



E-Assessment as method and set of tools to ensure effective learning & teaching: Theory and Practice

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Background of the authors:

The first author, Rouxelle de Villiers, has taught at several levels, first as high school teacher for Mathematics, later as executive management development officer, and management coach and consultant in formal private education, and lastly many years as tertiary educator in the formal university sector, teaching from first years, through final year business graduates to MBAs and executive short courses. The second author Dr Roy Larke, is a career academic, with 27 years' experience working in Japan, at University of Marketing & Distribution Sciences in Kobe, and Rikkyo University in Tokyo. He was also visiting professor at Haas Business School, UC Berkeley, University of Edinburgh, and ESADE in Barcelona. He brings teaching experience at all levels, notably in MBA and EMBA at these schools, and was responsible for development of online and distance learning teaching methods at the schools in Japan. He is also author of Webquests: A corporate training application (in Japanese), introducing the concept of web-based investigation for company training programmes. Over the past five years, the third author Assoc. Prof Joanna Scott-Kennel has designed, developed and run three fully online tertiary level courses from her New Zealand base. She is Adjunct Professor in Finland, has held visiting professor positions in both Europe and Asia. She has initiated and developed online teaching innovations, including custom course webpage design, online assessment, e-delivery methods and two co-authored e-textbooks used by students in New Zealand and internationally.

E-Assessment as method and set of tools to ensure effective learning & teaching

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

Abstract:

Several simultaneous educational transitions—for example, a rapid expansion in blended andragogy; advances in technology and digital teaching aids; and the increased availability and uptake of online distance learning—drive the need for new approaches to assess outcome-based e-learning and business competency teaching. This study reviews the a priori research on traditional tertiary-level assessment and re-interprets the literature to align with e-learning and blended learning teaching strategies and practices. This reformulation, combined with insights from e-learning scholars, practitioners and students, results in a new framework of seven principles of best practice in assessment strategies and practices that support effective competency development in blended undergraduate classes. A key principle highlighted by this study is that modern pedagogy, aided by technology, allows students to co-create knowledge and make sense of complex concepts in partnership with facilitators (teachers and peers). It follows that effective assessments should involve all three partners of the student-peer-facilitator tripartite and apply the same generative technologies used during the learning process. This study presents each of the nine principles with tried and tested implementation strategies, along with examples of assessment strategies successfully used in blended business education classes at tertiary level.

Keywords: *assessment; blended learning; co-creation of knowledge; e-assessments; e-learning; experiential learning; flipped classes; online assessments; social media*

Introduction

The purpose of this paper is to provide insight into the key concepts of e-assessment and to investigate key principles to guide educators in their assessment strategies and practices involving e-assessment tools. We illustrate a number of the ways in which technology and e-learning serve as useful and effective assessment mechanisms for satisfying the principles of effective assessment within blended and e-learning contexts. The study is based on a review of the prior literature, interviews with highly experienced e-learning facilitators, feedback from students, and the authors' own development, implementation, and review of experiences in the use of flipped and blended teaching in New Zealand and Japan. The methods profiled 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 introduces seven e-assessment principles, implying that they are fundamentally important to all types of e-assessments, irrespective of context, content or stakeholders. We start by reviewing the concept of assessment and how this has evolved with the development of online teaching technologies, and then consider assessment categories and how they apply to e-learning contexts. The research methods, confirmatory introspection and auto-ethnography, are introduced. After a brief summary of key extant contributions in the e-assessment literature, we present the seven principles.

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These are expanded, with theoretical justification and practical examples, in the final section. Brief conclusions and suggestions for future research follow.

A Brief History of Assessment

History records Horace Mann as an early pioneer, in 1840 in the USA, of learning measurement using standardized written examinations (Pearson et al., 2001). Assessment experts, however, assign the oldest undergraduate assessment at tertiary education to the University of Wisconsin, for having assessed student outcomes and performance formally and continually since 1900 (Urciuoli, 2005)—in response to the call to develop an accreditation mechanism to measure the efficiency of higher education institutions. More recently (1980) the focus shifted to emphasize student learning rather than institutional efficiency. In 1992 the US Department of Education (Ewell & Steen, 2006) introduced a requirement for accreditation agencies to consider learning outcomes as a condition for accreditation. The same year the Higher Education Funding Council in the UK proclaimed the assessment of quality of education in funded institutions. According to assessment experts (Urciuolo, 2005; Kirkwood, 2009) the terms ‘standards’ and ‘accountability’ permeate educational discourse today throughout Europe, following trends set in the USA. A profound transition occurring in tertiary education today is a significant move from a historic classroom model to an online or blended delivery model (Benfield, Robert & Francis, 2006; Mandelbaum, 2013; Schlager, Farooq, Fusco, Schank, & Dwyer, 2009). Current educational trends of accountability and blended learning (blending traditional delivery methods with various technology-based pedagogies) propels scholars to review their teaching and assessment strategies and practices. Further, scholars advocate “flipped” classroom teaching, where the learning tripartite (i.e. students, peers and facilitators—the latter consisting of teachers, lecturers and tutors) co-create concepts, knowledge maps and charts, models, and frameworks maps in the classroom, after they have individually studied preparatory materials. Abeysekera and Dawson (2015, p.1) define the flipped classroom as, “approaches [that] remove the traditional transmission lecture and replace it with active in-class tasks and pre-/post-class work”, while Honeycutt, and Garrett (2014) expands the definition of flipped classes as a shift from individual to collaborative work, the move away from dissemination of information, and towards acting with, and on, information to achieve specific learning outcomes.

Scholars advocate the use of assessment to ensure that educational institutions achieve student learning goals (Haken, 2006), and as an important evidentiary aid when seeking and maintaining accreditation (Buzzetto-More & Alade, 2006). Hersh (2004) advocates that institutional effectiveness and assessment of student learning are inseparable and assessment should be considered an integral part of the teaching and learning processes, as well integral to the feedback loop that serves to enhance institutional effectiveness. Proponents of e-learning (Vendlinski & Stevens 2002; Bennett, 2002; Buzzett-More, 2006) report on the use of information technologies and e-learning strategies to

