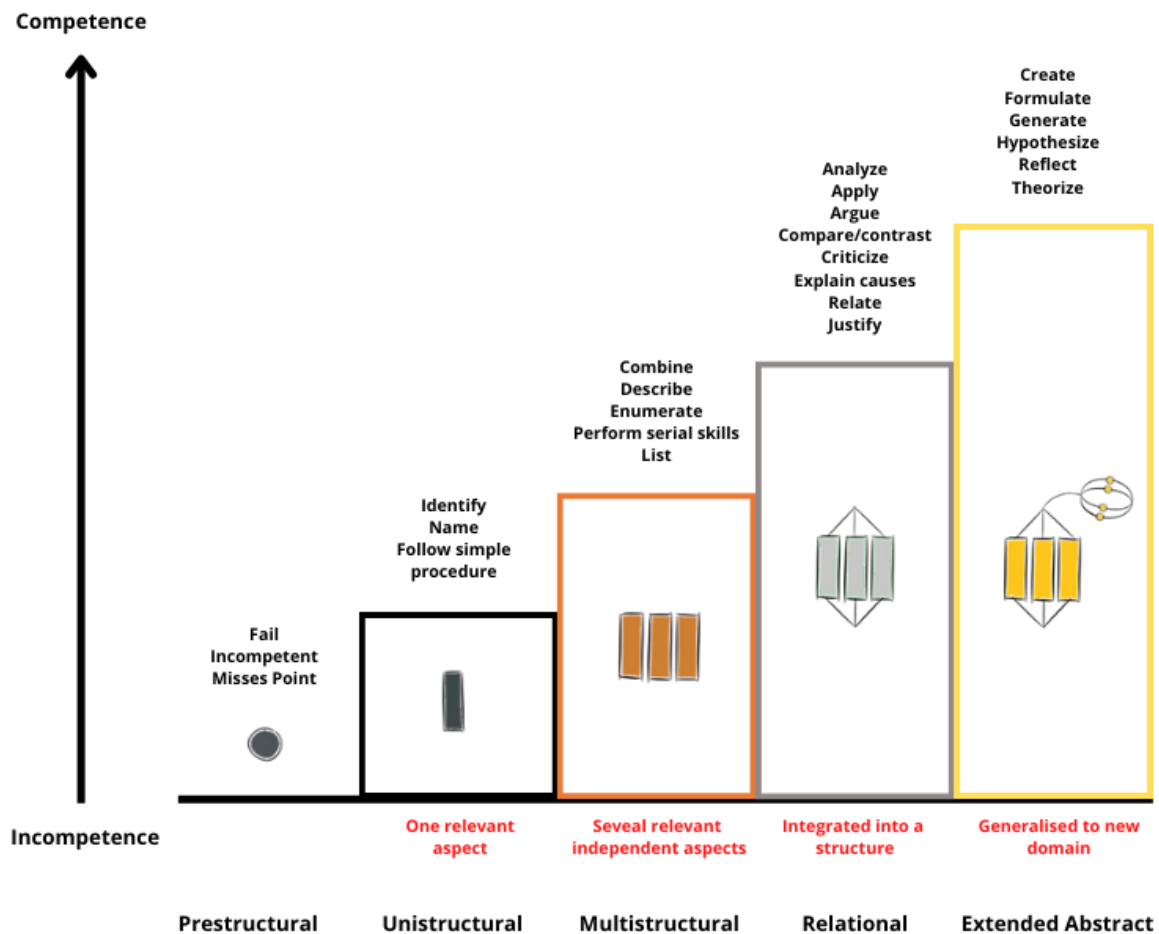
### 1.3.3 Progressions and Levels

Providing a global measure of student understanding was an important aspect of establishing criteria. A number of general frameworks were considered, including Bloom's (Krathwohl et al., 2001) Taxonomy, Miller's (1990) Pyramid, The New Taxonomy (Marzano & Kendall, 2008), and the Structure of Observed Learning (SOLO) Taxonomy (Biggs & Collis, 1982). The SOLO taxonomy was ultimately selected due to its focus on the sophistication of a learner's mental models rather than only on what learners are able to do (as is the case with Blooms). By focussing on a learner's mental model the SOLO taxonomy also explicitly builds the notion of progression within it. This is a problem for other frameworks such as Bloom's Taxonomy – you can perform some of the 'levels' within Bloom's taxonomy at different levels of sophistication (e.g. analyse and evaluate).

The SOLO Taxonomy (Figure 1.3) consists of five levels of understanding (adapted from Biggs & Tang, 1999):

- **Pre-structural** – no useful memory
- **Uni-structural** – recall of simplistic information
- **Multi-structural** – recall of more information, but not integrated into a mental model
- **Relational** – has a 'concrete' mental model but not well integrated with other knowledge
- **Extended abstract** – has an abstract mental model which is integrated with other knowledge

**Figure 1.3 The SOLO Taxonomy**



### 1.3.4 Rubric Development

The SOLO Taxonomy and both the assessment frameworks came together in the development of rubrics, with the SOLO Taxonomy providing a global indicator of progression or performance within rubrics. The GTS and TCF were interpreted in light of the specific assignment requirements to provide the specific criteria for professional and academic performance. The individual performance descriptors within the rubric were derived from interpreting the criteria in light of each level of the SOLO Taxonomy (see Figure 1.4 and Table 1.2 below).

Each descriptor within a rubric (for Multi-structural and above) described the specific evidence a student needed to demonstrate to receive a badge for that criterion at that level. For example, criterion A on the rubric for one assignment stated: *How well have you explained how your readings inform our understanding of physical, social and/or intellectual development of students and how these may affect how they learn?* (based on GTS 1.1a). To achieve a gold badge for that criterion a student would need to: *[demonstrate] understanding of several different aspects of student development and how they are interrelated, and how they may affect learning and hence may influence pedagogical decision making.* The process of going from a standards framework to a criterion, to a badge is illustrated in Table 1.2.

With respect to their correlation with traditional grades, it was decided that Extended Abstracts roughly correlates with High Distinction, Relational correlates with Credit-Distinction, and Multi-structural correlates with a Pass.


**Figure 1.4: Annotated Assessment 1 Rubric**

**Assessment 1 Rubric**

Criteria were derived from GTS and TCF and interpreted in light of the specific assessment requirements. Further divided into Academic Understanding, Academic Literacy and Self-

	SOLO Levels				
	Extended abstract <small>Generalise to new domain. Create, Formulate, Generate. Hypothesise, Reflect, Theorise.</small>	Relational <small>Integrated into a structure. Analyse, Apply, Argue. Compare/Contrast, Critique. Explain causes/Relate. Justify.</small>	Multi-structural <small>Several relevant independent aspects. Combine, Describe. Enumerate, List. Perform serial skills.</small>	Uni-structural <small>One relevant aspect. Identify, Name. Follow simple procedure</small>	Pre-structural <small>Incompetent. Misses the point. Does not answer what the assignment asks</small>
	Higher Distinction	Distinction - Credit	Pass	Fail	Fail
How well have you explained how your readings inform our understanding of physical, social and/or intellectual development of students and how these may affect how they learn? (GTS 1.1.a)	You have demonstrated understanding of several different aspects of student development and how they are interrelated, and how they may affect learning and hence may influence pedagogical decision making	You have demonstrated understanding of several different aspects of student development and how they are interrelated, and how they may affect learning	You have demonstrated understanding of several different aspects of student development and how these may affect learning	You have demonstrated understanding of one relevant aspect of student development and how that may affect learning	You have not demonstrated that you understand student development or how that may affect learning
How well have you explained the significance of your chosen readings to graduate standards? (GTS 6.1.a)	You have provided a critical justification for why these readings are significant that goes beyond how they relate to the teaching standards	You have provided a critical explanation of why these readings are significant in the light of the teaching standards	You have provided several reasons why these readings are significant in the light of the teaching standards	You have provided one or two reasons why these readings are significant in the light of the teaching standards	You have not provided any reasons why these readings are significant in the light of the teaching standards
Understanding of the prescribed article (GTS 1.3.a)	You have provided evidence of understanding the prescribed article and seeing how it might be relevant beyond schooling	You have provided evidence of understanding the key ideas in the prescribed article and how they relate to each other	You have provided evidence of understanding several discrete aspects of the prescribed article	You have provided evidence of understanding one aspect of the prescribed article	You have not provided evidence of understanding the prescribed article
How well have you set out and justified your argument? (RTD Critical thinking)	You have made one or more claims and developed a valid argument to justify the claim(s). You have set out objections and counterarguments to the claim(s) and provided responses to those objections and counterarguments. You have articulated general principles supporting the claim(s).	You have made one or more claims and developed a valid argument to justify the claim(s). You have set out objections and counterarguments to the claim(s) and provided responses to those objections and counterarguments.	You have made two or more claims and have provided a range of reasons to support the claims	You have made a claim and have provided a reason to support the claim.	You have made one or more claims, but have not provided reasons to support the claim(s).
<b>ACADEMIC LITERACY</b>	<b>Higher Distinction</b>	<b>Distinction - Credit</b>	<b>Pass</b>	<b>Fail</b>	<b>Fail</b>
E Clarity of communication in professional English (C2a Expresses themselves clearly)	<b>All</b> the following apply: Your sentences are concise and well structured <b>AND</b> Your grammar and spelling are flawless <b>AND</b> Your terminology is accurate and appropriate for academic writing in Education	<b>One</b> of the following applies: Your sentences are too long and/or poorly structured <b>OR</b> Your grammar and/or spelling contains errors <b>OR</b> Your terminology is inaccurate or inappropriate for academic writing in Education (incl. flowery language)	<b>Two</b> of the following apply: Your sentences are too long and/or poorly structured <b>AND/OR</b> Your grammar and/or spelling contains errors <b>AND/OR</b> Your terminology is inaccurate or inappropriate for academic writing in Education (incl. flowery language)	<b>All</b> the following apply: Your sentences are too long and/or poorly structured <b>AND</b> Your grammar and/or spelling contains errors <b>AND</b> Your terminology is inaccurate or inappropriate for academic writing in Education (incl. flowery language)	Your writing is incoherent (including not written in professional English)
F Effective use of Cornell Notes (I2a Collates information and ideas)	You have filled in all four sections of each Cornell Note with appropriate content, including abstraction AND critical evaluation	You have filled in all four sections of each Cornell Note with appropriate content, including abstraction OR critical evaluation	You have filled in all four sections of each Cornell Note with appropriate content	You have filled in all four sections of each Cornell Note	You have not filled in all the sections of the Cornell Notes templates
G APA 7 Referencing (R7a Applies disciplinary knowledge)	You have demonstrated understanding of how to use referencing effectively and your references are all in the correct APA 7 format.	You have included all the necessary elements in the references in the correct APA 7 format (i.e. there are no errors)	You have included all the necessary elements in the APA 7 references (but they may be in the wrong format/order) (i.e. there are minor errors)	You have omitted some relevant elements in the APA 7 references (i.e. there are major errors)	You have not provided APA 7 references and/or have not included relevant elements in them
<b>STUDENT SELF-ASSESSMENT</b>			<b>Pass</b>		<b>Fail</b>
H Have you self-assessed your assignment? (GTS 5.1a Self-assessment)			You have rated your assignment against ALL of the criteria	You have rated your assignment against at least half of the criteria	You have rated your assignment against fewer than half of the criteria
	Extended abstract <small>Generalise to new domain. Create, Formulate, Generate. Hypothesise, Reflect, Theorise.</small>	Relational <small>Integrated into a structure. Analyse, Apply, Argue. Compare/Contrast, Critique. Explain causes/Relate. Justify.</small>	Multi-structural <small>Several relevant independent aspects. Combine, Describe. Enumerate, List. Perform serial skills.</small>	Uni-structural <small>One relevant aspect. Identify, Name. Follow simple procedure</small>	Pre-structural <small>Incompetent. Misses the point. Does not answer what the assignment asks</small>

