Recent Developments in Assessment

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Introduction

Several companies – IBM, Starbucks, Apple, Google, Ernst & Young, Penguin Random House, Hilton Group, Publix among them - no longer use degrees and similar qualifications as a primary basis for hiring employees. Instead, they prefer to examine the competencies and capabilities of candidates. They want to know what the candidate has actually done and is capable of. They do not think a degree, no matter where it is from, tells them about the emotional intelligence, legally defensible competences and capabilities or the team-skills of a potential employee. Other companies, such as Deloitte, mask where a candidate earned their degree during the application process so as not to bias assessors when making selection decisions. In each company, degrees act as a filter but not a barrier to hiring. More organizations are also seeking more in-depth assessment of a person – they want to understand their portfolio of knowledge, skills and capabilities.

This is one reason for the significant development within higher education of e-portfolios, which capture more of the students work, and of competency based assessments. It is also the reason so many students are seeking to develop a broader experiential base, including work-based learning and international experience, as part of their higher education program. But these developments are also challenging passive assessment processes – pencil and paper assignments.

In this chapter, recent developments in assessments *for* learning and the assessment *of* learning will be examined. The focus is on not just the developments themselves, but their implications for institutions and the opportunities they provide for new routes to success for learners. The chapter builds on an earlier contribution to this area of study (Murgatroyd, 2018a, 2018b)

Definitions

In order to make sense of what follows, it is important to draw a distinction between formative assessment intended to support the learner in their learning journey – now frequently referred to as assessment *for* learning – and summative assessment intended to confirm and credential learning – now referred to as an assessment *of* learning. This distinction is important, since the developments which are occurring differ between these two sets of distinct activities. Indeed, one characteristic of the current assessment landscape is the growing difference between these two activities.

Ten Key Developments

A renaissance in assessment is clearly taking place (Hill and Barber, 2015). This is being driven both by a general disaffection with the quality of traditional assessment methods and by the power of technology. It is also driven by a growing number of academic, student and legal concerns relating to the efficacy of assessment. Cumming (2009) points out that legal challenges generally focus on discrimination in assessment and testing, allegations of inappropriate assessment and/or failure to provide appropriate educational instruction as a result of errors in assessment. While many of these challenges are settled through the policies and procedures within the institution, some are now finding their way into the courts. In particular, a set of challenge to Pearson corporation's teacher certification examinations and video assessment (Singer, 2016) has demonstrated that the role of algorithms for assessment is problematic and court decisions are being made which reflect the complexity of assessment which fully takes into account the context in which learning is taking place. Here we focus on ten key developments which capture the essence of the renaissance.

1. Assessment Based Credentials

Western Governors University offers its degrees on competency based assessment, not course work. Others are now following their lead. The University of Wisconsin, for example, offers flex-based degrees in commerce, technology, nursing where the student only needs to complete assessments of learning to gain the credential. Colleges and universities in New Hampshire, Ohio, Michigan, Arizona now also offer such credentials. O support these developments, the US Department of Education has invited institutions to submit proposals to expand this route to credentials and plans to offer students financial aid to support their pursuit of assessment based credentials.

2. MOOC's for Degrees, Certificates and Diplomas

FutureLearn – the world's third largest MOOC provider with over 6 million learners worldwide – now offers undergraduate degrees and graduate diplomas and degrees. Through partnerships with Deakin University (Australia) and Coventry University (UK), some fifty online undergraduate degrees and six graduate programs in a variety of subjects are now or will soon be available. Other MOOC providers, such as edX also offer micro-credentials which are transferable to undergraduate and graduate programs. *Coursera* offers four degrees with its partners, the University of Illinois and HEC Paris. The model varies by MOOC provider, with some offering course work for free, but a charge is made for assessment. Other models see fees for a variety of components of this learning.

3. On Demand Assessment

Made possible by machine and artificial intelligence systems, institutions are enabling students to call for assessment on demand, both assessment for learning and assessment of learning. Kentucky Community Technical College System, for example, has on demand courses available 365 days each year. Students call for a course and complete a pre-test before they begin studying, if they are successful on the pre-test they can call for the final assessment at any time for their course.

4. Automated Assessment Generation

A number of machine intelligent and artificial intelligence systems are now available which are capable of developing assessment and test items automatically. Such systems include *Varafy*, *Tao* (open source) and *IGOR*. They all require sample items and an assessment rubric and then can generate hundreds of thousands of versions of these items in a variety of formats, including long and short essay forms, graphic based assessments, multiple choice and scenario based assessment.

