# Exploring the use of micro-credentialing and digital badges in learning environments to encourage motivation to learn and achieve

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For the last 20 years the benefits of networked communities, interactive media, online tutorials, and e-learning applications have been investigated for the provision of education in New Zealand. In monitoring individual performance, a range of measures can be used, such as allocated grades, credits earned, and activities completed. These specific measures are institutionally controlled, have limited reach beyond the institution and, in isolation, do not truly represent a learner's progress, proficiency or acknowledge a learner's achievements. This paper argues that digital micro-credentials, often called badges, can be used as valid indicators of accomplishment, skill, knowledge or interest. In formal educational environments endorsed credentials, with defined learning outcomes, can be used for certification purposes. This paper will contend that micro-credentialing ecosystems create a broader picture of a learner's educational achievement by providing the infrastructure for individual learners to demonstrate their knowledge, skills and achievements through the display of endorsed digital micro-credential collections.

Keywords: micro credentials, digital badges, elearning, motivation, competency, e-portfolios

## Context

Learners constantly acquire new skills, knowledge and capabilities in both formal and informal environments. Informally they learn from clubs, societies and sports teams. Formally they engage in structured courses from educational institutions and professional associations. Increasingly these learners are using a range of technologies to communicate and share their experiences. This fragmentation of learning and diversity of environments presents a unique challenge to industry, educational providers and learners (Waller, 2012). The New Zealand Tertiary Education Commission (TEC) recognises this diversity of learning and is actively pursuing a vision to support the creation a coherent system of academic and vocational pathways for learners in full and part-time education and training in a variety of settings. In essence they want to build a tertiary environment that encourages the personalisation of learning. (Tertiary Education Commission, 2012). The Waikato Institute of Technology has undertaken a number of initiatives that investigates the infrastructure and framework required empowering learners /employees to create a holistic view of their achievements through the earning and pictorial display of earned "micro-credential / badge" collections. These collections will enable them to signal current capabilities and personal achievement to their peers, employers, professional and social groups. They also allow institutions/industry to review and assess the abilities of individuals and then guide the creation of personal, educational and career development plans.

## Theoretical framework

In modern, flexible, technology-enabled, educational environments learners are able to choose the time, place and pace of their learning event. While educators will provided materials and structure learning activities to ensure participants meet identified performance criteria, the ultimate responsibility of achieving the criteria is transferred from the instructor to the learner. In these more personalised environments learners need to be more self-motivated and self-directed (Clayton, 2012). A fundamental criterion for the success of these learning environments is the provision of validated feedback, formative and summative, that will motivate learners to continue complete activities presented. micro-credentials and digital badges are increasingly being used as indicators of accomplishment, skill, knowledge, or interest. Indeed it is argued the micro-credentials and digital badges awarded provide a broader picture of learning achievement than the award of a final grade from formal educational offerings (Goligoski, 2012).

The literature agrees a 'badge' is a symbol or indicator of an accomplishment, skill, quality or interest that can be

shared across communities (Goligoski, 2012). Digital micro-credentialing has manifest itself in the use of digital badges to clarify, validate, describe and define the skills, knowledge and capabilities learners have acquired (Elkordy, 2012). The use of micro-credentialing and associated digital badges is gaining momentum worldwide with many institutions adopting a digital badge framework for their students (Walshe, 2014). In this paper it may appear the terms micro-credentials and digital badges are used both interchangeably to indicate personal achievement. However, the authors argue there are subtle differences between them. For the authors of this paper micro-credentials are only awarded on the acquisition of specific knowledge or demonstrated competency of an identified skill. They are then validated by recognised professional bodies or educational institutions. While a validated indicator, a digital badge is awarded, the conditions associated with the award of the micro-credential are maintained by the formal credentialing bodies. In essence they indicate competency and compliance and as such they could be regarded as a "summative" award. Digital badges however, are awarded to indicate progress being made or activities undertaken. For example they can recognize participation in group activities, support of other learners or signal progression in particular activity. While an aggregation of a number of these badges could result in a summative award, this is not the purpose of the award. The main purpose is to encourage learner ongoing engagement which can be seen to be motivational. As such they could be regarded as formative awards.

