

Principles of Effective E-Assessment: A Proposed Framework

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Abstract. Simultaneous educational transitions including the rapid expansion in blended andragogy, advances in technology and digital teaching aids, and the increased availability and uptake of online distance learning are driving a need for new approaches to assessment for e-learning and business competency teaching. This study aligns previous research relating to traditional tertiary-level assessment with e-learning and blended learning teaching strategies and practices. This reformulation, combined with insights from e-learning educators, facilitators and students, results in a new framework consisting of seven principles of best practice in e-assessment strategies. A key insight highlighted by this study is that modern andragogy, aided by technology, allows students to co-create knowledge and make sense of complex concepts via the student-peer-facilitator tripartite. This study presents each of the seven principles, along with examples of successful assessment strategies implemented in international business and marketing classes at tertiary level.

Keywords: assessment; blended learning; co-creation of knowledge; e-assessments; e-learning; experiential learning; flipped classes; online assessments; business education, social media.

Assessment: from the Latin root *assidere*, to sit beside another.

1. Introduction

The purpose of this paper is to provide insight into the andragogy of e-assessment and to investigate key principles which will guide international business educators' strategies and practices involving e-assessment tools. The paper proposes that seven principles, namely affordance, alignment, articulation, accountability, accreditation, adaptation and authenticity, are fundamental to all types of e-assessments, irrespective of context, content or stakeholders.

The study is based on a review of previous research, interviews with experienced e-learning facilitators, feedback from students, and the authors' own experiences of development, implementation and facilitation of "flipped" and blended teaching. The e-assessment methods profiled here are supported by a number of different software platforms, and include computerized testing, online diagnostic testing, rubrics, course appraisal, discussions, blogs, wikis, video recordings of presentations, and electronic reflections and portfolios.

The paper begins by reviewing how the concept of assessment has evolved with the development of online teaching technologies, and how they are applied to e-learning contexts. The paper then briefly outlines the research approach and introduces each of the three authors who act as the principal informants. Our narrative then focusses on the seven principles of e-assessment, first by drawing on key contributions of the extant literature as theoretical framing, then supporting our theoretical justification through practical examples, real-life experiences and post-assessment feedback. Brief conclusions and suggestions for future research follow.

2. Assessment - History and Future

In 1840, Horace Mann, an early pioneer of learning measurement, used standardized written examinations as one of the earliest forms of assessment (Pearson, Was, Sensale, and Kim 2001). Urciuoli (2005), however, assigns the oldest undergraduate assessment to the University of Wisconsin, which has assessed student outcomes and performance formally and continually since 1900 in response to calls for accreditation mechanisms to measure efficiency of higher education institutions. More recently the focus of assessment has shifted to emphasize student learning rather than institutional efficiency. In 1992, the United States (U.S.) Department of Education introduced a requirement for accreditation agencies to consider learning outcomes as a condition of accreditation (Ewell and Steen 2006). The same year the Higher Education Funding Council in the United Kingdom (U.K.) recommended the assessment of *quality* of education in funded institutions. Further, according to recent assessment research (Urciuoli 2005, Kirkwood 2009), the terms ‘standards’ and ‘accountability’ now permeate educational discourse throughout Europe, following trends set in the U.S.. Allen (2004) advocates that institutional effectiveness and assessment of student learning are inseparable, and that assessment should be considered an integral part of teaching and learning processes and to the feedback loop that serves to enhance institutional effectiveness.

In conjunction with the move toward accountability for quality, tertiary education is making a profound transition from a historic classroom model to an online or blended delivery model (Benfield and Francis 2006, Mandelbaum 2013, Schlager, Farooq, Fusco, Schank, and Dwyer 2009). The co-evolving educational trends of accountability and blended learning (i.e. blending traditional with technology-based delivery methods) has prompted many international business educators to review their teaching and assessment strategies and practices. Proponents of e-learning (Vendlinski and Stevens 2002, Bennett 2002, Buzzetto-More 2006) report on the use of information technologies and e-learning

strategies as a means for assessing teaching and learning effectiveness by providing alternative assessment protocols.

Further, scholars are advocating so-called “flipped” classroom teaching, where the learning tripartite of students, peers and facilitators (the latter consisting of teachers, lecturers and tutors) co-create concepts, knowledge maps and charts, models and frameworks in the classroom, having first studied preparatory materials individually prior to the class. Abeysekera and Dawson (2015) define the notion of a flipped classroom as involving, “approaches [that] remove the traditional transmissive lecture and replace it with active in-class tasks and pre-/post-class work”, while Honeycutt and Garrett (2014) expand the definition of flipped classes as a shift from individual to collaborative work, combined with a move away from dissemination of information, and towards acting with and on information to achieve specific learning outcomes.

Advances in information and communication technology (ICT) and web-based teaching aids are having a profound impact on teaching-learning approaches (Caravias 2014, JISC 2011, Tapscott and Williams 2006). This study defines e-assessments in line with the work of Pachler, Daly, Mor and Mellar (2010, p. 716) as, “the use of ICT to support the iterative process of gathering and analysing information about student learning by teachers as well as learners and of evaluating it in relation to prior achievement and attainment of intended, as well as unintended learning outcomes.” Thus e-assessments are built on traditional assessment techniques, but facilitated via online processes and digital tools.

Several research studies assert the positive effect of blended learning for teaching and learning (Bielawski and Metcalf 2005, Benfield *et al.* 2006), but fail to link the learning approaches to assessment andragogy. In a review of computer assisted assessment, Conole and Warburton (2005) report that, “[t]he role of technology and how it might impact on assessment is still in its infancy and we need to develop new models for exploring this.” Reeves and William (2002) call for an improvement in the quality of assessment within e-learning practices. However, there appears to be a dearth of academic studies on strategies and practices in e-assessment in business education. Yet proponents of blended learning and online teaching-learning aids report on a number of augmentation advantages of e-assessment: support of a greater variety of artefacts; allowance for greater learner expression; dynamism and multimedia driven; accessible by larger audiences; enabling meta-documentation; easy to store; and serving to advance student ability either academically or professionally (Buzetto-More 2006, Bennett 2002). Finally, e-assessments facilitate tertiary education as a co-creative process. Rather than the mere transferral of information and the transmission of knowledge, the process is one through which students actively partner with facilitators to learn by co-constructing their own knowledge, skills and attitudes to information, and by taking responsibility for their development

and growth (De Corte 1996, Katernyak, Ekman, Ekman, Sheremet, and Loboda 2009, Nicol and Macfarlane-Dick 2006, Pintrich and Zusho 2002).