5. Automated Marking of Student Assignments

Tools to support the task of marking by instructors have been available for some time – e.g. *eMarkin Assistant, Rubric-O-Matic, Gradeassist, Mark-rite*. But now machine and artificial intelligence systems are also capable of evaluating student work. Programs such as *MarkUS, Oto* and *AMS* were developed to assess computer science programming activities of learners (as well as to detect cheating), but there are now many more systems that can grade and review assignments (formative and summative), using the

instructor specifications and rubrics. For example, *Intellimetric* uses past evaluations of long-form essays to create a rubric and framework for evaluating new assignments. It then uses these frameworks to assess the students work. It can be used to provide feedback on both the content and structure of the students work. *eRater* is a similar machine intelligent engine, which also weighs key features of the students writing skills and provides feedback. Automated grading of multiple choice and standard test items has been taking place for some time, but now neural network based technologies are being applied to refine and expand the opportunity for such assessment on a broader range of assessment item types (Nguyen and Dery, 2016).

6. Video Based Assessment of Competencies

Does a pencil and paper assessment or an instructor / practitioner review of a demonstrable skill or competency pass the test of being legally defensible? The courts, when asked to make this judgement, have often said no (*US National Research Council*, 1999, especially in relation to health care professionals. With video based demonstrations of competencies assessed by trained assessors and the assessment verified by a verification process using timed video linked to statements of competence, courts are able to verify that a specific person has demonstrated on one or more occasion the specific competency and skill specified in the competency statement. Products such as Vametric's *Valid-8* provide this service and is used by the UK's National Health Service, Rolls Royce, the British Army as well as many other employers. If competency can be specified as standard for a trade, profession or occupation - for example using *Polaris® Competency Model* – then demonstrating a competency, capturing the work on video and assessing that work against the agreed competency rubric and having that assessment verified by a third party provides a basis for public assurance and legal assurance that the person has the skills and competency they claim.

7. Adaptive Assessment

All major learning management systems (LMS) have adaptive learning and assessment engines. These adjust learning content based on student performance on an assessment. As the student progresses through a course they complete tests, quizzes and assignments which are marked automatically by the LMS. Using instructor designed sequences (or, increasingly, machine intelligent algorithms), the LMS then determines which content the learner now needs to master before they can progress to the next "lesson" or competency. The use of analytics and algorithms is key to this work – past student

behaviour (both previous students who have taken this same course or a particular students behaviour) determine what happens next for the learner. Some systems are emerging which enable the LMS to determine not only what the learner should work on next (content), but what style of learning is most suited to this learner – e.g. video, audio, graphic, text, game, simulation – based on the pattern of their use of learning resources and its output in terms of mastery of knowledge or skill. Systems such as *Zoomi*, *Brightspace LeaP* (*Desire2Learn*), *Knewton*, *Realizeit*, *Adaptemy*, *Alex* are all competing in what is quickly becoming a complex market.

Many learning game designs use adaptive learning. Varied groups of researchers have developed, refined and validated the ALGAE (Adaptive Learning GAme dEsign) model for this work. This is a comprehensive model based on game design theories and practices, instructional strategies, and adaptive learning models and algorithms, now all combined into a single model. This work enables adaptive engines to be underpinned by sound research and development (Lavieri, 2014).

8. Peer to Peer Assessment

Because of the scale of MOOCs – some have over 100,000 learners enrolled – and the development of online learning, faculty members have made increasing use of peer to peer assessment to support the learning agenda of their students. Peers provide written feedback and sometimes grades on assignments completed by their peers (Boud and Cohen, 2001). How this is done varies a great deal, but there are now technologies which support this work, such as *CrowdGrader, PeerScholar, eenio, Cocertify* and *PeerWise*. Each of these technologies are subtly different, but they provide a basis for peer based learning, support and assessment. For example, *CrowdGrader* has the instructor creating an assignment which students then respond to; students then grade the work of other students and the instructor then assigns final grades.

9. e-Portfolios

Higher education institutions in the UK and many elsewhere in the world have determined that students need much more than an official transcript – they need to be able to share a portfolio of their work – projects, exemplars, case studies, videos, testimonials, assignments, which they can share with potential employers, colleagues or others. In the UK, the Government Department for Business, Innovation and Skills determined that portfolios were essential to enhance life-long

learning, for skills development and improving life-chances (Government of the UK, 2006) Such portfolios are also used for personal development planning and program planning. The UK's JISC has developed a guide to e-portfolios (JISC, 2012).