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7 provide a means for assessing teaching and learning effectiveness by providing alternative assessment
8 protocols (Bennett, 2002). New measures for assessing learning will yield rich sources of data and
9 expand the ways in which educators understand both learning mastery and teaching effectiveness.
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12 Our study defines e-assessments in line with the work of Pachler et al. (2010, p. 716) as, “the use of
13 ICT to support the iterative process of gathering and analyzing information about student learning, by
14 teachers as well as learners and of evaluating it in relation to prior achievement and attainment of
15 intended, as well as unintended learning outcomes.” Thus e-assessments are built on traditional
16 assessment techniques, but facilitated via online processes and digital tools.
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20 Advances in communication technologies and web-based teaching aids have had a profound impact
21 on teaching-learning approaches (Caravias, 2014; JICS, 2011; Tapscott & Williams, 2006), but the
22 assessment is not so clearly considered. Blended learning approaches combine a mix of Information
23 and Communication Technology (ICT) with various digital learning resources and delivery
24 methods—blending traditional face-to-face instruction with technology mediated instructional
25 methods. Several research studies assert the positive effect of blended learning for teaching and
26 learning (Bielawski, & Metcalf, 2005; Benfield, Roberts, & Francis, 2006; Chew; Lim, Morris, and
27 Kupritz, 2014) but fail to link the learning approaches to assessment strategies and practices. Thus,
28 new assessment strategies, practices and tools are needed in response to new e-teaching/e-learning
29 practices.
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35 There appears to be a dearth of academic studies on strategies and practices in e-assessment in
36 business education. A review of computer assisted assessment by Conole and Warburton (2005, p. 27)
37 reports that, “[t]he role of technology and how it might impact on assessment is still in its infancy and
38 we need to develop new models for exploring this.” Revees and William (2002) call for an
39 improvement in the quality of assessment within e-learning practices. In contrast, proponents of
40 blended learning and online teaching-learning aids report on a number of augmentation advantages of
41 e-assessment to support a greater variety of artefacts and allow for greater learner expression; are
42 dynamic and multimedia driven; to be accessible by a large audience; to contain meta-documentation;
43 are easy to store; and may serve to advance student ability either academically or professionally
44 (Buzetto-More, 2006; Bennett, 2002).
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49 Further, today scholars characterise tertiary learning as a co-creative process. Rather than the mere
50 transferral of information and the transmission of knowledge, the process is one where students
51 actively partner with teachers to learn by co-constructing their own knowledge, skills and attitudes to
52 information and taking at least part responsibility for their development and growth (De Corte, 1996;
53 Katernyak, Ekman, Ekman, Sheremet, & Loboda, 2009; Nicol, 1997; Pintrich & Zusho, 2002).
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7 Despite the huge shift in the conceptualization of student development and learning, the concomitant
8 shift expected with regards to student assessment is emerging much more slowly. It is our precept that
9 placing students in partnership role, with the concomitant pro-active role in generating and
10 transferring knowledge between members of the teaching-learning tripartite, should have profound
11 implications for how teacher and facilitators plan and execute assessment. Research suggests that
12 teachers are still primarily responsible for formal assessment (Biggs, 2011; Boud, 2000; Kolb 2011;
13 Yorke, & Knight, 2004), and although peer review and self-assessment are increasingly used as
14 assessment tools, teachers still hold almost all responsibility for determining students' competency
15 and the requirement of any remedial process or subsequent improvements. In contrast to this,
16 educators advise that students learn best by actively constructing their own understanding. Learners
17 derive meaning from information, linking new concepts to prior knowledge, not by passively listening
18 to transmitted information, even in the form of feedback – thus improving knowledge retention and
19 application. (Schank, Berhman, & Macpherson, 1999; Umapathy, 1985). In contrast to the current
20 dominant practice of spending most time on designing learning interventions, educators need to spend
21 sufficient time planning for, and implementing opportunities for learners to make their own evaluative
22 judgements about the quality of their work in order to improve their ability to be reflective, life-long
23 learners with futureproof competencies.
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30 *Assessment categories and how they apply to e-learning contexts*

31 An assessment is a measurement of the learner's achievement and progress in a learning process in
32 relation to desirable outcomes (Gikandi, 2011; Keeves, 1994; Reeves & Hedberg, 2009) and is a
33 "critical catalyst for student learning" (Conole and Warburton, 2015, p.17). It consists of various and
34 ongoing processes that involve planning, discussion, reflection, measuring, observing, rating, data
35 aggregating and analyzing, and improving based on the data and artefacts gathered around a specific
36 set of learning objectives (Calderon 2005; Buzzetto-More & Alade, 2006). Educators generally agree
37 on three broad categories of educational assessment: formative, summative, and diagnostic (Bull and
38 McKenna, 2004). The key difference between these assessment types, is an assessment's end purpose.
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44 *Formative assessment* is commonly applied in the classroom as a source of ongoing feedback with the
45 purpose of improving teaching and learning (Hargreaves, 2008). The primary goal of formative
46 assessment is to *monitor learning* to enable timely, personalized feedback (Nicol & Macfarlane-Dick,
47 2006). According to Sadler (1998) formative assessment refers to assessment specifically intended to
48 improve and accelerate learning. Feedback provides insight to teachers on how to improve their
49 teaching to ensure more effective learning environments and enable facilitators to recognize
50 excellence as well as areas where students are struggling. Feedback to students should enable
51 remedial activities (if necessary) and provide personal insight into their own progress and
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7 performance, strengths and weaknesses, and enable both student and teacher to target areas that may
8 need additional work (Gikandi, Morrow, & Davis, 2011; Race, 2014).
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11 *Summative assessment* measures students' learning at the completion of an instructional unit, the end
12 of a course, or after some defined period (Gikandi, 2011, p. 2336). The overall intent of summative
13 assessment is to *evaluate student learning* at the end of an instructional unit by comparing it against a
14 pre-determined, appropriate standard or benchmark, and thus summative assessments remain crucial
15 for certification and establishing reasonable levels of competency.
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18 *Diagnostic assessment* offers indicative, problem-identification and problem-solving opportunities to
19 gather information about many issues relevant to the teaching and learning process. Examples may
20 include: determining students' prior knowledge; individual and collective student growth;
21 effectiveness of teaching practices and programs; projection of whether a student; or class is on track
22 to achieve competency benchmarks; and the unique instructional needs of diverse students (Bull &
23 McKenna 2004; Conole & Warburton, 2015; Laurillard,2013). The main purpose is to detect
24 remedial and enhancement opportunities to build on areas of strength and scaffold or develop areas of
25 weakness.
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30 Some authors (JSICS, 2011; Nicol, & Macfarlane & Dick, 2006) add *self-assessment* as a fourth
31 category, and define it as, "the degree to which students can regulate aspects of their thinking,
32 motivation and behaviour during learning" (Pintrich & Zusho, 2002, as cited in Nicol, & Macfarlane
33 & Dick, 2006, p.199), but in our view, this type of assessment intervention differs only in the 'who',
34 rather than the purpose of the assessment. The purpose of self- or peer-assessment is still to provide
35 formative, diagnostic or summative feedback, but the responsible or party auctioning or executing the
36 assessment changes from teacher to student (learner) and from peer to student.
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41 Our study uses the definition of e-assessments as provided in the work of Pachler et al. (2010, p. 716,
42 see above). Thus e-assessment builds on traditional assessment techniques for formative, summative
43 and diagnostic assessments, but is facilitated via online processes and digital tools. As the term 'e-
44 assessment' is sometimes understood as referring only to on-screen assessment, 'technology
45 enhanced' or 'technology-enabled assessment' are the terms used here to describe practices made
46 possible by technology (JISC report, 2011) further, although our adopted definition encompasses
47 teachers, learners and their peers, it does not elucidate the relationship between the three that exists
48 via technological ties that further support assessment of student learning. We suggest in this paper that
49 online technologies serve to establish, enable and strengthen three-way relationships and assessment.
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Principles of effective assessment