3. Types of Assessment

An assessment is a measure of a learner's achievement and progress in relation to desirable outcomes of the learning process (Gikandi, Morrow, and Davis 2011). Assessment also consists of various and ongoing processes that involve planning, discussion, reflection, measurement, observation, rating, data aggregation and analysis, and improvement based on the data and artefacts gathered around a specific set of learning objectives (Buzetto-More and Alade 2006). Educators generally agree on three broad categories of educational assessment: formative, summative and diagnostic (Bull and McKenna 2004). The key difference between these is the end purpose of the assessment.

Formative assessment is commonly applied in the classroom as a source of ongoing feedback with the purpose of improving teaching and learning (Hargreaves 2008). The primary goal of formative assessment is to monitor learning to enable timely, personalized feedback (Nicol and Macfarlane-Dick 2006). Formative assessment refers to assessment specifically intended to improve and accelerate learning. Feedback provides insight to facilitators on how to improve their teaching to ensure more effective learning environments and to enable them to recognize excellence as well as areas where students are struggling. Feedback to students should include suggestions for remedial activities (if necessary), provide personal insight into the students' own progress and performance, strengths and weaknesses, and enable both student and facilitator to target areas that may need additional work (Gikandi *et al.* 2011).

Summative assessment measures students' learning at the completion of an instructional unit, the end of a course, or after some defined period (Gikandi *et al.* 2011, p. 2336). The overall intent of summative assessment is to evaluate learning at the end of an instructional unit by comparing it against a pre-determined, appropriate standard or benchmark. Thus, summative assessments remain crucial for certification and establishing reasonable levels of competency.

Diagnostic assessment offers indicative, problem-identification and problem-solving opportunities to gather information about many issues relevant to the teaching and learning process. Examples of such issues include: individual and collective student growth; effectiveness of teaching practices and programs; projections of whether a student or class is on track to achieve competency benchmarks; and the unique instructional needs of diverse students. The main purpose is to detect remedial and enhancement opportunities to build on areas of strength and to scaffold or develop areas of weakness.

Some authors add *self-assessment* as a fourth category, and define it as, “the degree to which students can regulate aspects of their thinking, motivation and behaviour during learning” (Pintrich and Zusho 2002, as cited in Nicol and Macfarlane-Dick 2006, p. 199, JISC 2011), but in our view, this type of assessment intervention differs only in the “who” in terms of the instigator of assessment, rather than the purpose of the assessment. The purpose of self- or peer-assessment is still to provide formative, diagnostic or summative feedback, but the responsible party actioning or executing the assessment changes from facilitator to student (learner) or from peer to student.

In line with our earlier definition, *e-assessment* builds on traditional techniques for formative, summative and diagnostic assessments, but is facilitated via online processes and digital tools. The term “e-assessment” is sometimes understood as referring only to on-screen assessment, but we also include “technology enhanced” or “technology-enabled assessment” in this paper. Further, although our adopted definition encompasses facilitators, learners and their peers, it does not elucidate the relationship between the three that exists via technological ties that further supports assessment of student learning. We suggest in this paper that online technologies serve to establish, enable and strengthen three-way relationships and that this is key to effective e-assessment.

4. Research Approach

Kolb (1984, 2014) proposes that experience is the source of learning and development, and defines experiential learning as an integrated process, combining experience, perception, cognition and behaviour. In-depth auto-ethnography and confirmatory introspection provide the methodological foundations for this paper. Auto-ethnography (Hamilton, Smith, Worthington, 2008, Hannigan 2014, White 2001, Preissle and deMarrais 2011, Bennett 2004) and confirmatory introspection are suggested by sociology researchers (Marshall 2013, Holbrook 2006) to be commonly used qualitative methods in social sciences as they legitimize the act of reflexive inquiry and exploration of a topic.

The foundations of this paper are the key objectives of effective assessment as outlined in the literature. Building on this literature, we collate and compare the experiences of the three authors of this paper who teach both domestic and international students across cultural and country boundaries. We focus, in particular, on their perceptions, cognition and practical insights on e-learning and e-assessment. The authors also act as “critical friends” (Hamilton 2005), or sounding-boards to review how the context and teaching environments affected practice, strategies and decisions relating to e-assessment. The expertise embodied in the authors’ experiences with the use of technology in andragogical situations is summarised in Appendix A. Further, the paper draws on thematic

analysis of student journals, course appraisal records and interviews with other facilitators and student participants, as well as theme-based analysis of e-journals and reflective portfolios of student feedback on e-assessments.

Courses in marketing, management, and organizational behaviour at undergraduate and postgraduate level taught in Finland, Japan, New Zealand, South Africa and Spain provide the ethnographic context for the principles proposed here. In the broader analysis we considered various blended and online programmes: Masters and PhD programmes at Aalto University, Finland; undergraduate courses in consumer behaviour, distribution and marketing, and Executive MBA distribution courses taught at Rikkyo University in Japan; the four-year Bachelor of Management Studies degree and one-year Masters programmes at the University of Waikato; the three-year Bachelor of Commerce at Victoria University of Wellington; the consumer behaviour, co-operative education workplace learning programs and MBA courses at Auckland University of Technology (all in New Zealand); and the undergraduate marketing courses at ESADE in Barcelona (Spain). Within these courses, numerous e-assessment tools employed by the authors are included in the analysis, including multimedia e-portfolios, infographics, e-journals, multiple choice online quizzes, multimedia CVs, interactive video presentations and personal profiles.

The use of auto-ethnography and confirmatory introspection allow the authors, with several decades of cognitive and affective information between them, convenient access to data on the lived experiences of both themselves and of closely-associated colleagues, as well as those of their students. Although this reflective account is somewhat personal, it does provide preliminary confirmation and illustration of effective use of e-assessment. The insights garnered from the literature, the authors' experiences (and those of their colleagues) and student feedback and commentary are distilled into the seven principles of e-assessment presented in the remainder of this paper.