Most LMS systems have e-portfolio's built-in, but there are also stand-alone e-portfolio systems, such as *PebblePAD, EPET* and *RAPID* which several institutions have deployed. One particular form of e-portfolio links strongly to assessment. *RIIPEN*, developed in Canada, is a platform which enables an instructor to partner with a collegue i industry or a profession o develop work-relevant assignments which are then marked and feedback provided by both the instructor and their partner in the private sector. The resultant assignment, feedback and testimonial are then placed in that students e-Portfolio within *RIIPEN* and shared with relevant organizations chosen by the student. Using its "sister" product, *Prollster*, *RIIPEN* is also able to assess the "soft skills" students use and display in work-based projects or related activities.

10. Trans National Qualification Frameworks

There are now a great many international agreements, both educational and trade agreements, which seek to enable the mobility of learners and graduates of college and university programs. For example, the Canada-EU agreement contains a streamlined process for the mutual recognition of professional qualifications, which focuses on the development of mutual recognition agreements (MRA) between professional bodies where the skills and competencies, especially as assessed through professional competency assessments and examinations, will form a key component for such MRA's.

Amongst the most comprehensive educational agreements is that created by the small states of the Commonwealth in their Transnational Qualification Framework (TQF). This agreement, signed by some thirty-one countries, provides small states with more up-to-date procedures and guidelines and a referencing tool for alignment of qualifications in individual countries to an agreed international framework. The TQF functions as a translation device, making qualifications more readable, transferable and transparent, which in turn, will help learners and workers move between countries or change jobs. The Erasmus, Tempus and Erasmus Mundi programs in the European Union are also aimed at high levels of interchange of learners within the EU (Ferdinande, *et. al*., 2013)

What matters here is that the integrity of assessment across jurisdictions does not weaken these agreements – the real quality control relates to competency and capability assessment as well as to course design and the quality of instruction.

Institutional Developments Leveraging Assessment

Several universities in the United States have developed credentials in which the learner completes assessments of competencies and capabilities rather than courses or programs. Students take tests, write papers and complete assignments. But rather than focus on seat time or credit hours, degrees are awarded through tangible evidence of learning. This is the rationale for many activities of Western Governors University, but is also an emerging line of business for the University of Wisconsin, colleges and universities in New Hampshire, Ohio, Michigan, Arizona and now in the UK. Assessment based diplomas, degrees (undergraduate and graduate) are emerging as revenue streams independent of the development of courses and programs.

Such developments are timely. Many established universities and colleges, including many open and distance education institutions, are in trouble. Demographic shifts, growing competition, reductions in government funding and student support, new technologies and the globalization of learning have all taken their toll on the traditional model of the university. The Open University (UK), Athabasca University (Canada), University of Wisconsin system (US), University of Maryland University College (US) are all in the midst of radical change driven by a change in their circumstances. Many others are facing a challenge to their strategic intentions, as student behaviour changes and new players start to erode markets. As MOOC providers move to offer degrees and as new models of learning emerge, such as Ecole42 in both Paris and California, universities and colleges are reviewing their strategic position and their business process, some in the name of survival.

Five developments in the strategic management of higher educational institutions are occurring. These are:

1. **Refining and strengthening their value proposition**: colleges and universities are recognizes that their primary purpose is to enable learning and to support the learning objectives of their

learners, some of whom require recognition of what they can already do rather than courses or programs. The shift is from “teaching, course development and delivery” to “learning, learning recognition and life-long learning”. A driver for this shift is to make learning available to many traditionally unable to attend or study at a college or university – recent immigrants, working poor, single parents, disabled, prisoners, indigenous peoples, rural and remote learners. Recognizing that one size (semester based courses and fixed programs of study) no longer fit all, flexibility in both what a student learns, how they learn and how learning is recognized is a growing feature of emerging strategies for colleges and universities.

2. **Reimagining their business process** – from admission, using analytics to better target student support, investing heavily in technology assisted learning, on-demand assessment based on competencies and knowledge, an expansion of prior learning and transfer credit, more flexible programming and the use of Blockchain technologies to trace student activity are all part of the reinvention of how colleges and universities do business. Some are unbundling their services – the Open Polytechnic of New Zealand is unbundling course development from course delivery and assessment from course delivery; University of Maryland University College has unbundled their IT services and analytics services into separate companies which compete in an open market as well as sell services back to the University.
3. **Unconstraining the supply of learning supports** – technology is being used to support learners in a variety of ways, including adaptive learning, artificial intelligence “chatbots” acting as tutorial assistants, machine learning based guidance and counselling services as well as the use of analytic algorithms to focus student support so as to increase student retention and completion.
4. **Hyperscaling platforms for global reach** – using platforms like FutureLearn’s MOOC platform to deliver degree programs world-wide or the development of global programs offered through their own platforms, such as Open Universities Australia or the Open Education Resource University (OERu) are all means of globalizing the services of a specifc organization or network of organizations. In any given market, there are several global MBA programs available to a student who meets the admission criteria.
5. **Securing new markets** – the ultimate aim is sustainability through market growth, which requires many colleges and universities to find and mine new markets.