A broad literature contributes to our understanding of assessment as andragogy. Kellough & Kellough (1999) identify effective assessment as that which can: contribute to and improve student learning; identifies 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 communicate with stakeholders.

E-assessment must not only fulfil these seven purposes, but also offer affordance, meaning 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/teaching contexts. According to Kirkwood (2002; p.108), key andragogical functions for ICT include presentation, interaction, dialogue and generative activity (enabling learners to record, create, assemble, store and retrieve text, data, images, etc., 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 (in other words, not merely offering dialogue but with the intention of highlighting strengths, weaknesses and remedial opportunities) by expert mentors, coaches and trainers.

Given potential affordance of technology-based assessments over traditional means, it is perhaps surprising that there are not more e-assessment frameworks available. One example is McCracken, Cho, Sharif, Wilson & Miller (2012, p.107), who identify six assessment design principles in 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." There is a clear need for more detailed study of e-assessment, and frameworks should guide the design and implementation of assessment strategies for blended or online learning practices. Thus, the purpose of this paper is to respond to the call by scholars to develop a model to steer the design and implementation of principled e-assessments.

The objective for the remainder of the paper is to build on these principles using extant theory and real-world examples. We start by outlining our research method and approach. Then by combining the collective experience of our team, along with the research literature on assessment and e-learning, coupled with the affordance benefits of ICT, we conceptualize and illustrate seven principles for the design and implementation of effective e-learning assessments.

Confirmatory introspection and auto-ethnography as research methods

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 our own paper, we compare the teacher/assessor experiences of the three authors and base the second part of this report on the collective experiences, perceptions, cognition and about e-learning and e-assessment. We draw on in-depth auto-ethnography (AE) (Denzin, 2011; Hamilton, Smith, Worthington, 2008; Hannigan, 2014; White, 2001) and confirmatory introspection (CI) suggested by sociology researchers (Marshall, 2014; Holbrook, 2014) as increasingly common qualitative methods in social sciences and as a legitimate act of reflexive inquiry and exploration of a topic. The authors acted as a “critical friend” (Hamilton, 2005) and sounding-board to review how we were “othered” (Bennett, 2004) in our consideration of how the context and teaching environment affected our practice, strategies and decisions. Prompted by a large variety of vaguely defined principles uncovered in the literature review, we distil seven clear principles through comparison with thematic analysis of student journals and interviews.

The paper considers and relies on the experiences of facilitators, formal interviews with tutors and student participants and theme-based analysis of e-journals and reflective portfolios for student feedback on e-assessments. Courses in marketing, management, and organizational behaviour at undergraduate and post graduate level in New Zealand, South Africa and Japan provided the ethnographic context for the introspection and deliberations. In the broader analysis we considered various blended and online programmes: the 4-year Bachelor of Management Studies degree and 1-year Masters programmes at the University of Waikato (NZ), the 3-year Bachelor of Arts at Victoria University of Wellington (NZ), Masters and PhD programmes, Masters and PhD programmes at Aalto University, Finland, and consumer behaviour, distribution and marketing courses, and EMBA distribution courses taught at Rikkyo University in Japan; Consumer Behavior, Co-operative Education Workplace Learning programmes and MBA Alliances & B2B Networks Studies at AUT, New Zealand.

The use of AE and CI allows the researchers with several years of cognitive, conative and affective information, easy access to data on the lived experiences of themselves and closely-associated colleagues. Although this reflective account is somewhat personal, as are in-depth case studies, the accounts provide confirmation and illustration of the seven principles of effective e-learning assessments, as described below.

7 Principles of effective e-learning assessments

1. Affordance

Our starting point for our first principle is to ask simply, which alternative opportunities and possibilities for formative, diagnostic or summative assessment do the technology-based assessment strategies and tools afford, over and above more traditional assessments? 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 & Calderon (2005) frame this as (i) the identification of outcomes; (ii) the gathering and analyzing of evidence; (iii) reporting and discussion of results; (iv) identifying and suggesting improvement opportunities; (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 decision by educators. Buzzetto-More and Alade (2006, p. 256) record a large variety of e-assessment opportunities, amongst others: 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 an attempt to aid educators in finding alternative blended or online e-assessment tools that would offer greater benefits than traditional assessments, the authors tested various e-assessments, including multi-media e-portfolios, infographics, e-journals, multi-choice online quizzes, multi-media CVs and personal profiles as set out in Table 1.

In order to provide value over traditional methods, e-learning assessments should afford currency, responsiveness and flexibility in terms of content, delivery and feedback, increasing participation and engagement by both teacher and learners. Further, they need to enable students to take charge of their own learning and engage interactively with others. Finally, online availability of e-assessments affords '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'. But how can instructors use the special opportunities that are afforded by the facilities and attributes of the ICT and e-assessment aids, best promote learning and development? The following discussion illustrates an example of this affordance principle applied in practice by one of the authors.