**Table 1.2: Illustration of progression from standard to badge**

Graduate Teaching Standard 1.1	Criterion A, linked to GTS 1.1a	Descriptor for Criterion A at Extended Abstract Level	Badge for demonstrating evidence of achieving GTS 1.1a at Extended Abstract Level
Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning.	How well have you explained how your readings inform our understanding of physical, social and/or intellectual development of students and how these may affect how they learn? (GTS 1.1.a)	You have demonstrated understanding of several different aspects of student development and how they are interrelated, and how they may affect learning and hence may influence pedagogical decision making	

## 1.4 Badge Development

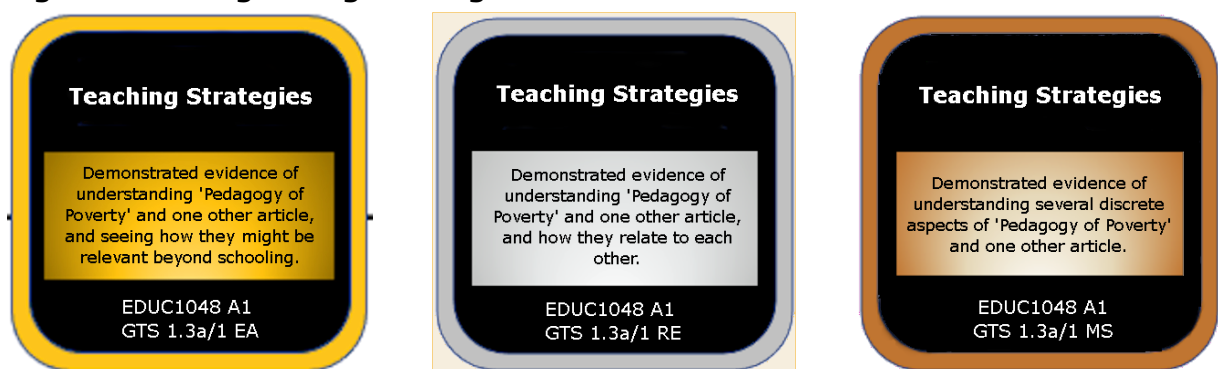
This section outlines the process of badge development, including badge design, badge types and badge levels.

### 1.4.1 Badge Design

Initial badge designs were created using GNU Image Manipulation Program (GIMP) software and contained elements such as:

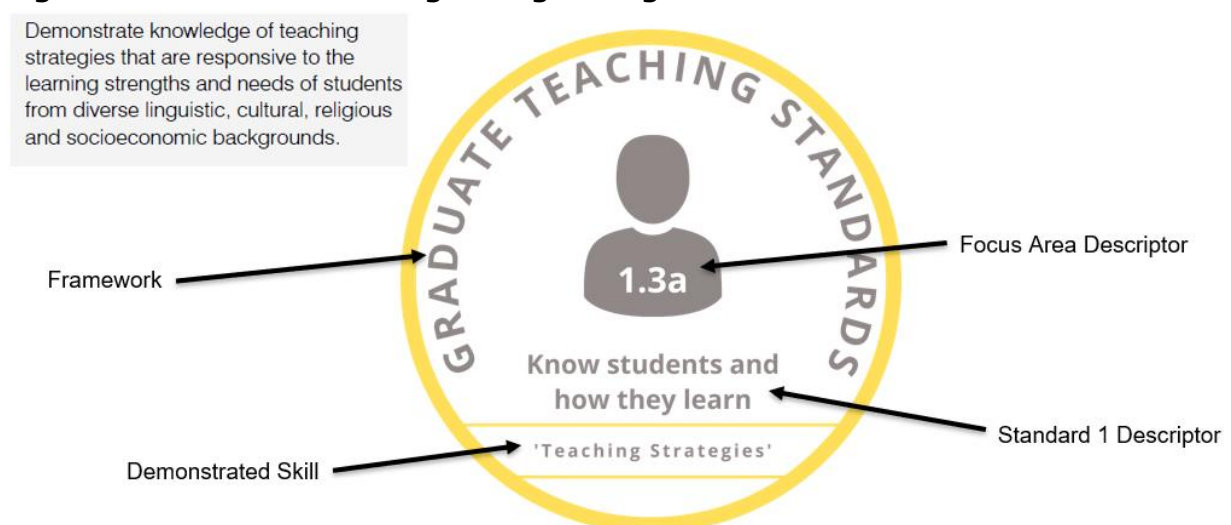
- the badge descriptor (taken from the assessment framework from which the badge was derived – in the example in Figure 1.5 this was GTS 1.3a, 'Teaching Strategies'),
- a description of the evidence required for the badge to be awarded,
- badge metadata;
- a colour (gold, silver or bronze) indicating the achievement level (Extended Abstract, Relational or Multi-structural).

**Figure 1.5: Badge designs using GIMP**



Following student feedback and a review of badge designs from other higher education institutions within Australia, the badge design was streamlined using the content creation tool Canva. The revised badges were circular instead of square, listed the framework around the upper edge, displayed the standard focus area within a related image in the centre, the standard descriptor underneath the image, and the demonstrated skill in the band below (Figure 1.6). The colour of the outer ring and the band indicated the achievement level.

**Figure 1.6: Streamlined badge design using Canva**



### 1.4.2 Badge Types

Following from the criteria established in Section 1.3 above, badges were developed from either the GTS or TCF. Figure 1.7 shows examples of the badges developed for Assignment 1.

Figure 1.7: Badge types for Assignment 1

## Graduate Teaching Standards

























## Competency Framework



Following from this, Figure 1.8 displays the badges associated with Assignments 1 to 3. Across all three assignments badges were further categorised into 'Academic Understanding', 'Academic Literacy' and 'Self Assessment' based on the demonstrated competency of each badge.



Figure 1.8: Badges across Assignments 1-3

	Academic Understanding						Academic Literacy			Self-assessment	
	1.1	1.3	6.1	I4	R6	R7	R10	C2	I2	P7	5.1
Assignment 1		 IntroToEd-A1 / GTS 1.3a	 IntroToEd-A1 / GTS 6.1a				 IntroToEd-A1 / TCF R10b	 IntroToEd-A1 / TCF C2a	 IntroToEd-A1 / TCF I2a	 IntroToEd-A1 / TCF P7a	 IntroToEd-A1 / GTS 5.1a
Assignment 2		 IntroToEd-A2 / GTS 1.3b			 IntroToEd-A2 / TCF R6b		 IntroToEd-A2 / TCF R10c	 IntroToEd-A2 / TCF C2a	 IntroToEd-A2 / TCF I2b	 IntroToEd-A2 / TCF P7a	 IntroToEd-A2 / GTS 5.1a
Assignment 3	 IntroToEd-A3 / GTS 1.1a		 IntroToEd-A3 / GTS 6.1b	 IntroToEd-A3 / TCF I4a		 IntroToEd-A3 / TCF R7a		 IntroToEd-A3 / TCF C2a	 IntroToEd-A3 / TCF C2b	 IntroToEd-A3 / TCF I2c	 IntroToEd-A3 / GTS 5.1a

GTS = Graduate Teaching Standards  
TCF = The Competency Framework

### 1.4.3 Badge Levels

Badges were divided into three levels of achievement as specified by the SOLO Taxonomy considered in Section 1.3.4 above. Gold correlated with Extended Abstract (roughly a high distinction), silver correlated with Relational (roughly credit to distinction) and bronze correlated with Multi-structural (roughly a pass).