5. Seven Principles of Effective E-Assessment

A broad literature contributes to our understanding of effective assessment in the traditional sense. For example, Kellough and Kellough (1999) identify seven objectives of effective assessment techniques which are to: contribute to and improve student learning; identify students' strengths and weaknesses; review, assess and improve the effectiveness of different teaching strategies; review, assess and improve the effectiveness of curricular programs; improve teaching effectiveness; provide useful administrative data that will expedite decision making; and provide a basis for communication with stakeholders. However, effective e-assessment must also offer *affordance*, in other words it must offer additional benefits over traditional means of assessment. This affordance is derived from the ability of ICT to enable users to transform, progress and

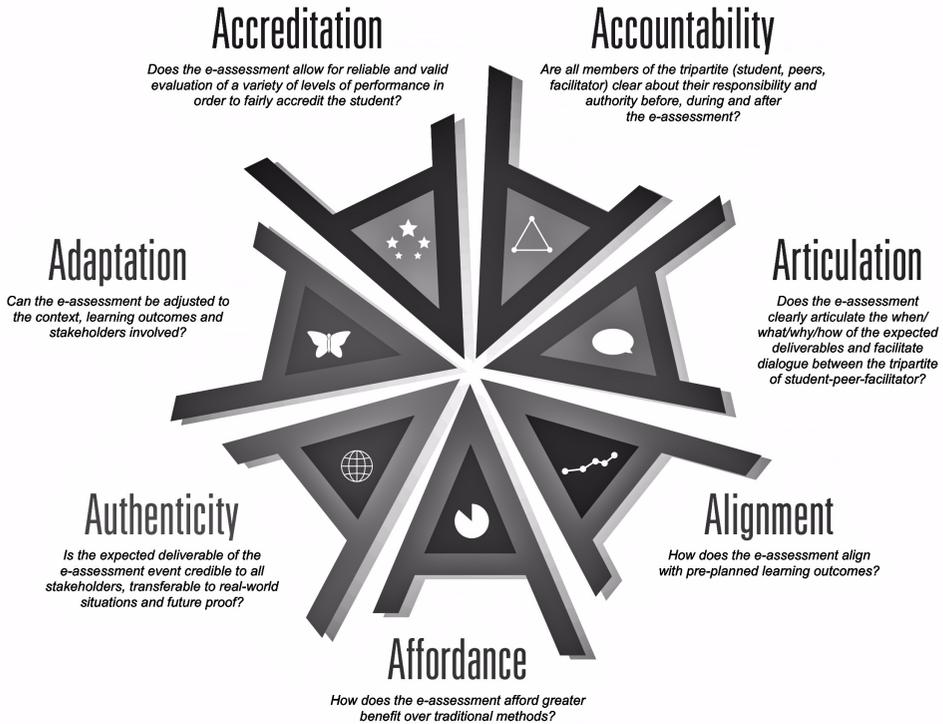
supplement existing andragogies, particularly when used in blended learning contexts.

According to Kirkwood (2009, p. 108), key andragogical functions for ICT include presentation, interaction, dialogue and generative activity (enabling learners to record, create, assemble, retrieve and curate data in response to learning activities for assessments and to evidence their experiences and capabilities). To these we would add the diagnostic function of ICT, which enables learners to engage in self-assessment, peer-assessment and submit various assignments and artefacts for assessment and feedback via two-way dialogue with facilitators, expert mentors, coaches and trainers with the intention of highlighting strengths, weaknesses and remedial opportunities in their learning process.

Given the affordance potential of technology-based assessments over traditional means, it is perhaps surprising that there are not more e-assessment frameworks available. A couple do exist. One example is presented in the work of McCracken, Cho, Sharif, Wilson and Miller (2012, p. 107), who identify six assessment design principles for creating assessment strategies for online teaching and learning environments: “(a) technology affordances, (b) alignment of objectives with assessment, (c) discipline-specific practices and approaches, (d) meaningful and timely feedback, (e) authenticity and transferability and (f) transparency of assessment criteria.”

Despite these useful contributions to our understanding of effective e-assessment techniques, there is a clear need for more detailed study of e-assessment. In particular, there are few frameworks that can be readily applied to guide the design and implementation of assessment strategies for blended and online learning practices of international business educators. With this objective in mind, the remainder of the paper presents what we propose are the seven key principles for the design and implementation of effective e-assessment. These principles are built through application of extant theory and literature on assessment and e-learning, coupled with the affordance benefits of ICT and illustrated by real-world examples. Figure 1 provides a diagrammatic illustration of the framework, and offers a key question for educators to evaluate both current and future assessments on the criteria outlined for each of the principles.

Figure 1: Principles of E-Assessment: Key Questions for Andragogy



Adapted from: De Villiers, Larke, and Scott-Kennel 2016.

Affordance

There is support for the affordance principle in the literature. Vendlinski and Stevens (2002) report that technology provides new possibilities to assess learning that will yield rich insights into each of the various stages of the assessment process. Martell and Calderon (2005) frame this as: (i) the identification of outcomes; (ii) the gathering and analysing of evidence; (iii) reporting and discussion of results; (iv) identifying and suggesting improvement opportunities and; (iv) reflection and implementing changes. They highlight the need for this information to be accessible, relevant and of high quality to ensure authentic, fact-based decisions by educators. Buzzetto-More and Alade (2006, p. 256) record a variety of e-assessment opportunities, including: pre and post testing, diagnostic analysis, student tracking, rubric use/analysis, the support and delivery of authentic assessment through project-based learning (e.g. webquests, simulations, e-portfolios), artefact collection, data aggregation and analysis. In order to provide value over traditional methods, e-assessments should afford currency, responsiveness and flexibility in terms of content, delivery and feedback, increasing participation and engagement by both facilitator and learners. Further, such methods should encourage and enable students to take

charge of their own learning and engage interactively with others. Online availability of e-assessments affords “anytime anywhere” access to assessment information, data and feedback from multiple sources to multiple recipients, encouraging learners to “opt-in” rather than “opt-out” of the learning experience as they are able to track and monitor their own progress in a more direct and timely manner.

So how can international business educators use the opportunities afforded by ICT for effective e-assessment? To address this question, we focus our discussion on one e-assessment tool – which demonstrates affordance and has contributed to the combined learning actions and capabilities of students in later stage undergraduate and masters level papers in online discussions (facilitated by Learning Management Software (LMS) software such as Moodle). These are set up as a forum where students “post” a pre-researched reply to a current discussion topic. Once posted, the students have another week to read over and comment on other posts, which encourages discussion, critical thinking, constructive criticism, and, above all, ongoing engagement. Using e-assessment tools to compile the initial and reply posts enables contribution, review, evaluation and elaboration by learners, peers and facilitators – advantages beyond the scope of traditional assessment methods.