One learning technology that demonstrates these aspects of affordance and has contributed to the combined learning actions and capabilities of students in upper level undergraduate and Masters level papers are online discussions (run using Moodle software). 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

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7 week to read over and comment on other posts which encourages discussion, critical thinking,
8 constructive criticism and above all, ongoing engagement. Using e-assessment to compile the initial
9 and reply posts enables contribution, review, evaluation and elaboration by learners, peers and
10 teachers– advantages beyond the scope of traditional assessment methods.
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13 *...Moodle discussions also made a nice change to the one-off individual assignments and*
14 *group presentations I normally see. Delivering our own opinion/perspective on each topic*
15 *and then starting up a forum like discussion, surprisingly genius, I learnt a lot. I personally*
16 *think it would be cool to see similar constructive environments introduced into other*
17 *STMG/INMG papers, as discussing the ideas we're taught really helped in understanding*
18 *them (MK, undergraduate, NZ).*
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22 This creates an environment in which all participants can draw on expertise in the class and learn from
23 each other; students can participate regardless of geographical location; and benefit from the
24 flexibility, timeliness and accessibility of a broader range of course-related resources via a centralised
25 technological platform. Independent online research effort extends their ability to apply what they
26 have learnt and enhances their learning experiences.
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30 *I also loved the Moodle chat sessions because while we never physically met anyone else in*
31 *the course, I feel like there was much more interaction and communication than most other*
32 *papers that have lectures and tutorials. Through posting regular replies to different topics we*
33 *were able to have open discussions and really see and understand other peoples' perspectives*
34 *and thought processes as people were more open and confident about sharing their ideas.*
35 *This really helped me understand and remember the content (KH, undergraduate student).*
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40 Further, affordance value lies in the ability of students to receive feedback from peers, which not only
41 reduces marking time, but actually increases the quality of individualised feedback. More importantly,
42 it gets everyone engaged because students have the time to prepare posts, reflect on others' answers
43 and engage in multi-directional dialogue. Further, students can revisit the forum at any time and
44 review all recorded responses, a feature not available via in-class tutorials. Finally, flexible
45 submission times and the ability to submit posts from any location with internet access are especially
46 useful for international students and those already in the workforce.
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50 *I was offered work in Australia near the end of my degree and as such these courses have*
51 *been a god-send for me ... and in my opinion I was able to learn more in this format than*
52 *from traditional means. (CJ, Masters student)*
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7 Given average class sizes of 200 students, with an upper-limit of 700 students in a single lecture-hall,
8 the ability of instructors to encourage interaction with students through traditional methods becomes
9 limited. In Japan, Google Groups and Twitter feeds were used to encourage in class and between class
10 interaction between students and instructors and between students individually. The high context and
11 patriarchal culture of Japan does not openly encourage debate with the instructor, but it was clear that
12 the opportunity to initiate and participate in discussion was welcomed by many students.
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16 To round out our discussion of theory and practical application of the affordance principle, we leave
17 instructors with a question to help determine the strength of this principle in intended or enacted e-
18 assessment: *How does e-assessment afford greater/new benefits over traditional methods?*
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20 21 22 **2. Alignment** 23

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25 As presented by McCracken et. al. (2012) our second principle is that of alignment. When the learning
26 assessment strategies and the set of tools used in the assessments align well with the learning
27 outcomes assessed, this is referred to it as curricular alignment (Buzzetto-More and Alade, 2006;
28 Martell & Calderon, 2005). According to Baratz-Snowden (1993), curriculum alignment holds
29 educators accountable for demonstrating when and where students have the opportunity to learn
30 concepts and acquire competencies. Curriculum-assessment alignment links learning outcomes to
31 pedagogy, and demands reflection on the sequence in which competencies are built. Adept facilitators
32 select e-assessment events to create and promote opportunities for learners to demonstrate their level
33 of achievement in pre-determined learning outcomes. In addition, the very assessment should assist
34 learners to demonstrate to self, facilitators and peers, their improvement on pre-selected competencies
35 and thus close the gap between current and desired learning outcomes—improving their alignment
36 with academic standards. Further, curricular alignment requires educators to ensure performance
37 standards (as reflected in the rubric or assessment requirements) of a particular competency level (e.g.
38 first year studies versus masters' degree projects).
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45 Alignment has been achieved in practice through a combination of rubrics and e-marking through the
46 learning management system (LMS) used at the Waikato Management School (WMS). Students are
47 supplied with rubrics as part of articulation of the assessment (see below). Then post-submission
48 comments can illustrate how the assessment met, exceeded or failed to meet these rubrics. A key
49 advantage of e-marking technologies is the ability to use the track changes and comments functions of
50 modern word processing software to enable comments anywhere in the assignment. This allows
51 students to receive precise and constructive suggestions on what could be improved, rather than just a
52 generic comment (or worse still just a grade) at the end. This can be done quickly and clearly as one
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7 reads over the assignment, and through online document editors such as Google Docs or inDraft,
8 assignments can even be assessed through ongoing iterations, with (if desired) synchronous input
9 from multiple students and instructor. After marking, assignments complete with comments are
10 reloaded onto the course webpages. Although email provides a direct and personalised learning
11 conduit bridging teacher expertise and learner uncertainty, the real value of this interaction (i.e.
12 answers, clarification etc.) can be extended to other learners via electronic mediums (e.g. group email,
13 online forums, Facebook, blogs etc.) providing a non-confrontational and mutually beneficial
14 repository of dialogue relating to specific assessments. E-marking can also take the form of
15 personalised feedback via online communications (email, skype, voice recording etc.) and enables
16 learners to see exactly where real outcomes do or do not meet expected outcomes in a timely and
17 precise manner.
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22 Our question for instructors to ask of their assessments with regard to alignment is as follows: *How*
23 *does the e-assessment(s) align with pre-planned learning outcomes for this particular course or*
24 *learning intervention?*
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27 28 **3. Articulation**