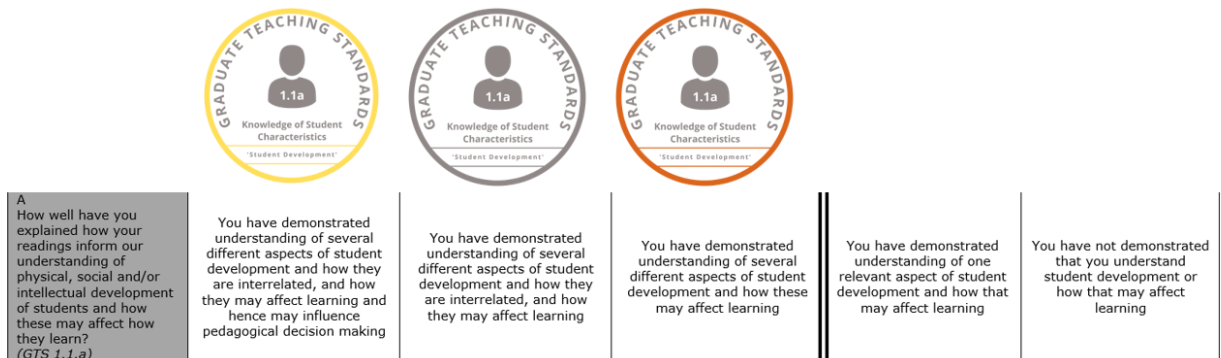
**Figure 1.9: Badge levels**



### 1.4.4 Badge Awarding

Following from the discussion around criteria in Section 1.3, a digital badge was awarded for demonstrating evidence against each performance descriptor within the rubric at Multi-structural level and above (for a technical discussion about how badge awarding functioned within existing IT systems please see section 2.2.6 of this report). Responses in the Uni-structural or Pre-structural category were not judged to have met the requirements for the task and as such no badge was awarded for performance in these bands. For example, Figure 1.10 below displays the badges that may be awarded for achievement against GTS 6.1a in Assignment 1 against the Assignment 1 rubric.

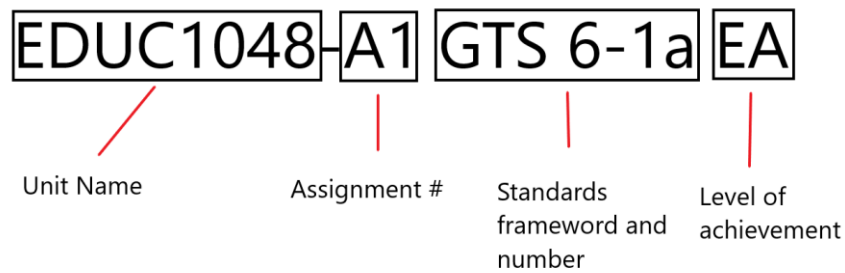
**Figure 1.10: Badges mapped against rubric**



## 1.5 Embedding Metadata

Badge naming conventions consisted of the course name (e.g. EDUC1048), assignment number (1, 2 or 3), standards framework (GTS or TCF), standard number, and achievement level (EA, RE or MS). Figure 1.11 illustrates the badge metadata for a gold badge awarded for meeting GTS 6.1a in Assignment 1 of EDUC1048.

**Figure 1.11: Badge naming protocol**




The letter after the standard number (i.e. the 'a' after 6.1) indicated how many times that standard had been assessed within the unit. For example, GTS 6.1a reflects the first time that standard is being assessed, GTS 6.1b reflects the second time etc..

## **1.6 Linking to Evidence**

To maximise a student's chance of success, specific badge descriptions accompanied relevant assessment tasks that made explicit the requirements for being awarded the applicable badge. These descriptions (represented in Table 1.3 below) were later accessible to students via the My eEquals badging platform, and included the name, image, description, earning criteria relative to specific assignment requirements, and details pertaining to the alignment framework.

The example in Table 1.3 details the description for the badge awarded for demonstrating evidence of Graduate Teaching Standard 1 in the third assignment in EDUC1048. The 'Earning Criteria' contains an explicit description of the evidence the student needs to provide to be awarded this badge at the gold level – in this case it involves creating a video and a written exposition that discuss issues relating to student development.

**Table 1.3: An example of badge metadata**

<b>Badge name</b>	EDUC1048-A3 / GTS 1.1a EA	
<b>Badge image</b>		1.1a
		Knowledge of Student Characteristics
		'Student development'
<b>Badge Description</b>	This badge indicates that you have demonstrated that you have met aspects of GTS 1.1 at an Extended Abstract level – <i>Knowledge and understanding of physical, social, and intellectual development and characteristics of students and how these may affect learning.</i>	
<b>Earning Criteria</b>	<p>To achieve this badge you have demonstrated understanding of several different aspects of student development and how they are interrelated, and how they may affect learning and hence may influence pedagogical decision making.</p> <p>You have done this in the context of studying EDUC1048: Becoming a Teacher, a Year 1 course in the four-year BEd programs at the University of Newcastle.</p> <p>This badge relates to Assignment 3 Parts 1 and 2, which ask you to:</p> <ul style="list-style-type: none"> <li>• Create a 4-minute video (+/- 10%) in which you explain to next year's incoming students what you have learnt on <u>IntroToEd</u> (this course). Assume that your video will be presented to incoming first year students to tell them what you think are the most important things you have learnt on this course.</li> <li>• Write an 800-word (+/- 10%) exposition that provides the academic underpinning for your video (in Part 1), that draws directly on the theoretical knowledge learnt throughout <u>IntroToEd</u>. Use Part 2 of the Assignment 3 Response document. You are expected to use in-text citations for each source that you refer to in this part of the assignment. Referenced do not count towards the word limit.</li> </ul>	
<b>Earning Criteria URL</b>	<a href="https://bit.ly/EDUC1048-Assignment-3">https://bit.ly/EDUC1048-Assignment-3</a>	
<b>Alignment name</b>	Graduate Teaching Standards	
<b>Alignment URL</b>	<a href="https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/graduate-teacher">https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/graduate-teacher</a>	
<b>Alignment Description</b>	The Graduate Teaching Standards show what an initial teacher trainee has to achieve in order to qualify as a teaching in New South Wales (Australia)	
<b>Alignment Framework</b>	The Australian Professional Standards for Teachers – Graduate level	

## 1.7 Research and Reflection

As can be seen in the discussion above, key reflections in Section 1 included developing a badge design format that was clear and appropriate, and deciding which global progression framework was the most suitable given the nature of the assessment tasks. The project team's views on these two challenges developed progressively over the early stages of the project in response to student feedback and engagement with relevant research.

Feedback from the students indicated that many of them were anxious about how well they had done on each assignment and found it difficult to ascertain this from the badges because there was not a clear alignment between the University Grading Scale and the SOLO taxonomy. It was also felt that there was a substantial jump in complexity between Relational and Extended Abstract within the SOLO taxonomy. This led to discussions about how to extend the SOLO taxonomy.

### **SOLO<sub>2.0</sub> (Adapted from Twining 2022)**







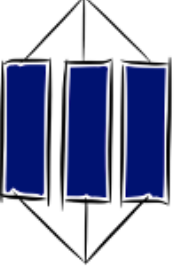
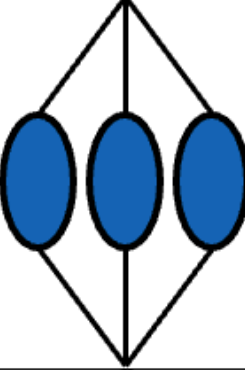
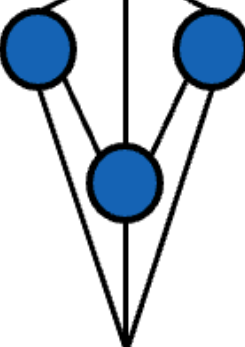
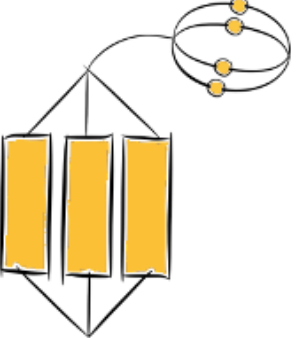
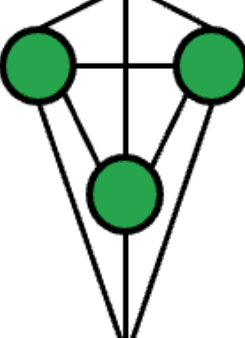
In the light of feedback from students about not understanding how the SOLO taxonomy aligned with the University grading scheme, and concerns about the size of the jump between Relational and Extended Abstract a series of discussions took place to revise the SOLO taxonomy in a way that would address both these problems.

The extent of the gap between Relational and Extended Abstract is hinted at by the label 'Extended Abstract', which suggests an intermediary stage (Abstract). John Biggs himself seems to acknowledge this problem by his observation that Relational can be sub-divided into 'bare Relational' and 'very rich Relational', but that there is a qualitative shift between 'very rich Relational' and Extended Abstract (Personal communication, 1st September 2022). However, sub-dividing Relational seems to miss the point. Relational describes a concrete model - a rich description of a specific instance of a phenomena - as such it is qualitatively similar to Uni- and Multi-structural. The major jump is from such a concrete model - a description of a specific instance - to an abstract model that can be generalised to different domains (Extended Abstract).

Logic suggests that an intermediary stage exists, in which one has a conceptual model that can be applied to other instances of the phenomena within the same domain (Abstract), but which cannot or in practice has not been generalised to different domains (Extended Abstract). Thus, SOLO<sub>2.0</sub> adds in another classification between Relational and Extended Abstract (see Figure 1.12. which shows the SOLO taxonomy (on the left), and the revised version (SOLO<sub>2.0</sub>) on the right).

The new category of Abstract requires that the concrete model provided in Relational has been analysed to provide a conceptual model that includes key relationships between the generalised aspects of the model. Thus, in moving from Relational to Abstract one moves from descriptions of several relevant aspects of the specific instance to a conceptual model that identifies key relationships and is applied to other instances of the phenomena within the same domain. Extended Abstract, as its name suggests, extends the Abstract categorisation by providing a generalised conceptual model that fully explains the phenomenon and is applied in other domains.