Thus, there are multiple affordance advantages to the use of such e-assessment tools as they create an environment in which all participants can learn from each other, thus facilitating co-creation of knowledge. Students can participate regardless of geographical location; and benefit from the flexibility, timeliness and accessibility of a broader range of course-related resources via a centralised technological platform. Independent research effort extends their ability to apply what they have learnt and enhances their learning experiences, as illustrated by this comment:

...Moodle discussions made a nice change to the one-off individual assignments and group presentations I normally see. Delivering our own opinion/perspective on each topic and then starting up a forum-like discussion, surprisingly genius, I learnt a lot. I personally think it would be cool to see similar constructive environments introduced into other [papers], as discussing the ideas we’re taught really helped in understanding them (MK, graduate).

Further, affordance value of online discussions lies in the ability of students to receive feedback from peers, which Author B found not only reduced marking time, but actually increased the quality and quantity of individualised feedback as this was received from both peers and the facilitator. Online discussions encourage everyone to participate because students have the time to prepare posts, reflect on others’ answers, and engage in multi-directional dialogue. Students can also revisit the forum at any time and review previously recorded responses, which is useful for preparation prior to summative assessment. Flexible submission times and the ability to submit posts from any location in the

world (with Internet access) are especially useful for international students, and those already in the workforce.

I was offered work in Australia near the end of my degree and as such these courses have been a “god-send” for me ...and in my opinion I was able to learn more in this format than from traditional means. (CJ, Masters student)

Finally, online discussions as part of an e-assessment strategy provide an extensible dimension to lecture classes with large class-sizes. In some systems, such as those found by Author C at some institutions in Japan, class sizes are considered “small” below 200 students, and classes of 700 or more students in a single lecture are common. Here, both synchronous and asynchronous online discussions using LMS software or even social media tools, provide many of the affordance benefits noted above. In high context and patriarchal cultures, such as Japan, open debate is not always encouraged in person, but it was clear that the opportunity to initiate and participate in discussion was welcomed by many students.

Alignment

Our second principle is alignment (see McCracken *et al.* 2012). Curricular alignment occurs when assessment strategies and tools align with learning outcomes (Buzzetto-More and Alade 2006, Martell and Calderon 2005) and holds educators accountable for demonstrating when and where students have the opportunity to learn concepts and acquire competencies (Baratz-Snowden 1993, 1999). Curriculum-assessment alignment links learning outcomes to pedagogy, and demands reflection on the sequence in which competencies are built. Adept facilitators select e-assessment events to create and promote opportunities for learners to demonstrate their level of achievement in pre-determined learning outcomes. In addition, the assessment should assist learners to demonstrate to themselves, their peers and the facilitator, improvement of pre-selected competencies and thus close the gap between current and desired learning outcomes. Further, curricular alignment requires educators to ensure performance standards (as reflected in the rubric or assessment requirements) of a particular competency level (e.g. first year studies versus Master’s degree projects) are met.

Alignment has been achieved in practice by Author A through a combination of rubrics and e-marking. Students are supplied with rubrics from the outset, then post-submission, facilitator comments demonstrate how the assessment met, exceeded or failed to meet the criteria specified in these rubrics. A key advantage of e-marking technologies is the ability to use the track changes and comments functions of modern word processing software to enable comments anywhere in the assignment. Comments can be pasted into tables that display rubric criteria, enabling students to receive precise and constructive suggestions on what, specifically, could be improved, rather than just a generic comment or grade at the end.

I looked over the rubric [table] for assignment 2. I think it's really great and explained exactly where improvement was needed and how my grade was concluded. I hope you use this format in the future (KK, undergraduate student).

E-marking can be done quickly and clearly as one reads over the assignment. Using online document editors such as Google Docs or inDraft for assignments enables ongoing iteration, with (if desired) synchronous input from multiple students and the facilitator. After marking, assignments complete with comments are reloaded onto the course webpages. E-marking can also take the form of personalised feedback via online communications (email, Skype, voice recording etc.) and enables learners to see exactly where real outcomes do or do not meet expected outcomes in a timely and precise manner.

Articulation

The principle of articulation has two objectives, the first is clarity of expression of assessment requirements and the second is dialogue during the process of assessment. With regard to the former, this requires clear identification of expected deliverables and the level of performance needed to achieve a range of competency levels within a learning outcome. The assessment should clearly articulate the when/what/why/how of the expected deliverables and these requirements should be easily accessible, coherent, timely and have comprehensible grading criteria associated with them. Extant literature (Brown and Glasner 1999, McCracken *et al.* 2012, Thorpe 2000) on assessment argues that well-articulated assessment criteria, including achievement standards for low and high performance, will provide students with insight into the effort and time required to be successful. Both of these orientations aid in the development of self-management competencies.

With regard to the latter objective, the assessment strategy and method should facilitate dialogue within the tripartite of learner-peer-facilitator, for instance between facilitators and learners, or between peers, for the purposes of collaboration, discussion and elaboration. This dialogue provides learners with ample opportunities throughout the learning and assessment process to engage actively with goals, criteria and standards. Meaningful feedback (Gaytan and McEwen 2007) is needed to articulate acceptable behaviour and progress at all stages of the assessment. This can be achieved in a number of ways.

For example, Author B pre-records online video presentations using Vis.Talk to help students prepare for a particular item of assessment. Articulation is enhanced by the fact that such materials are available "on demand" and can be viewed as often as needed and at times convenient to the learner as they work through the assessment. Live links to other relevant discussions, assignments and online material are included as part of the presentation. Students appreciate the articulation benefits LMS software can bring:

By doing the course online it helped me feel a lot less stressed as it had many benefits compared to traditional papers. Having access to Vis.Talk fit in with my busy and overcrowded schedule as it enabled me to be more flexible with my study instead of being stuck in lectures. I could pause the talks if I didn't understand something and immediately look it up without disturbing anyone (KH, Masters student).

As the students undertake the assessment, expectations can be more clearly articulated and expanded upon by both peers and facilitators. Articulation and dialogue can be facilitated by applications such as real-time chat, blogs, discussion groups, Facebook groups, online forums, and group email which provide a non-confrontational and mutually beneficial repository of dialogue relating to specific assessments, as shown by this feedback:

I also loved the Moodle [forum] sessions because... I feel like there was much more interaction and communication than most other papers that have lectures and tutorials. Through posting regular replies to different topics we were able to have open discussions and really see and understand other peoples' perspectives and thought processes as people were more open and confident about sharing their ideas. This really helped me understand and remember the content (HK, undergraduate student).