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30 The principle of articulation captures the issue of clarity of expression of requirements as well as clear
31 identification of expected performance to achieve a range of competency levels within a learning
32 outcome (e.g. the difference between success and not-success). Assessment should be easily
33 accessible, coherent, timely and have comprehensible criteria and grading rubrics (or other methods to
34 ensure clarity to tutors, students and assessors). Further, the assessment strategy and method need to
35 facilitate dialogue, either between teachers and learners, or between peers for collaboration,
36 discussion and elaboration, or within the tripartite of learner-peer-teacher, and provide learners with
37 ample opportunities throughout the learning and assessment process to engage actively with goals,
38 criteria and standards. Meaningful feedback (Gaytan and McEwen, 2007), or the need to articulate
39 acceptable behavior and progress at all stages of the assessment. Extant literature (Brown & Glasner,
40 1999; McCracken et al., 2012; Thorpe, 2000) on assessment argues that well-articulated assessment
41 criteria, including achievement standards for low and high performance, will provide students with
42 insight into the effort and time required to be successful. Both of these orientations aid in the
43 development of self-management competencies.
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50 In sum, articulation in practice needs to be evident throughout the assessment intervention. For
51 example, in online courses at the WMS, preparation for the assessment, online presentations (e.g.
52 lectures and workshops) consisting of pre-recorded videos and PowerPoint slides can be delivered by
53 Vis.Talk software. Articulation is enhanced by the fact that these are available 'on demand' and can
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7 be viewed as often as needed. Further, slides advance as the video proceeds and can be easily
8 navigated from the menu. Live links to relevant discussions, assignments and current material (e.g.
9 URLs) are included as part of the presentation.
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12 *By doing the course online it helped me feel a lot less stressed as it had many benefits*
13 *compared to traditional papers. Having access to Vis Talk fit in with my busy and*
14 *overcrowded schedule as it enabled me to be more flexible with my study instead of being*
15 *stuck in lectures. I could pause the talks if I didn't understand something and immediately*
16 *look it up without disturbing anyone. (KH, Masters student)*
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20 As the students undertake the assessment, expectations are more clearly articulated and expanded
21 upon by both peers and teachers. Articulation and dialogue can be facilitated by applications such as
22 real-time chat, blogs, discussion groups, Facebook groups, online forums, and LMS.
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25 In one course, Masters level students are required to critically review academic literature and apply
26 one theory or concept learnt in the course to their own choice of company, a skill which is honed
27 through incremental learning facilitated by specially designed online workshops and development
28 sessions (in which distance students participant via video chat) and through practice and review.
29 Hence, articulation remains relevant throughout the assessment. E-assessment in multiple stages (e.g.
30 feedback on initial draft or analysis prior to final writing up stage) provides targeted diagnostic
31 feedback.
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36 *The technology and integration of lectures, videos, academic articles and links to other e-*
37 *learning materials was nothing short of outstanding [it] grouped the topic areas into key*
38 *themes and through the use of Moodle the class was able to have regular online discussions*
39 *which definitely enhanced the learning experience. (CJ, Masters level course, studying from*
40 *Australia).*
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44 Articulation is particularly important over e-assessments of longer duration. For example, cross-
45 border doctoral supervision, including ongoing diagnostic assessment, joins the expertise of the
46 supervisor with the research interests and progress of the student. Shared electronic documents,
47 presentations and video conferencing or email communications is central to assessment of goals,
48 standards and development throughout the process.
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52 *It is incredibly useful to use e-technology as a distance PhD student. Such technology*
53 *mitigates any barriers inherent when there is a large geographic distance, for example, I am*
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7 able to be in constant contact with my supervisor, be it through writing or video-conference.
8 (SP, Phd (distance) student)
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10 To complete this discussion we suggest two important questions for instructors to ask regarding
11 articulation: *Does the content of the e-assessment event clearly articulate the when/what/why/how of*
12 *the expected deliverables? Does the assessment strategy and method facilitate dialogue: either*
13 *between teachers and learners, or between peers for collaboration, discussion and elaboration or*
14 *within the tripartite of learner-peer-teacher?*
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17 18 19 **4. Accountability**

20 All parties in the learning tripartite need to be fully accountable throughout the assessment event and
21 understand their respective responsibilities and duties. E-assessments should adhere to the principle of
22 aiding continuous measurement of successful, un-successful and did-not-complete assessment events.
23 Not all assessment events are compulsory and important insights can be gained by monitoring all
24 three categories of completion, in order to re-engineer curricula and assessment strategies. E-based
25 assessments afford a highly accurate, continuous and timely record of student non-conformance
26 (including monitoring incomplete, late submission and academic honesty issues. With minimal effort
27 Moodle and Blackboard can be programmed to send reminders of assignments due to students, record
28 the exact time of submissions and alert facilitators to the access frequency and duration of online
29 materials and teaching aids. In addition,
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33 Assessments need to provide both teachers and students with feedback on how students' present state
34 relates to specific targets, goals and standards set for learning intervention (reviewed throughout the
35 learning process. Gikan, Missor and Davies (2011, p. 2339) identified three key considerations with
36 regards to the reliability of e-assessments, namely: “ (1) opportunities for documenting and
37 monitoring evidence of learning, (2) multiple sources of evidence of learning and (3) explicit clarity
38 of learning goals and shared meaning of rubrics. Moreover, facilitators need to ensure that feedback is
39 attended to, acted upon and remedial (or advancement) activities are available or learners at various
40 competency levels.
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45 Our examples thus far have already provided evidence of how accountability (and related concepts of
46 ascertainment, validity and reliability) might be achieved throughout the assessment intervention.
47 Other examples, include LMS for assessment related resources, including lecture materials, readings,
48 cases, research materials, and links to relevant webpages, announcements, emails, updates, feedback
49 etc., which can act as a 'one-stop-shop' for all participants, and avoid the problems associated with
50 learners not receiving, or being able to access, up-to-date resources and information when required.
51 The centrality and accessibility of this information via an LMS, rather than merely transferring of
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static (and therefore obsolescing) content, serves to support learning and skill development in online courses offered at the WMS.

Accountability is also about ensuring that students, as well as teachers, participate in the assessment process and that it improves the outcome for all. Returning to the discussion of LMS (see Affordance), where posts are made by student, peers and teachers, attests to the synergy via a tripartite approach:

...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. Overall, I believe this paper effectively utilised net technology to give students an optimal learning experience (MK, undergraduate).

We leave instructors with several questions to consider with regard to the accountability principle: *Are all members of the tripartite clear about their responsibilities and authority before, during and after this e-assessment? To what extent do e-assessment strategies and practices a) inform and shape facilitators/tutors' teaching, and b) encourage students to take responsibility for their learning and encourage deep rather than superficial learning throughout the course, rather than at predetermined assessment intervals?*

5. Accreditation, Reliability & Validity

Effective e-learning assessments inform students of the benchmark or standard against which she/he has to perform, and is it clear at which point students will be seen to have achieved an acceptable, not acceptable or above expected competency level. In addition, the achieved grade or level should be standard, and relatively accurate in providing a benchmark for similar assessments in the paper and across tertiary institutions. Ewell and Steen (2006) stress a movement away from informal agreements about recognition of prior learning (RPL) between institutions (say high school, college and tertiary institutions) to ensure transfer or credits that are outcomes-based and a standardized accountability solution. Biggs (2003; 2011) posits that educators need to assess actual learning outcomes to see how well they match intended learning outcomes. However, educators need to do more than merely match objectives to intended goals, andragogy and assessment methodology. Assessment needs to be integrated into the entire learning process to ensure timely diagnostic and formative feedback to allow