**Figure 1.12 Comparing SOLO with SOLO 2.0 (Twining, 2022)**

	<b>SOLO</b>		<b>SOLO<sub>2.0</sub></b>	
<p><b>Pre-structural</b> Incompetent. <i>Misses the point. Does not do what the assignment asks.</i></p>				<p><b>Pre-structural</b> Incompetent. <i>Misses the point. Does not do what the assignment asks.</i></p>
<p><b>Uni-structural</b> One relevant aspect. <i>Identify. Name. Follow simple procedure.</i></p>				<p><b>Uni-structural</b> One relevant aspect. <i>Identify. Name. Follow simple procedure.</i></p>
<p><b>Multi-structural</b> Several relevant independent aspects. <i>Combine. Describe. Enumerate. List. Perform serial skills.</i></p>				<p><b>Multi-structural</b> Several relevant independent aspects. <i>Combine. Describe. Enumerate. List. Perform serial skills.</i></p>
<p><b>Relational</b> Integrated into a structure. <i>Analyse. Apply. Argue. Compare/Contrast. Criticism. Explain causes. Relate. Justify.</i></p>				<p><b>Relational</b> Concrete model which describes several relevant aspects and some of the key relationships between them. <i>Describe. Relate. Explain. Argue. Justify.</i></p>
				<p><b>Abstract</b> Conceptual model which explains key relationships between key aspects and is applied to other instances within the same domain. <i>Compare/Contrast. Analyse. Formulate. Apply. Reflect. Criticise.</i></p>
<p><b>Extended Abstract</b> Generalise to new domain. <i>Create. Formulate. Generate. Hypothesise. Reflect. Theorise.</i></p>				<p><b>Extended Abstract</b> A generalised conceptual model which explains relationships between aspects and is applied to other domains. <i>Create. Generate. Hypothesise. Synthesise. Theorise.</i></p>

Adding in the Abstract category also addressed the problem of SOLO not aligning clearly with the University grading scale, which has five grade bands - Fail, Pass, Credit,

Distinction, and Higher Distinction. Taking Multi-structural to be the pass grade then SOLO has two further bands (Relational and Extended Abstract), whilst most other grading systems have three additional bands (Credit, Distinction, and Higher Distinction). The addition of the Abstract band in SOLO<sub>2.0</sub> overcomes this problem (see Table 1.4).

**Table 1.4 Mapping SOLO and SOLO<sub>2.0</sub> to the University grading scheme**

<b>University Grading Scheme</b>	<b>SOLO</b>	<b>SOLO<sub>2.0</sub></b>
Fail	Pre-structural Uni-structural	Pre-structural Uni-structural
Pass	Multi-structural	Multi-structural
Credit	Relational	Relational
Distinction		Abstract
Higher Distinction	Extended Abstract	Extended Abstract

Thus we propose that SOLO<sub>2.0</sub> (Twining, 2022) is a logical and valuable extension to the original SOLO taxonomy.

## 2 Badge System Platform

Section two of this report deals with the mechanisms for creating and awarding badges, including systems, people and processes.

### 2.1 Systems

When thinking about digital badges one needs to consider the badging system and how it integrates with your institutional Learning Management System (LMS) and other University systems.

#### 2.1.1 University systems

The University has an established set of systems for administration and teaching, as well as an extensive infrastructure to maintain and protect its systems and data. Any new system (e.g. a badging system) has to be approved by the University IT team before it can be integrated as part of the overall University systems. This is primarily to ensure that it does not pose a security risk to the existing systems and data. Any changes to the University systems require extensive business appraisal and technical testing, which are time consuming processes.

All of the University's qualification systems are geared around the University Grading Scheme (see Table 2.1), i.e. the systems presumes that student achievement would be represented by marks, which could be converted to grades.

**Table 2.1 The University's Grading Scheme**

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

#### 2.1.2 Badging systems

In order to issue badges you need a system that allows you to create badges and issue them to students, and 'backpacks' that allows students to view their badges and share them with other people (e.g. potential employers).



There are a range of different badging systems, with different pricing models. Three such systems were considered as part of this project, each of which is briefly described below. These badging systems were considered because they were integrated with the University LMS (Canvas) or were already in use by the University (in the case of My eEquals). However, the University had not used any of these systems to issue digital badges previously and had not approved the use of Credly or Badgr as stand-alone systems (only as integrated within Canvas).

### **Credly**

<https://info.credly.com/>

Credly, or more specifically Credly Acclaim, is a commercial digital badging platform. Whilst this appears to be one of the industry leading platforms, it does not offer a free entry level option for badge issuers.

It does provide useful functionality, such as importing data that enables you to issue multiple badges to multiple people at one time. At the time of writing, Credly was one of two badging systems that was integrated with Canvas (see under Learning Management Systems below). Credly was taken over by Pearson in 2022.

### **Badgr**

<https://info.badgr.com/>

Badgr started out as an open-source platform in 2015, designed by Concentric Sky who were a lead author of the Open Badges 2.0 specification. When Mozilla, who were originally funded to develop the Open Badges standard, closed in 2018 they identified Badgr as the replacement system for both issuing and storing digital badges. In keeping with its open-source roots Badgr continued to provide a free entry level system, which provides basic badge creation and issuing functionality alongside user 'backpacks'. It also provides Badgr Pro, a paid for service, which has enhanced features, such as bulk awarding of badges and the ability to develop pathways (e.g. If you have Badge x and Badge y you automatically get Badge z).

In 2022 Concentric Sky was taken over by Canvas (see under Learning Management Systems below).

### **My eEquals**

<https://www.myequals.edu.au/>

My eEquals is a system that is used by higher education institutions in Australia and New Zealand to issue verified qualification records to students. Students can then share their verified qualification record with potential employers. My eEquals incorporates the ability to handle badges, based on the free version of Badgr. At the time of writing the creation, issuing, and viewing of badges is a free service within My eEquals. At the start of this project the University practice was to only provide students with access to My eEquals when they graduate (or complete a short course).

## **2.1.3 Learning Management System**

There are a large number of Learning Management Systems (LMSs). This report focuses on Canvas as that was the system in use at the university where this project was carried out.

Canvas is integrated with two digital badging systems: Credly and Badgr. Given that Instructure, who own Canvas, purchased Concentric Sky, who own Badgr, it seems likely that there will be increased integration between Badgr and Canvas in the future.

At present Canvas can issue badges using either Credly or Badgr. The badges are then available to view in Canvas (or directly in Credly or Badgr depending upon which system was used to create them).

### Technical Capacity

Within Canvas badges can only be issued when a student has completed a module – a set of materials. This may include having achieved a certain threshold score on an assessment. Canvas cannot currently issue a badge based on a student’s performance on a particular criterion within a rubric. However, it does provide a set of features that offer the potential to issue badges based on students’ performance on discrete criteria within a rubric. This consists of two elements:

- Outcomes
- The Learning Mastery Gradebook

**Outcomes** are criteria linked to a framework or set of standards. They can be set up at different levels within Canvas, which allows (a) the same Outcome to be reused across courses and assignments and (b) for progress against the Outcomes to be cumulatively tracked across courses and assignments. Figure 2.1 illustrates a possible Outcome.

**Figure 2.1 An example of an Outcome using the SOLO Taxonomy**

















Name: TCF R10a Critical thinking

How well have you set out and justified your argument?

Extended abstract	Relational	Multi-structural	Uni-structural	Pre-structural
In answering the focus question, you have made one or more claims informed by an educational concept or theory and developed a valid argument to justify the claim(s). You have set out objections and counterarguments to the claim(s) and provided responses to those objections and counterarguments	You have made one or more claims and developed a valid argument to justify the claim(s). You have set out objections and counterarguments to the claim(s) and provided responses to those objections and counterarguments	You have made two or more claims and have provided a range of reasons to support the claims	You have made a claim and have provided a reason to support the claim	You have made one or more claims, but have not provided reasons to support the claim(s)
4	3	2	1	0

**The Learning Mastery Gradebook** provides a record of how students are performing cumulatively against the Outcomes. Figure 2.2 illustrates the data provided in the Learning Mastery Gradebook.

**Figure 2.2 An illustration of the data provided in the Learning Mastery Gradebook**

Students	Outcomes			
	Outcome 1	Outcome 2	Outcome 3	Etc.
<b>Student 1</b>	Extended abstract 	Relational 	Extended abstract 	Multi-structural 
<b>Student 2</b>	Pre-structural 	Uni-structural 	Mutli-structural 	Mutli-structural 
<b>Student 3</b>	Mutli-structural 	Relational 	Mutli-structural 	Relational 
<b>Etc.</b>	Relational 	Extended abstract 	Mutli-structural 	Pre-structural 

Data can be exported from the Learning Mastery Gradebook within a Course using the standard Export Report feature, or by a System Administrator using the 'Outcome Results' report. In both cases the data is exported as a csv file. This data can be used to generate badges outside of Canvas (see Section 2.2.6 Awarding badges). Each of these reports provides different data, structured in different ways. These differences are explained in Section 2.2.6 Awarding Badges.

At present, there are limitations in Canvas around the provision of feedback on assignments. You can set up assignments so that 'the grade' is displayed as: Percentage; Complete/Incomplete; Points; Letter grade; GPA scale; or Not graded. You can also provide written feedback on the assignment itself, highlight how the assignment aligns against the rubric (with criterion specific comments), and provide overarching comments. However, you have to release all of the feedback at the same time. So, for example, you cannot release the written feedback on an assignment and its alignment against the rubric without also releasing 'the grade'. Mechanisms for getting around these limitations are explained in the sections below.

### 2.1.4 Intermediary System

A number of companies offer services that will take data from your LMS and manipulate it in order to assign badges to students, with the badges then being issued within another badging system (e.g. Badgr). Two such intermediary systems were explored.

#### Credentialate

<https://www.edalex.com/credentialate>

Credentialate aims to aggregate performance data for learners and award digital badges. It integrates with a range of LMS systems. Unlike some of the other providers Credentialate seem keen to work intensively with potential clients to set up a proof of concept pilot system to ensure that their system can meet the client's needs. This includes carrying out customisation and extension of the existing Credentialate tools when necessary. See Section 2.2.10 for more detail on a pilot use of Credentialate's tools.

#### Accredible

<https://www.accredibile.com/>

Accredible is another provider whose tools integrate with a range of LMSs, including Canvas. They claim to be able to issue badges in Canvas but, like Canvas, can only issue badges based on a student's final score/grade, time spent on an activity, or if they have completed a course/module. They cannot issue badges based on Outcomes or the Learning Mastery Gradebook in Canvas. As such they didn't appear to provide the additional badge issuing functionality that this pilot required.