Technology based feedback can also facilitate student-peer-facilitator dialogue post-assessment – which provides an excellent, albeit often overlooked, opportunity to further learning. In one Masters level course, for instance, students were required to critically review academic literature and apply one theory or concept learnt in the course to their own choice of company. This skill is honed through incremental learning occurring through ongoing dialogue. Learning was facilitated by specially designed online workshops and development sessions (in which distance learning students participated via video chat or Skype) which encouraged questions, peer- and self-evaluation. Post-assessment peer-review encouraged students to continue the dialogue. Hence, articulation of expectations and dialogue between facilitator, peers and the students themselves remained relevant throughout the assessment.

The technology and integration of lectures, videos, academic articles and links to other e-learning materials was nothing short of outstanding... [it] grouped the topic areas into key themes and through the use of Moodle the class was able to have regular online discussions which definitely enhanced the learning experience (CJ, Masters student).

Articulation is particularly important for e-assessments of longer duration or involving multiple stages (e.g. feedback on initial draft or analysis prior to the final write up stage) as it provides targeted diagnostic feedback. For example, cross-border doctoral supervision, including ongoing diagnostic assessment, joins the expertise of the supervisor with the research interests and progress of the

student. Shared electronic documents, presentations and video conferencing or email communications is central to assessment of goals, standards and development throughout the process.

Accountability

All parties in the learning tripartite need to be fully accountable throughout the assessment event and understand their respective responsibilities and duties. International business educators need to ensure e-assessment strategies and practices a) inform and shape facilitators' teaching, b) encourage students to take responsibility for their learning, and c) encourage deep rather than superficial learning throughout the course, rather than at predetermined assessment intervals. More specifically, assessments need to provide both facilitators and students with feedback on the current performance of students in relation to the specific targets, goals and standards set for learning intervention, throughout the learning process. Thus, e-assessments should adhere to the principle of aiding continuous measurement of successful, unsuccessful and incomplete assessment events. Not all assessment events are compulsory and important insights can be gained by monitoring all three categories of completion, in order to re-engineer curricula and assessment strategies.

Post-assessment, facilitators need to encourage accountability by ensuring that feedback is attended to and acted upon, and that remedial (or advancement) activities are available for learners at various competency levels. LMS software and other tracking systems (e.g. Blackboard) frequently include real-time gradebooks or similar mechanisms that provide such feedback to both students and facilitators, allowing current performance to be tracked. Accountability is about ensuring that students, as well as facilitators, participate in the assessment process and that ultimately this improves learning outcomes for all. The example of online discussions (see Affordance), where posts are made by the student, peers and facilitators, also attests to the synergy of accountability for the learning tripartite:

...while I was originally hesitant about the online Moodle discussions, they turned out to be a truly great and refreshing addition to past management [courses]. The initial post for each discussion essentially allowed us to deliver our own opinion on each topic, while also focusing on aspects that interested us. After this, the following discussions created a constructive environment between students, with the final result being a much deeper understanding of the focus topics than that provided by a one-off/individual (MK, graduate).

Accreditation

Effective e-learning assessments inform students of the benchmark or standard against which she/he has to perform, and make clear at which point students have achieved an unacceptable, acceptable, or above expected competency level. In addition, the achieved grade or level should be standardized, and therefore

provide a benchmark for similar assessments in the paper, other courses and even across tertiary institutions. Meaningful accreditation, therefore, relies on both the reliability and validity of assessment procedure.

Any assessment procedure relies on the observation, collection and recording of high-quality, reliable data that provide a basis for evaluation against predetermined objectives. It is no different for e-learning and online assessments. Gikandi *et al.* (2011, p. 2339) identify three key considerations with regards to the reliability of e-assessments, namely: “(1) opportunities for documenting and monitoring evidence of learning, (2) multiple sources of evidence of learning and (3) explicit clarity of learning goals and shared meaning of rubrics.” These criteria are linked not only to the articulation principle discussed earlier in this paper, but also to the ability of facilitators to engage in a continuous process of evaluation and feedback. The ability to do so not only reinforces the reliability of assessment but also the validity of the assessment.

Validity within the context of formative e-assessment may be defined as the degree to which the assessment activities and processes promote further learning (Gikandi *et al.* 2011). Valid assessment techniques involve assessing actual learning outcomes to see how well they match expected learning outcomes (Biggs 2003, 2011). However, we argue that educators need to do more than merely match objectives to intended goals, andragogy and assessment methodology as part of a summative assessment exercise. Accreditation-worthy assessment needs to be integrated into the entire learning process to ensure timely diagnostic and formative feedback to allow for either adjustment to the objectives or to the curriculum (Popper 2005). Thus, assessments increase in validity (and value) if the assessment protocols allow for effective feedback. Some research studies (De Villiers 2013a, Gaytan and McEwen 2007, Gikandi *et al.* 2011, Koh 2008, Wang, Wang, and Huang 2008, Wolsey 2008) report on the requirements for effective feedback: timely, ongoing, formatively useful, easy to understand, applicable for different learners, and realistic to follow. Van der Pol, Van den Berg, Admiraal, and Simons (2008) also suggest that style and presentation influences students’ use of feedback, in that the more the students comprehend feedback and perceive it to be useful, the more they are likely to utilize the feedback in revising their work.

In practical terms, computer-assisted assessments, such as computer-mediated multiple choice tests, offer a number of benefits that not only enhance learning and reduce the workload of administrators and practitioners, but also provide a more reliable assessment of achievement. E-assessments can be accessed at a greater range of locations than is possible with paper examinations, enabling learners to measure their understanding at the place and time of their own choosing. Immediate feedback delivered online in response to answers selected by learners can rapidly correct misconceptions; and the time saved in marking can be used in more productive ways, for example in supporting learners experiencing difficulties. Outcomes of assessments can also be more easily

collated and evaluated for quality assurance and curriculum review processes. Online tests, coupled with coaching reports or suggestions for remediation (based on incorrect answers), have provided a timely means of measuring extent of recall/learning and targeted areas for revision in undergraduate online courses, as evidenced by this student comment:

...the mini tests kept me up-to-date and on track with my reading and assignments... (SB, undergraduate)

There is a suggestion, however, that problems with academic honesty and integrity are more prevalent in online courses (Thomas 2014), particularly for summative assessment, which is often used for accreditation purposes. For example, unsupervised, students may attempt multiple choice tests in groups or even have friends complete the tests for them. On the one hand, if such a test is for formative assessment, then students would learn from group interaction (or even by looking up the answers in the textbook!), and so such practices may not necessarily be seen as a problem. On the other hand, if used as summative assessment, there are tools available to prevent or discourage “cheating” via e-assessment (Codova and Thornhill 2007). For example, LMS software such as Moodle, can track users by IP number and time allocated to activities to discourage group test taking. Many institutions around the world use Turnitin successfully to ensure students write their own assignments, and if used over multiple classes, it can ensure they are not submitting duplicate assignments. Even a simple Google search (cut and paste of key phrases) can track down plagiarism of online material.

