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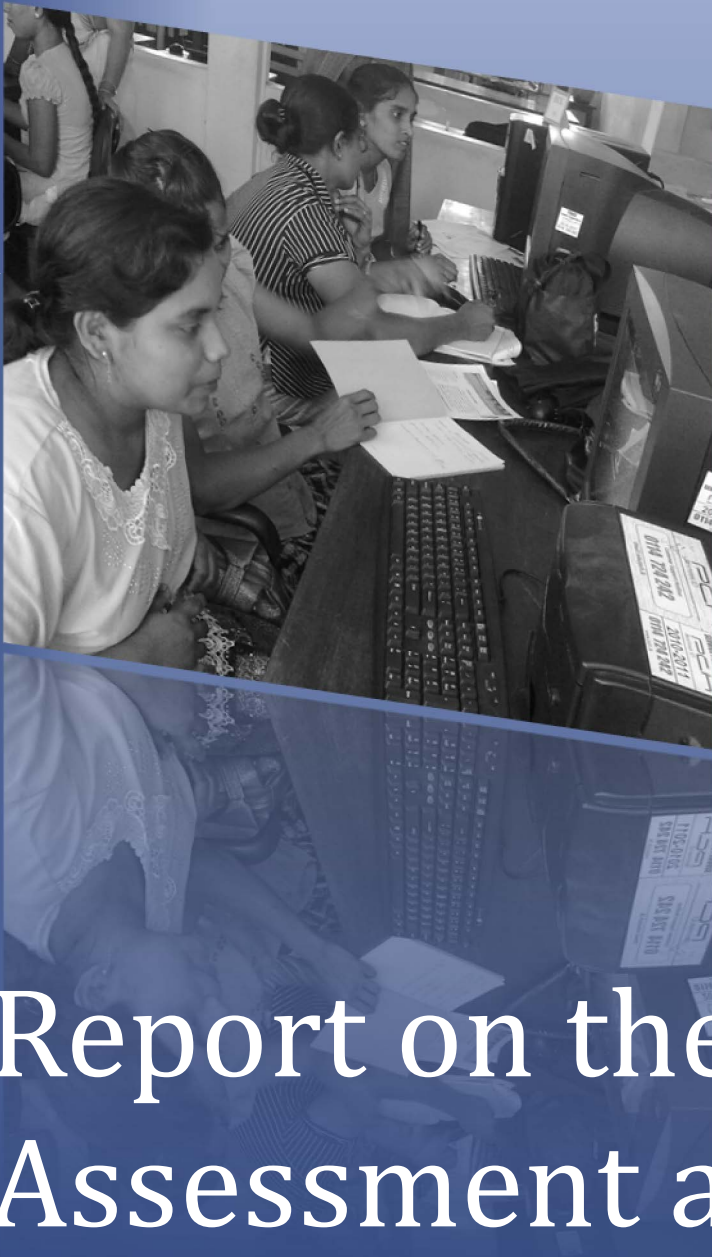
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Report on the Assessment and Accreditation of Learners using OER

Dianne Conrad . Wayne Mackintosh . Rory McGreal . Angela Murphy . Gabi Witthaus

July 2013

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Preface

This report shares the findings and lessons learned from an investigation into the economics of disaggregated models for assessing and accrediting informal learners, with particular attention to the OER University (OERu) consortium. It also relies on data from a small-scale survey conducted by two of the authors on perceptions, practices and policies relating to openness in assessment and accreditation in post-secondary institutions (Murphy & Witthaus, 2012). These investigations include the perceptions of stakeholders in post-secondary education towards the OERu concept, combined with a look at economic models for universities to consider in implementing OER assessment and accreditation policies.

The OERu is a global consortium of post-secondary institutions collaborating around the assessment and accreditation of learners studying online and using OER. Taylor (2007) described the aim of the OERu as providing free education to learners worldwide using OER as learning materials, with pathways provided to enable them to gain credible qualifications from government recognised or accredited educational institutions. The OERu concept is based on the notion of community service and outreach, and institutions that are members of the OERu network are committed to developing a “parallel learning universe” to augment and add value to traditional delivery systems in post-secondary education. The ultimate vision of the OERu is to provide free learning opportunities on a massive scale for learners who lack the financial means to access traditional higher education.

The OERu currently consists of a collaborative partnership among 26 partner institutions. The network includes nationally accredited universities, colleges and polytechnics and publicly-funded organizations (Mackintosh, Taylor & McGreal, 2011). The current geographic spread of institutions includes Australia, New Zealand, Canada, the USA, England, Ireland, Spain, South Africa, India and the South Pacific. The initiative is coordinated by the OER Foundation, which is an independent, not-for-profit organization that works internationally to support the mainstream adoption of OER in the formal education sector (Mackintosh 2012).

Executive Summary

The rapid growth in popularity of MOOCs (Massive Open Online Courses) and other initiatives in which large numbers of learners in many countries all take the same course is opening up a need to address learner assessment and accreditation. Learners who access digital learning content via the Internet and acquire knowledge and skills either formally or informally, alone or in groups, cannot readily have their learning assessed. They are consequently unable to receive appropriate academic recognition for their efforts. This is a critical issue that institutions leading in the open educational resources (OER) movement are addressing.