## **2.2 People and processes**

Prior to this project the University had never designed or awarded any digital badges.

### **2.2.1 Key stakeholders**

In order to implement the use of digital badges as part of course provision a wide range of players had to support (or at least approve) the project. Key amongst these were:

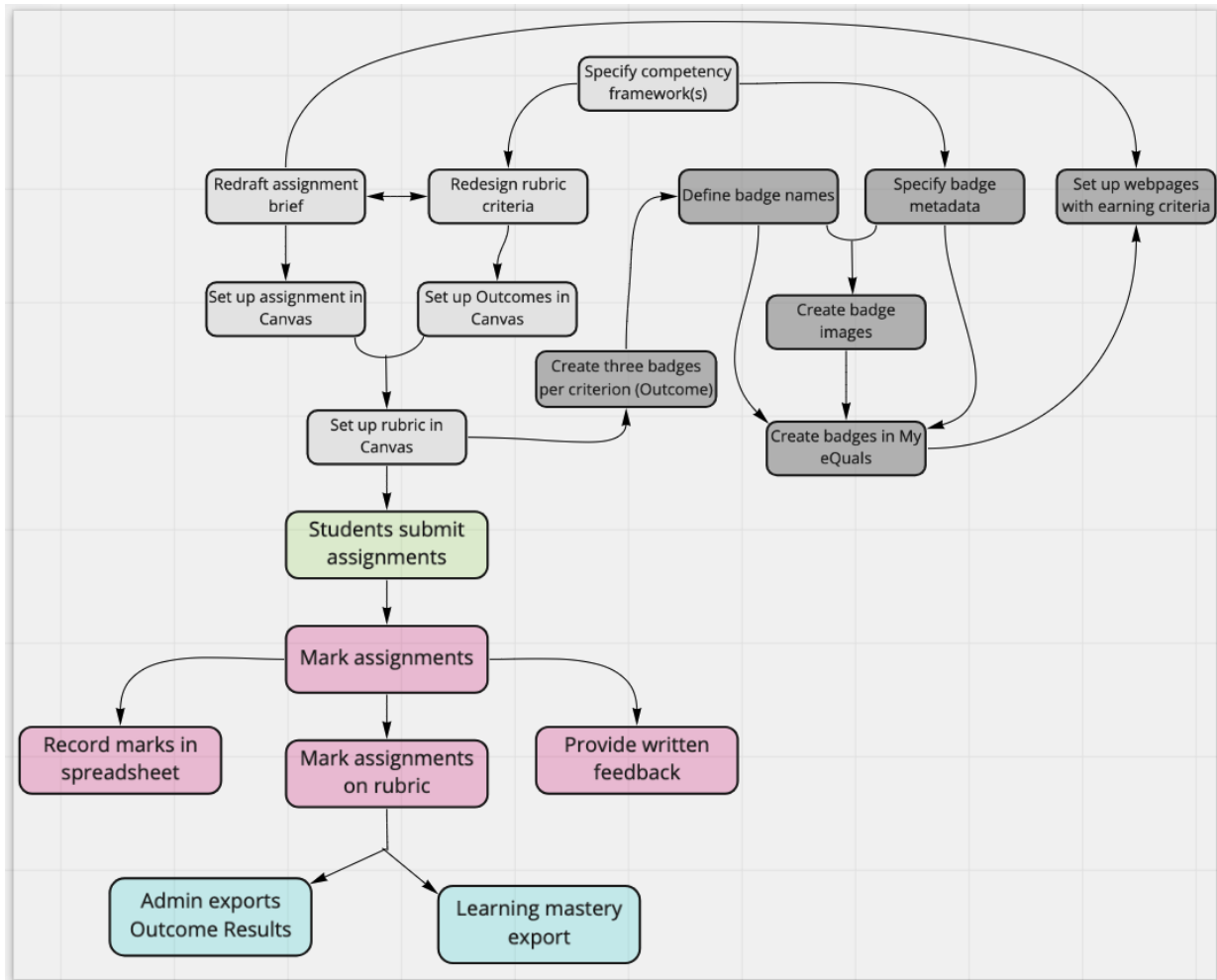
- The Head of School – to provide the authority and political support to make changes to the assessment processes and systems needed to enable them.
- The Head of Teaching and Innovation – to help establish University policies and strategy related to digital badges
- The IT Business Manager – to approve use of new systems, or for new uses of existing systems.
- The LMS Manager – to provide access to functionality within Canvas (e.g. use of Outcomes, The Learning Mastery Gradebook, and some Admin rights)
- The person overseeing My eQuals who controls access to the system for staff and students
- The marketing team who oversees the University brand guidelines as their approval would be required for any badge designs incorporating the University logo/name
- One of the University's graphic designers to create the official University approved badge design / template
- The university Ethics committee, which approved the research
- Colleagues within the School whose programs/courses/assessments were going to utilise digital badges – including the Deputy Head of School for Teaching, Program Convenors, Course Coordinators, academics, and casual tutors and markers

The other key stakeholders were the students who were going to be provided with digital badges instead of grades/marks.

### **2.2.2 Overview of processes**

Figure 2.3 Shows the key steps required to redesign assignments (light grey), create badges (dark grey), mark assignments (pink), and export the data needed to create badges (blue).

**Figure 2.3 Overview of setting up the assignments and badges and marking**



### 2.2.3 Setting up the assignments

As explained in Section 1.3, the decision was made to issue badges linked to each criterion within the rubrics for the assignments on the courses involved in Phases 1 to 4 of the project (i.e. EDUC1048 and IntroToEd). Each criterion within the rubric would be mapped to the categories within the SOLO taxonomy.

#### Redesigning the rubrics

The process of redesigning the rubrics was explained in Section 1.3.4.

Converting the original rubrics, which were based on the University Grading Scheme (Table 2.1), involved two key stages:

- Reviewing the original criteria to ensure that they included ones directly linked to the Graduate Teaching Standards
- Adapting the rubric for each criterion so that it mapped to the categories in the SOLO taxonomy, but still showed the marks and grades
- Creating a version of the rubric for students that did not show marks or grades

The process enhanced the rubric in two ways:

- It made sure that the assignment actually assessed the students against appropriate elements of the Graduate Teaching Standards – and thus met the accreditation requirements more explicitly
- By aligning the criteria with the SOLO taxonomy, which show progression in terms of the sophistication of one’s mental model of the phenomena under consideration,

it made the logical progression between levels within each criterion explicit – and hence less arbitrary.

### **Setting up the assignments in Canvas**

For this pilot study our intention was to provide students with feedback on their assignments in the form of (a) digital badges and (b) written comments from the marker, on the script, against the rubric, and an overall comment. We did not want to provide students with marks as the literature indicates that if provided with a mark students tend to ignore the other feedback.

Due to the limitations of Canvas noted above the assignments had to be set up as Complete/Incomplete rather than having points, marks or grades. This meant that when the feedback was released to students they would not see any marks.

#### **2.2.4 Setting up the badges**

Once badges had been designed (see Section 1.4) they had to be implemented in the badging platform (see Section 2.1.2). As the University had an account with My eQuals but not with Credly or Badgr it was decided that My eQuals would be used to create and issue badges.

The process of creating the badges involves filling in an online form in My eQuals that provides all of the metadata and badge images for each badge (see Table 1.3 in Section 1.6). Thus, for example, for the initial pilot of EDUC1048 22 badges had to be created in My eQuals.

#### **2.2.5 Marking assignments**

The University requires marks when recording student performance at the end of each course. As the assignments had to be set up as Complete/Incomplete this meant that when marking assignments the marks had to be recorded in a spreadsheet outside Canvas rather than within the grading tools within Canvas. This potentially raises issues about data security (e.g. having personal data recorded in a spreadsheet on an individual marker's computer). It also meant that this core data was not logged in an official University system at the point where the assignments were being marked. It created extra work for the markers, and increased the risk of human error.

In order to overcome these potential problems with human markers recording marks in a spreadsheet a 'Mark generation spreadsheet' was created that would automatically assign marks to assignments based on the digital badges that had been allocated during the marking process. This process is explained in Section 2.2.7 below.

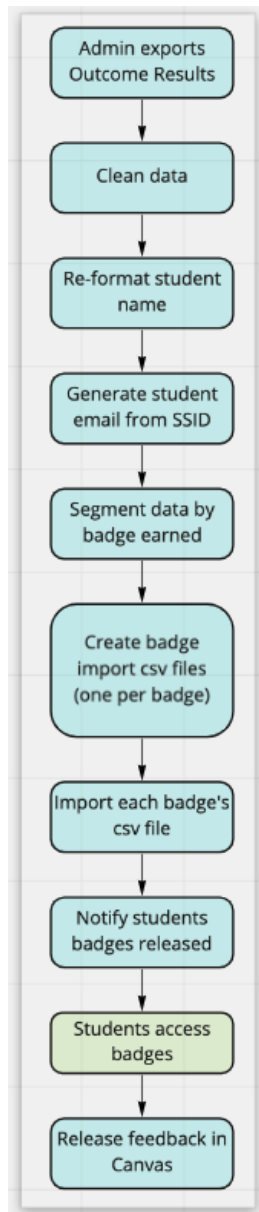
#### **2.2.6 Awarding badges**

##### **Bulk import**

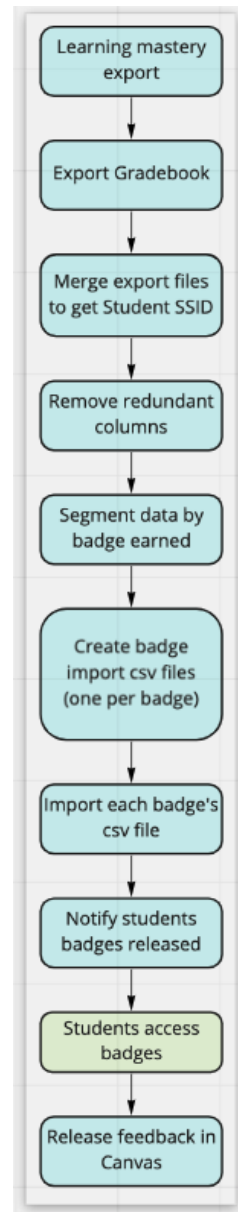
Figures 2.4 And 2.5 provide overviews of the two different approaches to exporting data from Canvas and processing it to generate badges in My eQuals.