However, e-assessment for accreditation purposes may be made much more sophisticated, thus incorporating more validity into assessment procedure. For example, in one capstone course, video clips of presentations were recorded using Panopto software, then uploaded by learners (a similar result could be obtained through open source tools such as YouTube and a mobile phone). These video clips enable facilitators to provide carefully considered summative assessment as to the extent to which learning has occurred and to provide detailed, reflective feedback from an audience perspective. Finally, as with the articulation principle, accreditation also incorporates learning by educators themselves. Online course and teaching appraisals facilitate constructive and timely feedback on facilitator performance.

Adaptation

A key advantage of e-assessments is adaptation to context, learning outcomes and stakeholders. Adaptation encourages multi-dimensional approaches to assessment through incorporation of a diverse range of opportunities for students to adequately demonstrate their competencies and skills, and enhance their learning (Gikandi *et al.* 2011, Gaytan and McEwan 2007, Crisp and Ward 2008). Research suggests that educators who desire to improve assessments in order to

improve learning, need to acquire a “deep understanding of the contexts and constraints which students encounter in different disciplines” (Donald 2002, as cited in McCracken *et al.* 2012, p. 108). This implies a deep knowledge of the various thinking competences required in each discipline, each course and each assessment event in order to select the most appropriate assessment strategy and tool for the desired outcome. E-assessment strategies should remain adaptive enough to allow for a mixture of assessment events, supporting various learning outcomes, as organized in Bloom and his co-authors’ (1956) taxonomy of learning, whilst simultaneously delivering on experiential, case-based and project-based learning outcomes.

Several studies conclude that educators need to adapt their teaching styles, instructional methods and assessments to facilitate the learning process by offering a variety of learning opportunities appropriate to different student learning styles and to different subject matter (Baker, Simon, and Bazeli 1986, Buch and Bartley 2002, Cartney 2000). Proponents of experiential learning (Anderson and Lawton 1988, Boud 1996, Cannon and Feinstein 2014, Gosen and Washbush 2004, Kolb 1984, 2014), goal-based scenarios (De Villiers, Hankin, and Woodside 2015, Schank, Fano, Jona, and Bell 1993) and project-based learning (Blumenfeld and Krajcik 2006, Gülbahar and Tinmaz 2006, Krajcik, McNeill, and Reiser 2008) suggest that effective learning strategies go beyond exposure to inert facts and information, and allow students to gain experiences in planning, executing, reflecting and redesigning, even in a simulated environment. For example, using video-recorded presentations prepared by student teams as an e-assessment tool is based on a shared experiential context as students make use of different skills and competences within their group.

A wide range of assessment activities, regularly administered, allow for dynamic adaptation to different learning contexts, content, learning outcomes and most importantly, learners’ preferred learning styles (Gaytan and McEwen 2007, Kolb 1984, 2014). Andragogy should consider the progressive development of learning outcomes to achieve first unconscious then conscious competence, and finally, mastery. According to McLoughlin (2002), “Effective scaffolding [for adaptive learning] diminishes when students achieve a greater degree of competence” (p. 156). The assessment method and supporting technology should be capable of modification and should be able to increase or reduce in intensity, as the learners’ capabilities ebb and flow over the various dimensions of the learning module.

Achieving multiple learning layers of competence across different contexts, abilities and outcomes can be facilitated through access to electronic resources and communications technology. The advantages of the flexibility and choice offered by ICT and e-assessments, are the design alternatives in topic, method, criteria, weighting, timing, formatting and timing of assessments. These choices allow for an improvement in the assessment experience of learners, overcoming some of the “industrialization” disadvantages of traditional methodologies,

providing more appropriate assessment strategies for the unique needs of diverse learners.

A good example of adaptive e-assessment is the international projects at Victoria University of Wellington where teams of six students across three countries must communicate electronically within a two week window to achieve a mutually-agreed upon goal (for example, development of a micro-financing scheme in India). The learning outcome (cross-cultural communication) is only possible using ICT and is achieved because of differences in location, language, training, skills, and abilities. Here, depth of context and capability is furnished largely by the students themselves, who, being from different cultural backgrounds, are able to contribute their own unique insights to the project.

I've learnt so much from this project, because we had to work with a team from several different countries I found I was learning and teaching at the same time (CY, undergraduate).

Authenticity

Our final principle captures the extent to which learners and assessors find the e-assessment credible and authentic in terms of real-world application to the domain being studied. E-assessment strategies and practices should encourage the development of competencies beyond the content, i.e. the development of learning communities, social and emotional competencies and reflective, self-management insights. Thus, the challenge for educators is to design e-assessments that have more lasting value rather than merely acting as a gatepost or diagnostic tool to determine competency progress.

Several studies of assessments in various learning domains (e.g. Gikandi *et al.* 2011, Lin 2008, Mackey 2009, Wang *et al.* 2008) suggest that outputs being assessed should be authentic or based on the real world (Buzzetto-More and Alade 2006, Wiggins 1990), or simulations of real scenarios likely to be encountered in the workplace (De Villiers 2013b, p. 2006). Authentic assessment interventions, relevant to real world situations that promote engagement, genuine problem-solving, complex decision making and deep reflection, allow for the potential to improve self-management and meta-cognitive thinking, and, importantly, to be transferrable upon graduation. This study expands the concept to include the fundamental principle that instructors should attempt to ensure that e-assessments simulate real-world assessments or performance evaluation (as completed by a mentor or workplace supervisor), so that students appreciate the value of feedback and learn how to respond to advancement conversations and opportunities to develop and grow. For example, custom webpages developed by Author B for an internship programme enabled student, teacher and sponsor to develop, revisit and evaluate the goals, progress and outcomes of student industry placements. Author C cites company course sponsorship in Japan, with specific project goals set by company mentors rather than course facilitators, as another

example. Here company representatives would attend every class to guide and provide feedback to students as the project progressed.