Institutional participation in the development and use of OER has been low, with few institutions indicating that they either produce or use OER. Even fewer institutions have implemented open courses for assessment and accreditation. However, this open movement is growing rapidly as evidenced by the growth of online OER repositories and the popularity of MOOCs as well as the establishment of collaborative initiatives based on the use and reuse of OER. This report examines potential models to address the learner assessment, certification and accreditation issues for learners participating in MOOCs as well as in other formal and informal learning contexts using OER at the higher education level.

Unbundling of services, so that assessment and accreditation are separate from teaching and support, can be much easier using OER-based courses rather than commercial content. Because of the ease of copying, adapting and otherwise re-using OER, OER-based initiatives can be scaled up and made freely available in different jurisdictions and institutions. Scalability is problematic for initiatives that rely on commercial content that is restricted by technological protection measures and restrictive licencing.

Major Assessment Practices

There are two main types of assessment or accreditation relatively common at the post-secondary level of education: Recognition of Prior Learning (RPL) and post-secondary credit transfer. RPL is also known as “Accreditation of Prior and Experiential Learning” (APEL), “Prior Learning Assessment” (PLA), and “Prior Learning Assessment and Reconciliation” (PLAR). Research shows that for RPL, the use of learning portfolios is quite popular, followed by examinations that allow learners to challenge-for-credit through assignments, examinations, interviews, courses, tutorials, demonstrations, self-assessment, external evaluations, essays, face-to-face or online workshops, and a variety of other instruments

RPL programmes exist at post-secondary institutions, in many countries. A variety of methods are used to ascertain proficiency and knowledge. The least frequently used and available (though it could possibly be the most effective from the perspective of learners) is the option to write a challenge examination or otherwise challenge-for-credit. Other methods of RPL, are much more resource intensive, requiring staff dedicated to spending significant time with prospective students. RPL-supportive institutions have developed resources and structures that cover most aspects of accreditation and assessment, including policy, research, repositories and experience with licensing.

Credit transfer refers to the willingness of institutions to grant credit to students who have taken courses at other institutions. Transfer credit is much more common than RPL but it is sometimes problematic for students. In North America, with its standard three credits for a one-semester course, credit transfer is easier to implement and therefore reasonably common, especially in the first two years of post-secondary education. However, this is not the case in jurisdictions outside of the USA and Canada, where many institutions are reluctant to accept transfer credits and the majority of students are restricted to taking all of their courses at one institution.

Approaches to Assessment

While international or even national accreditation and assessment services are not currently widespread or easily accessible, developing a robust system that can service thousands or even hundreds of thousands of learners internationally can change the dynamic of access to post-secondary education. The technology is already available, such as payment systems, content management systems, automated examination applications, and online invigilation.

Breaking down institutional silos is still a major issue in the “cottage industry” of post-secondary education before large-scale OER-based courses using RPL assessment systems can be put in place. The MOOC phenomenon has opened up this possibility and already institutions are considering alternatives. This report examines several options and provides more details on possible operational models.

Lessons learned so far from key initiatives

Current institutional processes for international credit transfer and course articulation are idiosyncratic, with lack of standardisation when working across regional and national borders. As such, the current course articulation processes are not well suited for credentialing services for OER learning. This is potentially the most significant policy barrier for scalable implementations of assessment and accreditation service provision for official recognition of learning on a massive scale. Current institutional processes often result in unnecessary duplication and inefficiencies that hinder the cost-effective implementation of assessment and credentialing.

Other significant barriers to OER identified by faculty and administration are fears of change; confusion over copyright issues and the use and reuse of OER; concerns regarding the effort required for implementation of OER initiatives; and the possibility of conflict with commercial publishers and other special interest groups. The greatest barriers to participation in open assessment and accreditation practices are identified as the lack of availability of committed staff members to support such activities, and the potential costs of redeveloping courses as OER. Lack of support for OER-based courses from senior management is also a great concern.

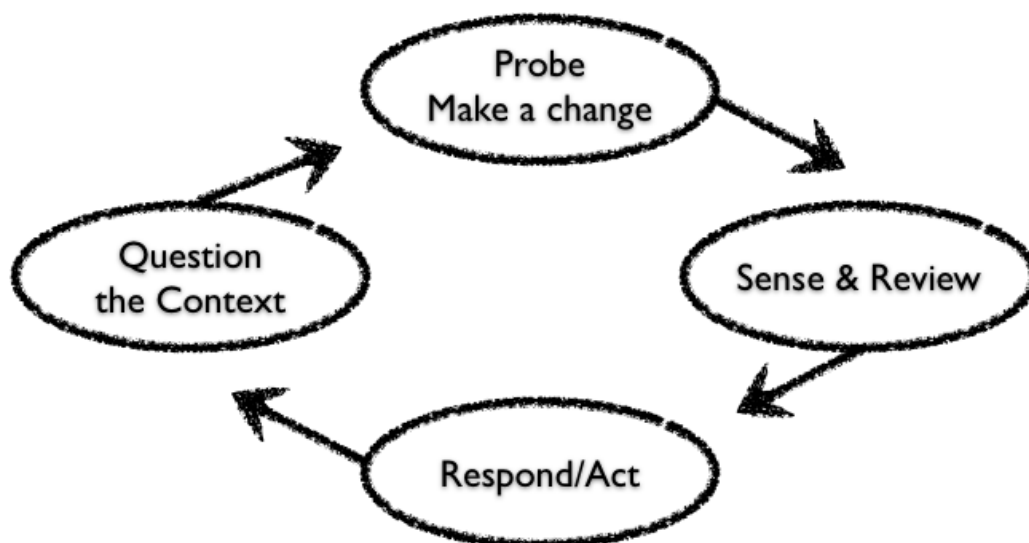
These “barriers” can be countered by incentives such as the low cost of entry and use of OER; minimal or non-existent licensing requirements; the ability to localize and update the content and make other changes without restriction; acceptance by students; and the potential to increase institutional reach.