Badges and micro-credentials are designed to indicate, to a range of stakeholders, the specific competencies, knowledge and capabilities acquired by the individual. Therefore, how, when and where they are displayed is of critical importance; a digital portfolio provides a useful mechanism. Although portfolios can serve multiple purposes, process, reflective or learning (Granberg, 2010), It can be argued that digital portfolios are, in essence, the purposeful collection of a learner's educational, social and personal achievements. This collection can be structured to exhibit to different target stakeholders the learner's abilities. In formal accreditation environments, digital portfolios can provide a space where learners' evidence of their competencies and achievements can be stored, systematically evaluated and displayed. In essence they allow learners to illustrate, to their peers, colleagues and other stakeholders, their progress, indicate their proficiency and acknowledge their achievements (Kim, Ng, & Lim, 2010).

## Micro-credentialing and digital badges in action

Since 2011 the authors have been involved in a number of initiatives, practical and conceptual, evaluating the potential impact of badge / micro-credentialing ecosystems on educational delivery and ongoing professional development in the health sector. Two key projects have been undertaken:

- The first investigated how digital badges could increase learner motivation, achievement and retention due to immediate feedback being provided through flexible, on-demand, validated recognition of a learner's current capabilities and achievements in the form of a series of badges. This project focused on the use of badges in an English language course for Japanese medical professionals run by a university in Japan
- The seconded explored how micro-credentials could be established, articulated, supported and validated through an industry-based ecosystem. The project examined the concept of micro-credentials to identify compliance with currency and competency of practice in the health sector, specifically in this case, nursing.

## Medical terminology and digital badges

For Japanese medical professionals English has become increasingly important. There is growing need for these professionals to understand and use English at conferences and/or workshops, to keep up to date with medical processes and procedures published in Western medical journals and there are ever increasing opportunities to communicate with other medical staff and patients in English. However, the curricula at medical schools in Japan are so extensive that the time allocated for English classes is usually very limited, which means those classes often do not have the depth or scope to improve the English communication skills of medical students to the level necessary for their future career. To address these issues an existing digital course offering, Medical Terminology, was re-designed to suit students' needs and align with learners' current capabilities. This re-design was focused on:

- Helping learners identify and engage with the suitable level of information and in appropriate level of activities, and
- Encouraging learners to independently engage with the review materials identified and participate autonomously in practice activities

To aid learners identify the appropriate place to begin their learning activities, the quiz functionality of the

learning management system (LMS) Moodle was used to create a "self-reflective framework". These frameworks, through a series of statements, challenge learners to reflect on their current level of competency in medical terminology. When the learner has responded to all the questions they are provided with specific feedback on their current competencies and then on which module(s) to review and which skills they need to develop. As the learner reviews the self-identified modules they are presented with a range of specific quizzes, developed in the Moodle LMS, to check their vocabulary and understanding on the topic. When learners have successfully completed the requirements of the module tests identified, they are awarded, using the LMS badge functionality, the associated module ' badge'. When learners have completed the requirements of all the module badges they are awarded a "course credential" which means they have successfully completed the basic medical terminology course. All the badges learners have earned have been designed to be displayed in a learner portfolio. This will serve to increase learner accomplishment and satisfaction, but can also be used to demonstrate to their peers, family members and others what they have learned, rather than what was taught.

| | | |
|---|---|---|
| Badge for your successful completion of this course | Available to users | ○ Complete **ALL** of: **"Quiz - Short test for module 1: Matching", "Quiz - Short quiz for module 1: Matching 2", "Quiz - Short test for module 2: Matching", "Quiz - Short test for module 2: Spell out", "Quiz - Short test for module 3: Spell Out", "Quiz - Short test for module 3: Spell Out 2", "Quiz - Short test for module 3: Matching", "Quiz - Short test For module 3: Dictation", "Quiz - Short Test for module 4: Spell Out", "Quiz - Short test for module 4: Matching",** |

### District Health Boards and micro-credentials

In the health sector in New Zealand, nurses are required to undertake a review of currency and competency of practice on an annual basis. To provide a conceptual framework for development, the authors developed a scenario of "Digital Dashboards" and the steps are outlined below.