An additional benefit of authenticity in e-assessment, is that students learn to provide constructive feedback. Anchoring assessment activities in meaningful simulations, empowers students to apply learning to real-world situations, while being mindful of the performance outcome. In practice, therefore, international business educators should consider how intended assessments contribute to students' application of the knowledge of real-world issues and to an orientation of life-long learning and development that ensures the skills developed today remain future proof and valid beyond graduation. One example used by Author A, is to require students to demonstrate their use of a particular set of persuasion and technical skills alongside online tools to develop an online, multimedia CV. The CV forms part of the course assessment, but also has the potential for use in real-world job applications. In this way the students' investment of time and effort is clearly of value to the future. Familiarity with collaboration tools such as Google Sheets and Google Docs, which mimic real-world interactions that occur in workplaces, are also useful additions to student skill sets. Further, using websites to present situations and scenarios in video clips, text links to contemporary publications, and real-world images will also give meaning and purpose to the students' assessment endeavours. Returning to our earlier example of online discussions illustrates how participation through research improves authenticity:

[The course] used the online discussion platform "Moodle" to empower us to learn more about specific topics. First we would research the topic and then write a blog. Next we could read other class members thoughts on the same topic and have an online discussion. I found this more productive and conducive to learning than the traditional in lecture discussions, as it was non-confrontational and other students had time to think before responding. This allowed us to gain a deeper understanding of international management (AS, undergraduate student).

Author B has also found that custom e-books, which include assessment activities based on learning objectives, not only align evidence and outcomes better than traditional andragogical methods that rely on external material, but by focusing on cases and examples relevant to local students greatly improve authenticity of such assessment.

I had the opportunity to work with [her] when she co-authored the e-textbook – the updated content, new materials and cases are exemplary. This is the only IB book that is available that looks at the New Zealand perspective. (IP, PhD candidate)

To conclude this section, Table 1 provides a summary of the description, key advantages and examples of application of each of the seven principles of effective e-assessment.

Table 1: The 7 As: Principles of Effective E-Assessments

#	Principle	Description	Key advantages	Examples (software/platform)*
1	Affordance	Ability to allow for formative, diagnostic or summative feedback more effectively than alternative technologies/ assessment tools.	<p>E-learning assessments afford currency, responsiveness and flexibility in terms of content, delivery and feedback, increasing participation and engagement by both teacher and students.</p> <p>Online availability allows anytime and anywhere access to assessment information, data, feedback from multiple sources to multiple recipients, offering the edge over traditional forms of assessment and encouraging learners to “opt-in” rather than “opt-out”.</p>	<p>Online discussions consisting of initial and reply posts to assessment questions and answers via a centralised technological platform (Moodle) (Masters course, University of Waikato).</p> <p>Use of online group discussions and workshops to facilitate peer evaluation and participation in classes of 300 or more participants.</p>
2	Alignment	Ability to align method with outcome. Address dissonance between expected and real outcomes.	Electronic evidence and feedback mechanisms enable alignment between method and outcome in a timely and personalised manner.	Rubrics, e-marking (e.g. track changes in electronic documents), and personalised feedback via online communications (email, Skype, voice recording etc.). Value of feedback can be extended to group (class email, online forums, social media, blogs etc.).
3	Articulation	Goals, standards, expectations are clearly articulated and both students and facilitators are open to dialogue in case of uncertainty throughout the assessment intervention.	<p>Enhanced clarity and understanding of assessment.</p> <p>Student-peer-facilitator synergy promotes mutual learning and development through assessment.</p> <p>May be particularly relevant to assessments of longer duration and greater complexity where formative and diagnostic assessments are on-going and goals may evolve over time.</p>	<p>Online presentations in the form of lectures and workshops clarify objectives, expectations (GAPE, Vis.Talk)</p> <p>Applications (email, real-time chat, person-to-person video, blogs, discussion groups, social media groups, online forums, group email, etc.) facilitate discussion provide a direct and personalised learning conduit.</p> <p>In-depth feedback via e-marking and peer review of formative assessment prior to preparation of summative assessment.</p> <p>Cross-border research supervision (Skype, email, cloud-based file transfers, Doctoral and Masters students).</p>
4	Accountability	Students and teachers are mutually responsible for the learning outcomes to be achieved and for providing/collecting evidence of this achievement.	Tripartite responsibility (student-peer-facilitator) for assessment outcome completion, evaluation and review.	Online portal for assessment related resources, including lecture materials, readings, cases, research materials, and URLs to relevant webpages, announcements, emails, updates, feedback etc. (Learning Management Systems, Blackboard).
5	Accreditation	The assessment is a realistic measure of the expected learning outcome, and feedback provided before, during and after assessments is useful for the purpose it is designed for.	<p>Reinforces reliability and validity of assessment.</p> <p>Computer-assisted assessment can enhance learning and reduce the workload of educators.</p> <p>Promotes academic integrity.</p>	<p>Online tests coupled with coaching reports or suggestions for remediation (LMS).</p> <p>Videos of presentations uploaded by (groups of) students as summative assessment (Panopto).</p> <p>Applications to reduce and deter cheating (Turnitin, Google search).</p> <p>Online teaching/course appraisals facilitate anonymous, constructive and timely feedback to teachers (BLUE).</p>

6	Adaptation	The assessment can be adapted to accommodate the assessed content, the learning context, teachers and learners' styles and most importantly, the learning outcomes.	Achieving multiple learning layers of competence across different contexts, abilities and outcomes.	International project teams achieve a mutually-agreed upon goal, bridging cross-cultural differences in location, language, training, skills, and abilities (Skype, email, teleconferencing, undergraduate course, Victoria University of Wellington).
7	Authenticity	Upon deep consideration, the assessment event seems fair, legitimate, realistic and useful in the real-world application of the learned knowledge, skills and attributes.	Currency and future value of assessments. Application of skills in the "real world".	<p>Custom webpages developed for an internship programme enabled student, teacher and sponsor to develop, revisit and evaluate the goals, progress and outcomes of student placement in industry (undergraduate course, Victoria University of Wellington).</p> <p>Present situations and scenarios (e.g. YouTube) video clips, text links to contemporary publications and real-world images give meaning and purpose to the student's assessment endeavours.</p> <p>Collaboration tools such as Google Sheet and Google Docs, that may mimic more real-world interactions that occur in workplaces; Using CV design tools such as ABOUTme.com to communicate personal interests and competencies.</p> <p>Custom e-textbooks link assessment activities to learning objectives.</p>

* Unless otherwise stated these are undergraduate (3rd and 4th year) marketing and international business courses offered by the Waikato Management School, University of Waikato.