In both cases the data that had been exported was not in the required format in order to carry out the bulk imports to issue badges. Thus, the exported data had to be manipulated in Excel so that it contained the necessary information, this then had to be segmented into a separate csv file for each badge that was going to be awarded. These csv files needed to include the name of the person getting the badge and their email address. This is illustrated using the Admin Outcomes Results Report as that was the easiest export file to use.

**Figure 2.4 Using the Admin Outcome Results Report**



**Figure 2.5 Using the Mastery Gradebook Export**



The Admin Outcomes Results Report included all of the data for every student against every outcome on every assignment on every course. It included the following 30 fields:

*student name; student id; student sis id; assessment title; assessment id; assessment type; submission date; submission score; learning outcome name; learning outcome id; Attempt; outcome score; assessment question; assessment question id; course name; course id; course sis id; section name; section id; section sis id; assignment url; learning outcome friendly name; learning outcome points possible; learning outcome mastery score; learning outcome mastered; learning outcome rating; learning outcome rating points; account id; account name; enrolment state.*

Thus the data had to be narrowed down so it only included the rows relating to the particular assignment for the particular course. This data then had to be manipulated to

put the student name in the correct format for the badge import files, and to create the email address from the student sis id.

The data from the Admin Outcomes Results Report was imported into Sheet 1 of an Excel Workbook. Sheet 2 of the workbook copied across the following fields: Name; SSID; Course; Assignment; Date; Outcome; Result. It included two additional fields which used formulae to convert the existing data into the required format as follows:

- *the email address was generated by concatenating the SSID with the tenant for the email address (i.e. the part after the @ sign) using the formula =C2&"@uon.edu.au" where C was the row containing the data*
- *the Student name, which was in the format 'fname, cnames' was converted into the format 'cname fname' using the following formula =RIGHT(TRIM(C2),LEN(TRIM(C2))-SEARCH(" ", TRIM(C2)))&" "&LEFT(TRIM(C2), SEARCH(" ", TRIM(C2))-1) where C was the row containing the data*

The contents of the second sheet were then copied and pasted as values into a third worksheet to remove the formulae.

Where a marker had failed to highlight how the assignment aligned with the rubric when marking, the data exported from Canvas was incorrect. It also soon became clear that the data exported in the Admin Outcome Results Report needed to be cleaned up to remove duplicate entries for some students. It is not clear what causes these duplicate entries, but appears to be related to assignments being remarked, or the original mark being submitted more than once (perhaps accidentally). Removing duplicates proved to be a time-consuming manual process.

Having cleaned up the data to remove duplicates, filters were then used on this third worksheet to select just the rows that applied to the one badge that was going to be issued next. The names and email addresses were then copied into a separate badge import csv file to be imported into My eEquals. The import option was then selected in My eEquals for the specific badge that was going to be issued to multiple students, and the badge import csv file was imported. Where a badge was being issued to several hundred students My eEquals generated an error message saying that the import had not been successful. However, that was inaccurate, as if you waited a few minutes then all of the students listed in the import file were issued with that badge.

The process of using the filters to select the data relating to one specific badge, and then copying that into a separate csv file and then importing it into My eEquals had to be repeated individually for each badge. Thus, for EDUC1048 Assignment 1 this process had to be repeated 22 times.

The process of cleaning up the data and exporting it from Canvas, and then creating the badges in My eEquals was time consuming. For example, for one assignment that had 21 possible badges and around 800 students it took roughly six hours to complete the process. The majority of that time was spent cleaning up the data and getting it into the correct format to import it into My eEquals.

### **Directly issuing badges**

Where a small number of badges needed to be issued, it was quicker to do that individually within My eEquals rather than using the bulk import approach. This happened where an assignment was submitted late and had not been marked prior to the release date for the badges.



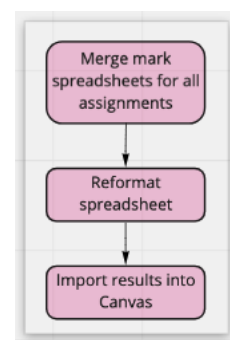
## 2.2.7 Autogenerating marks

One of the challenges identified previously was that markers had to manually record the marks for each assignment in a spreadsheet (see Section 2.2.5). This created extra work for the markers, and also increased the risk of human error which might potentially lead to a student being awarded the wrong outcome. In order to explore ways to overcome this problem the research team trialled using an Excel spreadsheet to automatically generate marks based on the badges that a student was awarded (or more accurately, based on how their assignment had been graded against the outcomes in the rubric). The autogenerated results were then compared with the human markers' results to see whether they were sufficiently closely aligned. For the small number of assignments on EDUC1048 the results were very positive (the autogenerated mark and human marks were within one mark of each other). For the larger cohort of students on IntroToEd Assignment 1 there were more disparities, and in particular the human markers tended to fail fewer students and award more higher distinctions than the autogenerating spreadsheet.

The addition of another category in SOLO<sub>2.0</sub> should reduce the discrepancies between human markers and the autogenerated marks, although it will not address the differences at the top and bottom end of the marking bands.

## 2.2.8 Uploading marks

At the end of the course marks had to be imported into Canvas so that they could then be recorded in the University's student data management systems. For this to happen the data needed to be formatted in the correct structure for importing. This again required the manual merging of data from the Excel spreadsheets used to record assignment scores, and then reformatting the data so that it could be imported back into Canvas. Whilst this was a simpler process than that involved in awarding badges, it still increased the staff workload and increased the risk of human error resulting in students being given the wrong outcome.



## 2.2.9 Faculty workload

Inevitably, the process of designing, creating and issuing badges added to staff workload. Some of this work, such as the badge design and creation, would be a one-off activity where a course was being re-run on multiple occasions. However, the issuing of badges and then having to import marks back into Canvas would have to be repeated for each run of the course. This looks impractical both in terms of staff time and the increased risk of human error resulting in students being given incorrect grades.

## 2.2.10 Roles (& Outsourcing)

Once it became clear that the manual processing of data to extract it from Canvas, convert it into the required format and then issue badges in My eQuals was not practical on an ongoing basis it was decided to try to automate the process. This led to a collaboration with Credentialate who specialise in extracting data from LMSs and using it to issue digital badges using a range of different systems, including Badgr and Credly.

As Credentialate was not a University approved provider a pilot was set up that used fabricated data. Credentialate demonstrated that they could take the (fabricated) export data from Canvas, clean it up and allocate badges and award them in Badgr. However, they were unable to issue badges in Canvas or My eQuals. Thus, in order to use the Credentialate service the University would have to have approved Credentialate as a provider and set up a University Badgr account that could be used to issue badges.

In the light of the research findings (see the main report) it was decided that the benefits of issuing Level 3 badges (i.e. badges at the level of a criterion within a rubric on an assignment) did not justify the downsides of doing so. This led to a change in the focus of the pilot study with Credentialate – to look at the automation of issuing Level 1 and 2 badges which is explained in Implementation Report B.

## **2.3 Research and Reflection**

The functionality to issue badges in Canvas based on performance against an assignment rubric does not exist. Whilst there are work arounds that enable this to happen they involve considerable manual processing of data which is both time consuming and increased the risk of human error. Given the way in which Canvas provides feedback to students against the rubric it seems that the badges do not add sufficient extra value to justify the extra work involved – this was explored towards the end of Phase 4 (for IntroToEd Assignment 3) and in Phase 6 (for EDUC1038) and is explained in the main project report.

### **3 Badge Program Implementation**

This section of the report details the process of implementing the use of digital badges which was discussed in sections one and two. There were two elements to the implementation that were significant across the categories described here:

- A. The incorporation of badges instead of marks on the courses involved in the pilot – this is primarily addressed in Section 2 of this report.
- B. Research on the impact of A on systems, processes and people – which is primarily addressed in Section 3 of the report.

#### **3.1 Recruitment: Communicating Purpose and Value**

Communicating the purpose and value of badging was an important aspect of both enhancing the benefit and utility of badges for all students within the course, as well as maximising the number of participants willing to take part in the research. This was achieved through adopting a direct recruitment approach where possible (with the Research Fellow attending 26 out of a possible 34 tutorials) and the use of a recruitment PowerPoint that explained the rationale and purpose of the project. Being concerned with communicating the purpose, value and benefits of using badges instead of grades in higher education. The recruitment presentation was viewed as also being beneficial to students who chose not to participate in the formal research. The recruitment protocol was developed to minimise any real or perceived coercion and maintain student anonymity during the recruitment process.

Initial recruitment for the small pilot was considered successful, with four of the six students in the cohort completing consent forms. However, only one of the four participants completing the three surveys and participating in an interview.

Recruitment in the large pilot was also considered successful, with 249 students signing consent forms out of a total of 860 students within the cohort.

Only 2 students and one tutor fully engaged with the research from EDUC1038 in Phase 6.

#### **3.2 Proceed in phases**

As per the research schedule (Table 3.1 below) the research into developing and implementing digital badges in EDUC1048 proceeded in a number of phases. Phase 1 was concerned with assessment development and badge development, including assessment frameworks, criteria, badge design, metadata badging platforms and awarding protocols (as detailed in Sections 1 and 2 of this report). Phase 2 was focussed on trialling these designs and processes with a small number of participants in the small pilot. Phase 3 involved drawing upon data collected from Phase 2, including researcher and student feedback, and refining the assignment rubrics, the badges and the awarding processes. Phase 4 involved trialling the revised badges and processes with a much larger cohort of students in the same unit. In Phase 4 a problem with issuing badges for the third assignment arose. This meant that only one badge was issued for Assignment 3, and students were told that due to technical difficulties we had not issued badges for Assignment 3. Thus, for the final assignment in Phase 4 students were given feedback against the rubric and on their assignment itself, but were not given a mark or badges.