**Step 1: Creation of micro-credential:** Discipline experts establish the performance criteria for an identified competency and create an appropriate badge. Professional bodies, certification agencies or health boards identify the specific collection of endorsed badges appropriate to the performance of an identified role. At this phase the badges are displayed in neutral colours.
**Step 2**: **Earning Micro-Credentials**: Using a self-reflective framework, employees purposefully review the endorsed collection, identifying their current capabilities against the stated performance criteria. On completion they use an e-portfolio to submit evidence to demonstrate achieved competence against identified badges. If they cannot demonstrate competency they identify the professional development required to complete the collection. Again, the badges are displayed in neutral colours
**Step 3**: **Awarding Micro-credentials**: First, evidence is reviewed and details, such as the date performance criteria were met, place issued, expiry and/or renewal dates, are embedded (referred to as baked) within the awarded badge meta-data. At this stage the identified badge displayed is green. Secondly, the professional development plan is reviewed and appropriate details (such as target date for completion) are noted on the incomplete badge within the collection. At this stage the identified badge displayed is yellow. If an employee has not addressed the requirements of a badge, the badge is set to red.
**Step 4**: **Displaying Micro-credentials**: The endorsed badge collections and associated meta-data are stored with employees' personal files. The meta-data within the badge is used to generate a web-feed to display the current status (Green: competent, Yellow: in progress, Red: not addressed/needs renewal) of an employee against identified competencies. Badges with time-constraints will be automatically set to degrade as the expiry date approaches.
**Step 5**: **Using Micro-credentials**: Employees are able to use an e-portfolio to access their meta-data fields and reflect upon current professional status against an identified role. Managers are able to use the functionalities of a dynamic dashboard to collate multiple-feeds from employees they line-manage and to review the status of the workforce in one space.

**Current** **Expiring** **Expired**

## Summary and conclusions

This paper has outlined two distinct approaches to the award of digital indicators (badges) to recognize, validate and reward learners. The first approach, using formative digital badges, involved redesigning a medical terminology course for a group of Japanese Medical professionals undertaking a course to enable them to use the English language in their professional capacity. Initial informal learner feedback indicated the use of badges helped motivate them toward further autonomous study. The second approach, a using summative award of micro-credentials, involved the identification of required compliance and competency standards and the development of a conceptual framework enabling nurses to take control of their compliance requirements. In conjunction, the organisation was provided with a pictorial display clearly indicating the current certification/competence of their staff, ensuring its practitioners were operating legally. Both these approaches indicate individuals can use micro-credential / badge collections to engage in a process of reflection and self-improvement. Through reflection individuals make meaning of their current capabilities and identify areas for improvement and personal growth.

The authors are conscious that further investigation is required into how the use of micro-credentials and badges helps motivate learners to study autonomously. As more learners participate in courses based on the use of micro-credentials, the authors intend to develop a set of measures to evaluate the success of these environments. The results of these evaluations will be valuable in monitoring the effectiveness of the courses and the use of micro-credentials/ badges in contributing to and enhancing learner independence, autonomy and acquisition of knowledge and skills.

The authors argue that a micro-credential and badge ecosystems would provide institutions with both the infrastructure and framework to empower learners and employees to create an holistic view of their achievements through the pictorial display of earned micro-credential badge collections. Collections enable employees and learners to signal personal achievement to potential employers, professional and social groups. They also allow institutions and employers to review an individual's abilities and then guide the creation of personal, educational and career development plans.

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