6. Conclusions

As blended and e-learning andragogy signposts a significant departure from traditional teaching/learning, as educational outcomes for business education shift, and as new online learning domains become available, new assessment strategies and processes are needed (Arevalo, Bayne, Beeley, Brayshaw, Cox, Donaldson, and Reynolds 2013, Harasim 1999, HEFCE 2009). The basic premise of assessment to understand and support student learning has remained unchanged since Socrates, but assessment processes have evolved. Scholars point out that with careful deliberation, planning and implementation, e-learning tools and teaching methods have the ability to enhance and transform learning outcomes and development occurrences within andragogy (Garrison and Anderson 2003, Kirkwood 2009).

This study investigates how ICT and e-learning tools contribute to an important component of learning activities, namely assessment. More specifically, it identifies and develops seven principles of effective e-assessment, and explores how the student-peer-facilitator tripartite, supported by online tools, affords even greater adherence to these principles. In addition, the programmes

considered for this paper and the teaching practices and student reflections over several programmes at several universities, indicate that e-assessments (like other generic assessments) need to be principle- and outcome-based to enhance the learning experience for all stakeholders in the tripartite. Considered introspection and student reflections confirm that, by adhering to these principles, e-assessment and ICT tools can afford international business educators with opportunities to achieve challenging learning outcomes. Facilitators and students confirm that when e-assessments are carefully designed in accordance with the principles in this paper, they establish meaningful, diagnostic, formative and summative feedback opportunities through iterative processes, enhancing the co-creation of learning experience of all parties. In doing so, the e-assessment andragogy truly captures the intent of assessment (as per our opening quotation) as being from the Latin root *assidere*, where facilitator, student and peers “sit beside one another”.

Despite the huge shift in the conceptualization of student development and learning, the concomitant shift expected with regards to student assessment is emerging much more slowly. It is our precept that placing students in a partnership role, specifically a pro-active role in generating and transferring knowledge between members of the teaching-learning tripartite, should have profound implications for how facilitators plan and execute assessment. Research suggests that teachers are still primarily responsible for formal assessment (Biggs 2011, Boud 2000, Passarelli and Kolb 2011, Yorke and Knight 2004), and although peer review and self-assessment are increasingly used as assessment tools, facilitators still hold almost all responsibility for determining students’ competency and the requirement of any remedial process or subsequent improvements. In contrast, research suggests that students learn best by actively constructing their own understanding, with learners deriving meaning from information and linking new concepts to prior knowledge, not by passively listening to transmitted information, even in the form of feedback (Schank, Berhman, and Macpherson 1999, Umapathy 1985).

In contrast to the current, predominant practice of spending the most time on designing learning interventions, international business educators need to spend more time planning and implementing opportunities for learners to make their own evaluative judgements about the quality of their work in order to improve their ability to be reflective, and to become life-long learners with futureproof competencies. Developing a clear understanding of the principles underpinning effective e-assessment and feedback will enable educators to integrate a wide range of technology-based tools into their assessment andragogy, thus providing a wider range of appropriate assessment and feedback strategies to learners at various stages and with various learning styles (JISC 2011).

7. Limitations and Future Research

As a conceptual paper, this research only offers limited empirical evidence to support the seven principles introduced. Depending on one's paradigm and particular epistemology, a scholar might see important differences between concepts within the constructs and wish to separate them into different/new principles in order to highlight the importance to e-assessments. Further research to provide empirical support and to demonstrate predictive validity of the model is required. There is also scope to consider the principles suggested here across a broader variety of teaching environments and study levels. Further research might consider alternative programmes (e.g. executive development); alternative domains (outside of the business school); and alternative university settings (rural, private and distance learning institutions). Furthermore, the scope of this paper did not allow us to focus on pitfalls or best-practices in the design and execution of e-assessments, (e.g. increasing the workload of staff, or allowing time for students to become familiar with the ICT element of e-assessment, over-and-above the course content). We are fully aware that such limitations and practical considerations need addressing. This paper on e-assessment principles represents a small, but we hope a critical first step towards more effective e-learning and e-assessments in international business education.

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Appendix A: Author Experience

Author A first taught management as a coach and training consultant working with blue chip companies in South Africa. She has since taught courses at universities in the U.K., U.S.A., New Zealand and Australia at undergraduate, postgraduate and MBA level, and has wide experience teaching differing class formats from small seminar, through to large lectures. Her key areas of teaching expertise include sales management, performance management, negotiation, creativity and innovation, marketing, consumer behaviour leadership and decision making.

She has used technology-based approaches to manage large classes and facilitate large class engagement, to distribute course materials, to substitute paper quizzes and exams, and to develop students' skills in digital technology. E-assessment activities include student-peer and student-facilitator interaction between classes, online discussions, student development of online questionnaire surveys, digital curriculum vitae and websites, peer review of assignments, online video pitches, and in-class, impromptu quiz delivery.

Author B has nearly 20 years of experience at tertiary level. Her areas of teaching expertise are international business, with a focus on management and strategy. She has taught in a wide range of multicultural classes, from very large undergraduate to very small Masters level groups, in a number of countries, predominantly New Zealand, but also in Finland, Japan and Vietnam. Her initial forays into e-learning included the establishment of a web portal with links to relevant online material, and custom webpages for an internship programme. More recently, she has designed, developed and facilitated three courses solely online. The e-assessment in these courses is supported by custom course webpages (MyWeb), online submission and feedback, e-delivery methods (Vis.Talk) and online course appraisal systems (e.g. Blue). She has also co-authored a full length e-textbook on International Business Strategy and an accompanying e-casebook to be used in conjunction with these courses.

Author C worked in Japan for 27 years, as well as long periods in Spain, the U.K., Singapore, the U.S.A., Australia and New Zealand, and has a wide experience teaching in multi-cultural and multi-lingual environments. His key areas of teaching experience are consumer behaviour, retail marketing and strategy, digital and online marketing, and international marketing and international business, in both English and Japanese. He also has significant experience in management training, both as part of Executive Master of Business Administration (EMBA courses), and for bespoke courses inside particular companies or industrial or government organisations. His use of teaching technology focusses on solving issues with large classes in Japan, and achieving student peer and facilitator interaction both in and out of class. In 1994 he chaired the first committee briefed with evaluating and implementing a Learning Management System (LMS) at the University of Marketing and Distribution Sciences in Kobe, Japan.