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7 for either adjustment to the objectives or to the curriculum (Popper, 2005). Objectives might have
8 been too challenging at lower levels of developmental competency, or not challenging enough when
9 students have already achieved the expected competency in prior learning opportunities.
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12 Therefore, any assessment procedure is dependent on the observation, collection and recording of
13 high-quality data that provides a basis for evaluation against predetermined objectives. It is no
14 different for e-learning and online assessments. Thus, validity within the context of formative e-
15 assessment may be defined as the degree to which the assessment activities and processes promote
16 further learning (Gikandi, Morrow and Davis, 2011). Closely linked to the issue of articulation,
17 assessments increase in validity (and value) if the assessment protocols allow for effective feedback.
18 Some research (De Villiers, 2012; Gaytan & McEwen, 2007; Gikandi, Morrow, D., & Davis, 2011;
19 Koh, 2008; Wang et al., 2008; Wolsey, 2008) reports on the requirements for effective feedback,
20 namely: timely, ongoing, formatively useful, easy to understand, situated for different learners, and
21 realistic to follow. Van der Pol, Van den Berg, Admiraal, and Simons (2008) suggest that style and
22 presentation influences students' use of feedback—the more the students comprehend feedback and
23 perceive it to be useful, the more they are likely to utilize the feedback in revising their work.
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29 In practical terms, e-assessments, such as computer-mediated multiple choice tests, offer a number of
30 benefits that can enhance learning and reduce the workload of administrators and practitioners. E-
31 assessments can be accessed at a greater range of locations than is possible with paper examinations,
32 enabling learners to measure their understanding at times of their own choosing; immediate feedback
33 delivered online in response to answers selected by learners can rapidly correct misconceptions; and
34 the time saved in marking can be used in more productive ways, for example in supporting learners
35 experiencing difficulties. Outcomes of assessments can also be more easily collated and evaluated for
36 quality assurance and curriculum review processes. Online tests coupled with coaching reports or
37 suggestions for remediation (based on incorrect answers) have provided a timely means of measuring
38 extent of recall/learning and providing targeted areas for revision in undergraduate online courses at
39 the WMS:
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45 *...the mini tests kept me up-to-date and on track with my reading and assignments... (SB,*
46 *undergraduate)*
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49 However, e-assessment for accreditation may be much more sophisticated, incorporating more
50 validity into assessments. In a capstone course, video clips of presentations are recorded using
51 Panopto software (REF: <http://panopto.com/>), then uploaded by learners. These enable teachers to
52 provide summative assessment as to the extent to which learning has occurred and to provide detailed,
53 reflective feedback from an audience perspective.
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8 There is suggestion, however, that issues of academic honesty and integrity are more prevalent in
9 online courses (Thomas, 2014), particularly for summative assessment, which is often used for
10 reliable accreditation purposes. For example, unsupervised, students may attempt multiple choice tests
11 in groups or have friends complete the tests for them. However, if such a test is for formative
12 assessment, then students would learn from group interaction (or even by looking up the answers in
13 the textbook), and so such practices need not be seen as a problem. There are tools available to
14 prevent cheating via e-assessment (Codova and Thornhill, 2007), for example, we have used Turnitin
15 very successfully to ensure students write their own assignments, and if used over multiple classes, it
16 can ensure they are not submitting duplicate assignments. Even a simple Google search (cut and paste
17 of key phrases) can track down online plagiarism by students.
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22 Finally, as with articulations, accreditation also incorporates learning by teachers. Online paper and
23 teaching appraisals facilitate constructive and timely feedback, usually anonymous, to teachers. These
24 can be administered outside the class time, allowing participants the flexibility to respond when they
25 are able.
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29 Despite the complexities involved in evaluating reliability and validity as part of the accreditation
30 principle, our question for instructors is straightforward: *Does the e-assessment allow for true*
31 *evaluation of a variety of levels of performance in order to fairly accredit the student?*
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34 6. Adaptive

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37 Our next principle relates to the ability of e-assessment to allow for dynamic adaptation to different
38 learning contexts, content, learning outcomes and most importantly, learners' learning. Furthermore,
39 to what extent does it encourage progressive development of learning outcomes, moving a student
40 alongside the teaching, from incompetence to competence? Extant literature suggests that effective
41 assessment strategies include a range of varied tools, such as diagnostic testing, portfolios, surveys,
42 course evaluations, rubrics, and peer feedback (Popper, 2005). Several studies conclude that educators
43 need to adapt their teaching styles, instructional methods and assessments to facilitate the learning
44 process by offering a variety of learning opportunities appropriate to different student learning styles
45 and to different subject matters (Baker, Simon & Bazeli 1986; Buch & Bartley 2002; Cartney 2000).
46 Proponents of experiential learning (Anderson, & Lawton, 1988; Boud, 1996; Cannon & Feinstein,
47 2014; Gosen & Washbush, 2004; Kolb, 1984; 2014), goal-based scenarios (De Villiers, 2013; Schank,
48 Fano, Jona & Bell 1993) and project-based learning (Blumenfeld, & Krajcik, 2006; Gülbahar &
49 Tinmaz, 2006; Krajcik, McNeill, & Reiser, 2008) suggest that effective learning strategies go beyond
50 exposure to inert facts and information, and allows students to gain experiences in planning,
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7 executing, reflecting and redesigning, even in a simulated environment. Returning to our previous
8 example of Panopto recorded presentations, students could make use of different skills within the
9 group, arising from different skills sets, majors and life and work experiences.
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12 A wide range of assessment activities allow for dynamic adaptation to different learning contexts,
13 content, learning outcomes and most importantly, learners' preferred learning styles. Gaytan and
14 McEwen (2007) reported that, "effective online assessments should include a wide variety of clearly
15 explained assignments on a regular basis" (p. 129). In addition to accommodating the learning style of
16 learners (Kolb 1984; 2014), assessment strategies and events consider the progressive development of
17 learning outcomes, moving a student alongside the teaching, from unconscious incompetence, to
18 conscious competence, and finally mastery. Optimally the assessment method and supporting
19 technology should be capable of modification and should be able to increase or reduce, as the
20 learners' capabilities ebb and flow over the various dimensions of the learning module. According to
21 McLoughlin (2002), "Effective scaffolding [for adaptive learning] diminishes when students achieve
22 a greater degree of competence" (p.156).
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28 A key advantage of e-assessments is the ability to access multi-dimensional approaches through
29 incorporation of a diverse range of opportunities for students to adequately demonstrate their
30 competencies and skills, and enhance their learning (Crisp & Ward, 2008; Gikandi, Morris, Davies,
31 2011; Gaytan & McEwan 2007;). Advantages of the flexibility and choice offered by ICT and e-
32 assessments, are the design alternatives in topic, method, criteria, weighting, timing, formatting and
33 timing of assessments. These choices allow for an improvement in the assessment experience of
34 learners, overcoming some of the "industrialization" disadvantages of traditional methodologies,
35 providing more appropriate assessment strategies for the unique needs of, and benefit to, diverse
36 learners. Research suggests that educators who desire to improve assessments in order to improve
37 learning, need to acquire a "deep understanding of the contexts and constraints which students
38 encounter in different disciplines" (Donald, 2002, as cited in McCracken et al., 2012, p108.) This
39 implies a deep knowledge of the various thinking competencies required in each discipline, each
40 course and each assessment event in order to select the most appropriate assessment strategy and tool
41 for the desired outcome. As reported earlier, principled e-assessments are adaptive enough to allow
42 for a mixture of assessment events, supporting various learning outcomes, as organized in Bloom's
43 taxonomy (1956) of learning, whilst simultaneously delivering on experiential, case-based and
44 project-based learning outcomes.
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51 Achieving multiple learning layers of competence across different contexts, abilities and outcomes is
52 facilitated through access to electronic resources (either remedial or advanced) and communications
53 technology. One means of employing an adaptive e-assessment approach at undergraduate level, is
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7 constructing and facilitating international project teams. Teams consist of six students across three
8 countries who must communicate electronically to achieve a mutually-agreed upon goal (for example,
9 development of micro-financing scheme in India) within a two week window. The learning outcome
10 (cross-cultural communication) is only possible using ICT and is achieved despite, or because of,
11 differences in location, language, training, skills, and abilities. Here, depth of context and capabilities
12 is furnished largely by the students themselves, who, being from different cultural backgrounds
13 themselves, can contribute their own unique insights.
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17 *I've learnt so much from this project, because we had to work with a team from several*
18 *different countries I found I was learning and teaching at the same time (CY, undergraduate).*
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21 An additional benefit, often stressed in relation to access to the content, is the “anytime, any place”
22 accessibility of online learning. We stress here the two, time-related adaptability benefits as they link
23 to (i) the timing of assessment events to coincide with individual learners’ progression through the
24 material or programme of development interventions, and (ii) engineering of assessment strategies
25 and plans to ensure alignment with progressive learning outcomes and the hermeneutic, iterative
26 learning process. There are various points in the learning process where assessments, and effective
27 feedback could be applied. McCracken et al. (2012), when referring to principles assessment for
28 online courses state: “We believe that it is good design practice to articulate assessments as early as
29 possible in the design process so that the development of objectives, learning activities and media
30 resources are more clearly aligned with the outcomes that instructors are striving to achieve” (p. 107).
31 As this student quote reveals, this is an important value proposition for many:
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37 *...to structure my learning to times of the day and week that best suit me, I had everything I*
38 *needed online, and surprisingly it actually came with me everywhere; something I can't say*
39 *for many papers (MK, undergraduate).*
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42 To conclude, we pose our question for instructors: *Can the selected e-assessments adjust to the*
43 *context and stakeholders involved?*
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45 46 **7. Authentic** 47