In the light of the findings from Phase 4 the subsequent two phases were redesigned in order to extend our understanding of the value of Level 3 badges relative to providing feedback on the assignment rubrics and to explore the use of Level 1 and 2 badges.

**Table 3.1: Project Phases**

<b>Nov-Dec 2021 - Phase 1:</b>
<ul style="list-style-type: none"> <li>• Obtain human research ethics approval.</li> <li>• Revise the assessments and rubrics on one small first year cohort course (EDUC1048: Becoming a Teacher) to incorporate awarding of badges.</li> <li>• Implement the revised course materials in learning management system (Canvas) and Badgr, exploring implications for the institution's systems, policies and processes.</li> </ul>
<b>Jan-Feb 2022 - Phase 2:</b>
<ul style="list-style-type: none"> <li>• Transact EDUC1048 (full time, compressed delivery, over four weeks) with a small cohort of students, one lecturer and one tutor.</li> <li>• Collect/analyse data on any impacts of the introduction of digital badges (Questionnaires, student focus group interview, staff journals/notes, staff interviews)</li> </ul>
<b>Feb 2022 - Phase 3:</b>
<ul style="list-style-type: none"> <li>• Revise assessments and rubrics for a large first year cohort course (IntroToEd), which has the same learning outcomes as EDUC1048 but involves over 1000 students, two lecturers and approximately 20 tutors.</li> <li>• Implement the revised course materials in Canvas and Badgr.</li> <li>• Provide professional development for the tutors.</li> <li>• Collect/analyse data on any impacts of implementation</li> </ul>
<b>Feb-Aug 2022 - Phase 4:</b>
<ul style="list-style-type: none"> <li>• Transact IntroToEd (10 hours study time per week over 13 weeks).</li> <li>• Collect data on any impacts of implementation. (Questionnaires, student focus group interviews, staff journals/notes, staff interviews).</li> <li>• Disseminate findings (e.g. web pages, blog posts, report, seminar/workshop).</li> </ul>
<b>Mar-Aug 2022 – Modified Phase 5:</b>
<ul style="list-style-type: none"> <li>• Recruit one course (EDUC1038) to explore the impact of withholding assignment marks/grades and badges, but providing feedback on the assignment rubric (Included in Implementation Report A).</li> <li>• Develop Level 1 and 2 badges for the NTPA, which is the capstone assessment of students' ability to apply a subset of the Graduate Teaching Standards in their final school placement (See Implementation Report B).</li> <li>• Get agreement from the staff involved in the assessment of the NTPA that we could issue Level 1 and 2 NTPA badges (See Implementation Report B).</li> <li>• Get ethical clearance to research student and potential employers' perceptions of the NTPA badges (See Implementation Report B).</li> </ul>
<b>Jul-Oct 2022 – Modified Phase 6:</b>
<ul style="list-style-type: none"> <li>• Carry out the research on EDUC1038 for the first two assignments. (Included in Implementation Report A).</li> <li>• Issue badges to students as they complete the NTPA and follow up with the students to explore their perceptions of the value of the badges, with a particular focus on their use in applying for jobs (See Implementation Report B).</li> <li>• Provide NCFE with material to go on their website for people who want to drill down into the details of the research</li> </ul>

The development and issuing of NTPA badges in Phases 5 and 6 are reported in Implementation Report B.

### **3.3 Education staff for Consistency**

For the Small Pilot the course coordinator acted as the tutor for the course. He was also the project lead, and so no additional professional development was needed.

For the Large Pilot two members of the project team were the course coordinators. There were 17 other staff working on the course, as tutors and/or markers. Professional development was provided for all 17 staff (tutors and markers). This consisted of an initial briefing meeting in which the use of digital badges was explained as part of the induction to the course. This was followed up by a meeting in which staff were shown how to mark the assignments in Canvas, providing written feedback, indicating how the assignment aligned with each of the criteria in the rubric, and recording marks in a separate spreadsheet. Before each assignment there was an additional briefing meeting to talk through the criteria – and compare the marks that staff had allocated on a number of assignments that all of them had marked prior to the briefing.

For EDUC1038 in Phase 6 the course coordinator had been a tutor on IntroToEd and the two EDUC1038 tutors had also both taught on IntroToEd in Phase 4.

### **3.4 Create Buy-in and Improve Participant Retention**

Student (and research participant) buy-in was an important focus of the research, as motivated students were more likely to benefit from the implementation of badges, and motivated participants were more likely to complete all the required surveys and the focus group interview. Reducing participant attrition was also a key focus given the 75% attrition rate in the small pilot. The following section details the strategies and processes undertaken in both the small and large pilot (Phases 2, 4 and 6) to promote student buy-in in the digital badges research. Initial recruitment strategies (which certainly impacted upon buy-in) will not be discussed here as they were discussed earlier in section 3.1.

A number of steps were taken in this regard across both Phase 2 (the small pilot), Phase 4 (the large pilot) and Phase 6 (Withholding marks but not awarding badges on EDUC1038).

#### **3.4.1 Phase 2: Small Pilot (EDUC1048)**

EDUC1048 is the core education course for Primary and Early Childhood pre-service teachers. They have to complete it before they can progress to Year 2 of the program. This run of the course took place in the Summer Term (January/February 2022). It was provided for students who for any reason did not complete the course in the first semester (which ran from February to June in the previous year). The Summer run of the course is compressed down from the normal 13 weeks into four weeks. The total number of study hours remains the same (130 hours over four weeks).

Historically the Summer course enrolls about 20 students. For the small pilot 12 students enrolled. However, only seven of them actually engaged with the course, and only five students completed the whole course. These figures reflect the challenges of trying to transact the course during a period when COVID case numbers were very high and self-isolation was required for suspected cases.























During the small pilot a number of discussions took place with the small cohort both before and after receiving badges. A preliminary discussion led by the course coordinator took place on the 10<sup>th</sup> of January 2022 where the project was introduced to the cohort – the limitations of using marks and benefits of using badges was a key feature of the discussion, as were the features of the SOLO taxonomy and the specific assignment criteria (as detailed in Section 1.3).

The following day (11-Jan-22) the RF explained the research project to the cohort in more detail, including a PowerPoint presentation (see Section 3.1 for details on recruitment).

Following receiving badges for their first assignment, the course coordinator held a Q&A session (18-Jan-2022) with students to gauge their reaction. Initial responses were not enthusiastic, and participant feedback indicated that they would rather receive all badges simultaneously and with more contextual information – ideally embedded within the rubric. Feedback from students, including informal feedback as well as survey and interview results, indicated that they were also uncertain as to their specific level of performance on the task.

In response to this the second assignment was followed by another Q&A session (31-Jan-22) with the course coordinator where badges were interpreted and explained. Student responses to Survey 2 indicated that this support was helpful, but that a grade was still desired: “Peter explaining it in the very next class was super informative but I still think an overall grade would allow us to know whether we will pass or fail the course rather than relying on badges for feedback”. Following from the comment above, in the latter stages of the unit a key concern for students became knowing whether they would pass the course as a whole when they did not have any grades to reference, though students were told that if they achieved each of the badges for Academic Understanding they would pass the assignment irrespective of any other badges they obtained (see Figure 3.1).

**Figure 3.1 The Course Badge Tree**

	Academic Understanding						Academic Literacy			Self-assessment	
	1.1	1.3	6.1	I4	R6	R7	R10	C2	I2	P7	5.1
Assignment 1		 IntroToEd-A1 / GTS 1.3a	 IntroToEd-A1 / GTS 6.1a				 IntroToEd-A1 / TCF R10b	 IntroToEd-A1 / TCF C2a	 IntroToEd-A1 / TCF I2a	 IntroToEd-A1 / TCF P7a	 IntroToEd-A1 / GTS 5.1a
Assignment 2		 IntroToEd-A2 / GTS 1.3b			 IntroToEd-A2 / TCF R6b		 IntroToEd-A2 / TCF R10c	 IntroToEd-A2 / TCF C2a	 IntroToEd-A2 / TCF I2b	 IntroToEd-A2 / TCF P7a	 IntroToEd-A2 / GTS 5.1a
Assignment 3	 IntroToEd-A3 / GTS 1.1a		 IntroToEd-A3 / GTS 6.1b	 IntroToEd-A3 / TCF I4a		 IntroToEd-A3 / TCF R7a		 IntroToEd-A3 / TCF C2a	 IntroToEd-A3 / TCF C2b	 IntroToEd-A3 / TCF I2c	 IntroToEd-A3 / GTS 5.1a

GTS = Graduate Teaching Standards  
TCF = The Competency Framework

A key piece of feedback taken from the small pilot was that structure and support around the receiving of badges was important – if students were confident in interpreting the badges then the feedback the badge provides will be more meaningful, and anxiety around overall performance in the course would be reduced, as this student explains in Survey 3: “I think an assignment or task relating to them much earlier in the course would help people understand them better. I know we did a brief explanation but more hands on with actually using them would be a better way to get an understanding of how it works”. Students also identified a number of benefits to using badges, which are discussed in section 3.5 below.

It is the view of the research team that, at least in part, student concerns about the level of support provided around badging in Phase 2 may have been a factor in retention within the research. As such, in addition to improving the overall quality of the student experience, targeted support became part of the strategy to improve student buy-in (and thus retention) in Phase 4.