We can see the renaissance in assessment as a component of each of these five elements:

1. **Refining and strengthening their value proposition**: The developments in assessment permit institutions to see a core component of their strategic intentions in terms of assessing learning in terms of what a student knows, can do and can understand rather than in terms of coursework, time served or attendance.
2. **Reimagining their business process –** given that assessments can be competency based, available on demand and competency can be assessed by technological systems or assessors anywhere in the world and by peers, university and colleges have new opportunities for fast-tracking credit granting, changing how prior learning assessment is undertaken and accelerating credential granting.
3. **Unconstraining the supply of learning supports –** adaptive assessment coupled with the use of "chatbots" to support learner progression and analytics to aid retention and completion, new supports for learning and learners are now possible.
4. **Hyperscaling platforms for global reach –** given the use of technology as basis for on-demand, anytime anywhere assessment, verified by a combination of security technologies (fingerprint and facial recognition systems, for example) and Blockchain, institutions can offer assessment based degrees and credentials world-wide. MOOC platforms also enable the globalization of degree granting systems.
5. **Securing new markets** – all of the previous points point to new market opportunities, especially in relation to professional training and education, competency based learning and accreditation and short, on-demand professional development.

In short, assessment is the new and substantial business and revenue opportunity for colleges and universities and will become a key component of the strategic plans for colleges and universities world-wide.

References

Boud, D. and Cohen, R. [Editors] (2001) *Peer Learning in Higher Education – Learning from and with Each Other*. London: Routledge.

Cumming J.J. (2009) Assessment Challenges, the Law and the Future. In: Wyatt-Smith C., Cumming J.J. (eds.) *Educational Assessment in the 21st Century*. Springer, Dordrecht

Ferdinande, H., Hosokawa, T., Yamada, K. and Nishimori, T. (2013) Tertiary Student Mobility in the European Union vs. That in Japan. *Journal of Higher Education and Lifelong Learning,* Volume 20, pages 1-12. http://tuningacademy.org/wp-content/uploads/2014/06/Ferdinande-H.-et-al_PUBL_2013_Tertiary-student-mobility-in-the-EU-vs-that-in-Japan_EN.pdf (Accessed 17th February, 2017).

Government of the UK (2006) *Further Education – Raising Skills, Improving Life-Chances*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/272259/6768.pdf (Accessed 10th November 2017).

Hill, P. and Barber, M. (2015) *Preparing for a Renaissance in Assessment*. London: Pearson. http://gr8dbl.doverbay.ca/wpcontent/uploads/2015/04/Preparing_for_a_Renaissance_in_assessment.pdf (Accessed 10th November 2017).

JISC (2012) *A Guide to e-Porfolios*. London: JISC https://www.jisc.ac.uk/guides/e-portfolios (Accessed 10th November 2017).

Lavieri, Edward (2014). *A Study of Adaptive Learning for Educational Game Desig*n. ProQuest UMI. https://search.proquest.com/docview/1562778630 (Retrieved 11 December 2014).

Murgatroyd, S. (2018a) New Approaches to the Assessment of Learning: New Possibilities for Business Education in Khare, A. and Hurst, D. (editors) *On the Line – Business Education in the Digital Age* at pages 141-155. Springer, Dordrecht.

Murgatroyd, S. (2018b) *A Renaissance in Skills: The Future Place of Online Learning for Skills for Business.* in Khare, A. and Hurst, D. (editors) *On the Line – Business Education in the Digital Age* at pages 251-165. Springer, Dordrecht.

Singer, A. (2016) New Challenges to Pearson Teacher Certification Exams. *The Blog, 19th May.* https://www.huffingtonpost.com/alan-singer/new-challenges-to-pearson_b_7312856.html (Accessed on 10th November 2017).

Nguyen, H. and Dery, L. (2016) Neural Network for Automated Grading. https://cs224d.stanford.edu/reports/huyenn.pdf (Accessed 10th November 2017).

Togut, T.D. (2004) High Stakes Testing: Educational Barometer for Success or False Prognosticator for Failure. The Beacon, Fall. http://www.harborhouselaw.com/articles/highstakes.togut.htm (Accessed 10th November 2017).

US National Research Council (1999) *High Stakes: Testing for Tracking, Promotion and Graduation*. Washington: National Research Council Consensus Report.