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49 Our seventh principle captures the extent to which learners and assessors find the e-assessment
50 credible and verisimilitude of real-world competency application to the domain being studied. E-
51 assessment strategies and practices should encourage the development of competencies beyond the
52 content, i.e. the development of learning communities, social and emotional competencies and
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7 reflective, self-management insights. Thus, the challenge for educators is to design e-assessments that
8 have more value than merely a gatepost or diagnostic tool to determine competency progress.
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10 Several studies of assessments in various learning domains (e.g. Gikandi, Morris & Davies, 2011; Lin,
11 2008; Mackey, 2009; Wang et al., 2008) suggest that outputs being assessed should be authentic or
12 based on the real world (Buzzetto-More & Alade, 2006; Wiggins, 1990) or simulations of real
13 scenarios likely to be encountered in the workplace (De Villiers, 2013; Page 2006). Authentic
14 assessment interventions, relevant to real world situations that promote engagement, genuine
15 problem-solving, complex decision making and deep reflection, thus improving self-management and
16 meta-cognitive thinking but importantly, are transferrable upon graduation. This study expands the
17 concept to include the fundamental principle that instructors should make every attempt to ensure that
18 e-assessments simulate real-world assessments or performance evaluation (as completed by a mentor
19 or senior/workplace supervisor), so that students appreciate the value of feedback and learn how to
20 respond to advancement conversations and opportunities to develop and grow. For example, custom
21 webpages developed for an internship programme at Victoria University of Wellington enabled
22 student, teacher and sponsor to develop, revisit and evaluate the goals, progress and outcomes of
23 student placement in industry. Company course sponsorship in Japan, with specific project goals set
24 by the company mentors rather than the instructors, is another example. Here company representatives
25 would attend each class to guide and provide feedback to students as the project progressed.
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33 An additional benefit of authentic e-assessments, is that students learn to provide mindful
34 feedback(learning- by-doing and learning-by-observation). Anchoring assessment activities in
35 meaningful simulations, empowers learners to apply learning to real-world situations, whilst being
36 mindful of the performance outcome. In practice, therefore, educators should consider how intended
37 assessments contribute to students' application of the knowledge of real world issues and how they
38 will contribute to an orientation of life-long learning and development to ensure that the skills
39 developed remain future proof and valid beyond graduation. An example is to require students to
40 demonstrate their use of a particular set of persuasion and technical skills to develop an online, multi-
41 media CV (ABOUTme.com; Resumonk.com or Linkedin.com) to employ for the assessment, but also
42 to use for real-world job applications. In this way the students' investment of time and effort is clearly
43 of value to the future. Collaboration tools such as Google Sheets and Google Docs, that may mimic
44 more real-world interactions that occur in workplaces are also useful additions to skill sets.
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51 Using websites to present situations and scenarios in video clips, text links to contemporary
52 publications, and real-world images will also give meaning and purpose to the students' assessment
53 endeavours. Returning to our earlier example:
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8 [The course] used the online discussion platform 'Moodle' to empower us to learn more
9 about specific topics. First we would research the topic and then write a blog. Next we could
10 read other class members thoughts on the same topic and have an online discussion. I found
11 this more productive and conducive to learning than the traditional in lecture discussions, as
12 it was non-confrontational and other students had time to think before responding. This
13 allowed us to gain a deeper understanding of international management (AS, undergraduate
14 student).
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18 One author has also found that custom e-books, which include assessment activities based on learning
19 objectives, not only align evidence and outcomes better than traditional pedagogical methods that rely
20 on external material, but by focusing on cases and examples relevant to local students greatly improve
21 authenticity of such assessment.
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25 *I had the opportunity to work with [her] when she co-authored the e-textbook ... the updated*
26 *content, new materials and cases are exemplary. ... This is the only IB book that is available that*
27 *looks at the New Zealand perspective.* (IP, former PhD candidate and now academic colleague)
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30 To conclude our discussion, we pose the final question for instructors: *Is the expected deliverable of*
31 *the e-assessment event credible to all stakeholders and does it allow for transferability and an*
32 *appropriate "shelf-life" relative to the effort expended on the e-assessment?*
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34 **Limitations**