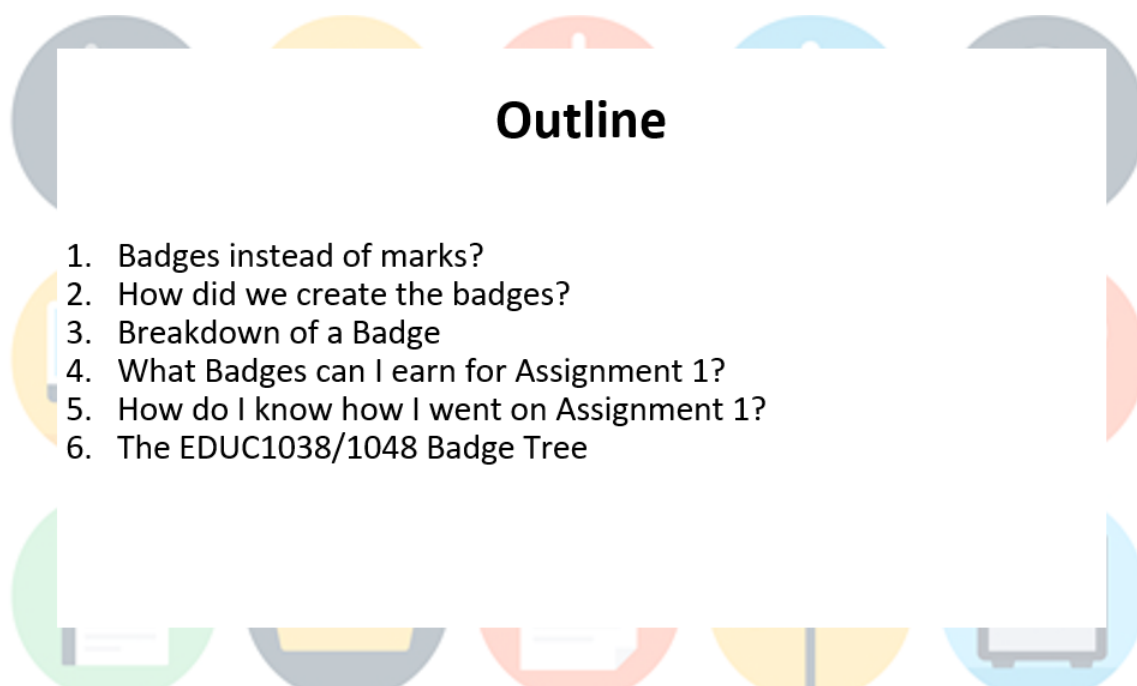
### 3.4.2 Phase 4: Large Pilot (IntroToEd)

IntroToEd is the core course for all Early Childhood, Primary and Secondary BEd students at the University. It ran from late February to early June 2022. Whilst IntroToEd is run as one course, it includes students enrolled on EDUC1038 (Secondary) and EDUC1048 (Early Childhood and Primary). Thus the course design, materials and assessment are the same as for the Small Pilot, but the course spans 13 weeks, with 10 hours study per week. Improvements were made to the course, and in particular the rubrics for the assignments following the small pilot.

Instead of face-to-face Q&A sessions with the unit coordinators (as happened in the small pilot), a remote session was held once per week via Zoom. Student attendance at that session was voluntary.

The feedback received in Phase 2 formed an important basis for reflection when refining the process for implementation in Phase 4, which will now be considered. With respect to providing additional support to students in making sense of badges, a number of resources were developed, including recorded presentations explaining what badges were being awarded for specific assignments, what the badges meant within the context of that assignment and the course as a whole, and assisting students in evaluating their overall performance in the assessment (Figure 3.2). It was also decided that from Assignment 2 onwards support material should be distributed shortly before students receive badges as opposed to shortly after.

**Figure 3.2: Screenshot from a presentation developed to support assignment 1**



For Assignments 1 and 2 badges were issued and other feedback was provided, but the marks were withheld. For Assignment 3 feedback was provided on the rubric and on the assignment itself, but neither badges or marks were issued. This change in the protocol was unintended – there was a problem with issuing the badges in My eEquals which was not able to be resolved within the timeframe set by the University for providing students with their results. This was despite the best efforts of the My eEquals technical support team. However, it had the benefit of allowing us to explore whether the benefits which appeared to occur in terms of students gaining formative feedback were due to the badges

or to the fact that the marks were withheld. This also led to a change in the plans for Phase 6, which is discussed in Section 3.4.3.

The other major change being implemented to improve participant retention in Phase 4 was the integration of the third survey into the focus groups.

In summary, a number of steps were taken to promote student (and participant) buy-in and retention across both the small pilot and the large pilot. These strategies developed in an iterative manner in response to both informal feedback and formal project data.

### **3.4.3 Phase 6: Withholding marks vs issuing badges**

It was decided to further explore the possibility that any benefits in terms of students engaging more fully with feedback on assignments was due to withholding marks and issuing badges, or whether simply withholding the marks would be sufficient. Thus in Phase 6 one course (EDUC1038) was recruited in Semester 2 that would withhold marks on assignments but would not issue badges.

EDUC1038 is the core education course for Secondary BEd pre-service teachers. They have to complete it before they can progress to Year 2 of the program. The course is a re-run of IntroToEd for the secondary students who start their BEd program part way through the year.

Canvas provides feedback in four forms:

- Comments added to the assignment itself
- The assignment rubric is highlighted to show how the assignment aligned with the criteria, specific comments can be added for each criterion
- An overall comment from the marker (which students can respond to)
- The grade in the gradebook or an indication of how the student has performed against the Outcomes in the Mastery Gradebook.

Withholding the grade but providing the other feedback alongside badges inevitably raised the question about which element of the feedback was of most benefit to students; to what extent were digital badges adding value to the other feedback that was available? In order to explore this students were not provided with digital badges for their assignments on EDUC1038. They were simply given all of the feedback noted above, which did not include a mark/grade or a badge.

## **3.5 Conduct Formal Evaluations**

A number of opportunities for formal evaluation have been built into the project structure. As per the schedule in Table 3.1, Phases 3 to 5 included a significant evaluative component, where results from one transaction phase were used to refine and develop research and implementation practices for the phases that follow. This reflective process was added to the Framework for Successful Badge Program Implementation outlined in the introduction. It is also noteworthy that the project deliverables for the NCFE, including the compiling of this report, also provide opportunities for formal evaluation.

## **3.6 Research and Reflection**

The key reflection and development during Phase 4 concerned the extent to which any impacts associated with issuing badges were due to the badges or to the withholding of marks. This led to changes to Phase 6, noted above.

The main report provides details of the research findings and a set of recommendations.



# Reference List

- Bassett, D. (Ed.) (2015) *The Future of Assessment: 2025 and beyond*. AQA.
- Black, P. & William, D. (1998). Assessment and classroom learning, *Assessment in Education*, 5(1), 7-74.
- Biggs, J., & Collis, K. (1982). *Evaluating the quality of learning: the SOLO taxonomy (structure of the observed learning outcome)*. England: Academic Press.
- Biggs, J., & Tang, C. (1999). *Teaching for quality at university: What the student does*. Maidenhead: McGraw-Hill.
- Krathwohl, D., Anderson, L., & Bloom, B. (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman.
- Butler, R. (2011) Enhancing and undermining intrinsic motivation: the effects of task-involving and ego-involving evaluation on interest and performance. *British Journal of Educational Psychology*, 58(1), 1-14. <http://dx.doi.org/10.1111/j.2044-8279.1988.tb00874.x>
- Education Services Australia. (2011). *Australian Professional Standards for Teachers, AITSL*. <https://www.aitsl.edu.au/standards>
- Elliot, R., Clayton, J., & Iwata, J. (2014). Exploring the use of micro-credentialing and digital badges in learning environments to encourage motivation to learn and achieve. In B. Hegarty, J. McDonald, & S. K. Loke (Eds.), *Rhetoric and reality: Critical perspectives on educational technology* (pp. 703-707). Australasian Society for Computers in Learning in Tertiary Education (ASCILITE).
- Galli, L., & Fraternali, P. (2014) Achievement Systems Explained. In Baek, Y., Ko, R., & Marsh, T. (Eds.), *Trends and Applications of Serious Gaming and Social Media* (pp. 25-50). Springer.
- Gibbs, G & Simpson, C. (2005) Conditions under which assessment supports students' learning. *Learning and Teaching in Higher Education* 1, 3 - 31.
- Hamari, J., & Eranti, V. (2011). *Framework for Designing and Evaluating Game Achievements*. [Paper presentation]. Proceedings of DiGRA 2011 Conference: Think Design Play.
- Hamari, J. (2017) Do Badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behaviour*, 71, 469-478.
- Hennah, N. (2018) Open badges Part 1: what, why, how? *School Science Review*, Issue 100, 76-80. <https://www.ase.org.uk/resources/school-sciencereview/issue-371/open-badges-part-1-what-why-how>
- Martin, J.E. (2020). *Reinventing crediting for competency-based education: the Mastery Transcript Consortium Model and beyond*. Routledge.
- Marzano, R., & Kendall, J. (2008). *Designing & assessing educational objectives: applying the new taxonomy*. Thousand Oaks, California: Corwin Press.
- Miller, G. (1990). The Assessment of Clinical Skills/Competence/Performance. *Academic Medicine*, 65(9), 63-67.
- Oxley, K., & van Rooyen, T. (2021). Making micro-credentials work: A student perspective. *Journal of Teaching and Learning for Graduate Employability*, 12(1), 44-47. <https://ojs.deakin.edu.au/index.php/jtlge/article/view/1321/1376>
- Perkins, J., & Pryor, M. (2021). Digital badges: Pinning down employer challenges. *Journal of Teaching and Learning for Graduate Employability*, 12(1), 24-38.
- Robinson, K. & Aronica, L. (2015) *Creative Schools: The grassroots revolution that's transforming education*. Penguin Books.
- Selvaratnam, R.M., & Sankey, M.D. (2020). An integrative literature review of the implementation of micro-credentials in higher education: Implications for practice in Australasia. *Journal of Teaching and Learning for Graduate Employability*, 12(1), p. 1-17 <https://ojs.deakin.edu.au/index.php/jtlge/article/view/942/1019>

- Stefaniak, J., & Carey, K. (2019) Instilling purpose and value in the implementation of digital badges in higher education. *International Journal of Technology in Higher Education*. 16:44.
- Thompson, D. (2016) Marks should not be the focus of assessment – but how can change be achieved? *Journal of Learning Analytics*, 3(2), 193-212. <http://dx.doi.org/10.18608/jla.2016.32.9>
- Twining, P. (2022, October 24) SOLO 2.0. The halfbaked.education blog. <https://halfbaked.education/solo2-0/>
- Wotjas, O. (1998, September 25) Feedback? No, just give us the answers, *Times Higher Education Supplement*.