35 As conceptual paper, a limitation of the paper is the lack of empirical evidence to support the claims
36 by the authors about the significance and validity of the interviews, surveys and thematic analysis
37 used to confirm their experience and the literature review. Depending on one's paradigm and
38 particular epistemology, a scholar might see important differences between concepts within the
39 constructs and wish to separate them into different/new principles in order to highlight the importance
40 to e-assessments. Further research to provide empirical support and to demonstrate predictive validity
41 of the model is required.
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46 Although are confident that the research team of this study brings a diverse range of experiences at a
47 variety of universities, a range of study levels (undergraduate and post-graduate development levels),
48 there is plenty of scope to consider the principles suggested here across a broader variety of teaching
49 environments and study levels. Further research to consider alternative programmes (e.g. executive
50 development); alternative domains (outside of the business school; marketing, strategy and
51 organizational behaviour); and alternative university settings (rural, private and distance learning
52 institutions) is necessary. Furthermore, whilst the scope of this paper does not allow us to focus on
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7 pitfalls or best-practices in the design and execution of e-assessments, (e.g. increasing the workload of
8 staff, or allowing time for students to become familiar with the ICT, over-and-above the course
9 content), we are fully aware that such limitations and practical considerations need addressing. This
10 paper on e-assessment principles is only a small, but critical first step to proceed on a route to
11 effective e-learning and e-assessments.
12

13 14 15 **Conclusions**

16 As blended and e-learning andragogies signpost a significant departure from traditional
17 teaching/learning, as educational outcomes for business education shifts, and as new online learning
18 domains become available, new assessment strategies and processes are needed (Arevalo, Bayne,
19 Beeley, Brayshaw, Cox, Donaldson, et al. 2013; Hallett, & Essex, 2002; Harasim, 1999; HEFCE,
20 2009). The basic premise of assessment is to understand and support student learning has remained
21 unchanged since Socrates, but assessment processes have evolved. Scholars point out that with careful
22 deliberation, planning and implementation, e-learning tools and teaching methods have the ability to
23 enhance and transform learning outcomes and development occurrences within andragogy (Garrison
24 & Anderson, 2003; Kirkwood, 2009).
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29 Developing a clear understanding of the principles underpinning effective e-assessment and feedback,
30 will enable educators to integrate a wide range of technologies into their assessment strategies and
31 practice, thus providing a wider range of appropriate assessment and feedback strategies to learners at
32 various stages and with various learning styles.
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36 This study investigates how ICT and e-learning tools contribute to an important component of
37 learning activities, namely assessments. More specifically, it identifies and develops seven principles
38 of effective e-assessment, and explores how the teacher-learner-peer tripartite, supported by online
39 tools, affords even greater adherence to these principles. In addition, the programmes considered for
40 this paper and the teaching practices and student reflections over several programmes at several
41 universities, indicate that e-assessments (like other generic assessments) need to be principle- and
42 outcome-based to enhance the learning experience for all stakeholders in the tripartite, rather than add
43 an additional complication or merely decrease the need for face-to-face or onsite contact between
44 peers-learners-facilitators. Considered introspection, student reflections and expert interviews confirm
45 that, by adhering to the principles, e-assessment and ICT tools can afford instructors with
46 opportunities to achieve challenging learning outcomes. Instructors and students confirm that when e-
47 assessments are principled and carefully selected based on pre-determined learning outcomes, they
48 establish meaningful and diagnostic, formative and summative feedback opportunities in an iterative
49 process, enhancing the co-creation of learning experiences of all parties.
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Table 1. The 7 A's: Principles of Effective E-Assessments

#	Principle	Description <i>Question for educators</i>	Key advantages
1	Affordance	Ability to allow for formative, diagnostic or summative feedback, similar or equal to alternative technologies/assessment tools <i>How does e-assessment afford greater/new benefits over traditional methods?</i>	E-learning assessments afford currency, responsiveness and flexibility in terms of content, delivery and feedback, increasing participation and engagement by both teacher and learners. 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'.
2	Alignment	Ability to align method with outcome and dissonance between expected and real outcomes <i>How does e-assessment align with pre-planned learning outcomes for the particular course?</i>	Electronic evidence and feedback mechanisms enable alignment between method and outcome in a timely and personalised manner
3	Articulation	Goals, standards, expectations are clearly articulated and both learner and teacher are open to dialogue in case of uncertainty throughout the assessment intervention <i>Do all stakeholders in the tripartite (student, peer, instructor) understand the content of the e-assessment event and clearly articulate the when/what/why/how of the expected</i>	Enhanced clarity and understanding of assessment Student-peer-educator synergy promotes mutual learning and development through assessment 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.

Comment [RDV1]: consistency throughout as EDUCATORS changed from andragogues.

	<i>deliverables?</i>	
4 Accountability	<p>Learners and teachers are mutually responsible for the learning outcomes to be achieved and for providing/collecting evidence of this achievement</p> <p><i>Are all members of the tripartite (student-peers-facilitators) clear about their responsibility and authority before, during and after this e-assessment?</i></p>	<p>Tripartite responsibility (student-peer-educator) for assessment outcome completion, evaluation and review</p>
5 Accreditation	<p>The assessment is a realistic measure of the expected outcome and feedback provided before, during and after assessments are useful for the purpose it is designed for.</p> <p><i>Does the e-assessment allow for true evaluation of a variety of levels of performance in order to fairly accredit the student?</i></p>	<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>
6 Adaptive	<p>Assessments can be adapted to accommodate the assessed content, the learning context, teachers and learners' styles and most importantly, the learning outcomes.</p> <p><i>Does the e-assessments adjust to the context, learning outcomes and stakeholders involved?</i></p>	<p>Achieving multiple learning layers of competence across different contexts, abilities and outcomes</p>

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7 Authentic	<p>Upon deep consideration, the assessment event seems fair, legitimate and a realistic and useful in the real-world application of the learned knowledge, skills and attributes.</p> <p><i>Is the expected deliverable of the assessment event credible to all stakeholders and does it allow for transferability and an appropriate "shelf-life" relative to the effort expended on the e-assessment?</i></p>	<p>Currency and future value of assessments</p> <p>Application of skills in the 'real world'</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>* Unless otherwise stated these are undergraduate (3rd and 4th year) marketing and international business courses offered by Waikato Management School, University of Waikato</p>
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