The key institutional success factors for the provision of open assessment and accreditation services appear to be a reliance on a strong base of support within institutions – both in terms of leadership and resources, and an existing culture of openness, including policies and practices around the creation and use of OER. Policies that enable either open access or recognition of prior learning via credit transfer or RPL are also important. Institutions that already have these features in place are likely to be in the best position to implement assessment and accreditation of OER-based learning services, and could provide models for other organizations that would like to participate in collaborative open education, assessment and credentialisation initiatives in the future.

Conceptual frameworks and ways forward for further analytical work

A number of analytical options are discussed and one option recommended is to test small projects and see which ones work, then reinforce the successful ones and abandon the others. Given the rapid change in the “industry” of learning, more contenders are entering the field and learning by doing. Many of the MOOC initiatives are starting off with “trial” courses to survey the landscape and learn from the implementation, one example being the University of Edinburgh (Haywood, cited in Witthaus 2012b).

In a rapidly changing digitally networked world, with new technology entrants constantly appearing, a Probe, Sense, Respond perspective can be a useful approach, as advocated for complex systems, using the [Cynefin framework](#). Each initiative should be small enough to fail but when aggregated help to inform decision-makers on the patterns within these complex adaptive systems. Therefore, no single analytical framework should be adopted to the exclusion of others.



Assessment, Certification and Accreditation of Free Learning

This section examines several models on how to incorporate openness into the educational landscape. By looking at the main components of the traditional educational offering, new ways of delivering each component can be examined. By thus separating the components, a disaggregated model for OER could provide a more flexible framework, following the principle of “small pieces, loosely joined”.

Five scenarios are presented, focusing mostly on the reuse of OER under different accreditation conditions. This highlights the key role of accreditation and suggests where the competition from the private sector will come from. Once accreditation is addressed, the other pieces can fall into place more easily. Making accreditation easier, with standardized assessment and the reuse of OER, may provide a strategic advantage for institutions competing with the growing number of public/private institutions offering online programmes.

A key objective of this report is to analyse and evaluate existing and potential scalable approaches to formal assessment and accreditation of learners/students for digital learning, comparing and contrasting such uses with more traditional approaches. The process of accreditation is what currently distinguishes traditional approaches in the formal post-secondary sector when contrasted with nascent forms of certification now emerging with initiatives like: the Mozilla Open Badges project (Open Badges (Undated: Online) and the Coursera, Udacity and EdX MOOC initiatives.

Accreditation refers to a “process of quality assurance through which recognition is granted by competent authorities to confirm that standards of education established by professional authorities have been met” (CICIC 2012: Online). It is conceivable that the boundaries between the traditional approaches to accreditation and nascent forms of certification now emerging from the large free online courses operating in the informal and non-formal education sectors may begin to blur over time. For-profit MOOCs like Coursera, and Udacity are partnering with accrediting agencies and or universities to provide official accreditation for their courses. Coursera has an agreement for credit equivalency with the American Council for Education (Coursera 2013: Online). Udacity has teamed up with Georgia Technical University to offer accreditation (Techcrunch 2013: Online). MOOC providers are no longer restricting their certification to “Certificates of Participation” or “Certificates of Accomplishment”.

Commercial startups that are providing no-cost access to learning opportunities are protecting their prospective commercial interests associated with future certification through copyright and user terms of service agreements. This is a dynamic and fast changing landscape and it is expected that the early implementations of the emerging business models will augment and diversify over time. These for-profit institutions have the flexibility to modify and adapt their terms of service for generating new market propositions in the online education sector and this may impact on future markets for online learning and emergent forms of certification.

The formal public higher education sector is also showing increased interest in the assessment, credentialing and accreditation models for no-cost access to learning opportunities. Consider for example: the OER university international network of 26 accredited institutions who will be able to accredit OER learning on five continents; the multimillion dollar philanthropic investment from the Bill & Melinda Gates Foundation to explore the potential of the MOOC phenomenon within public community colleges and universities (Fain 2012); and FutureLearn Ltd, spearheaded by the British Open University as major shareholder with 11 partner universities from the United Kingdom, who are planning to offer free access to online learning (Open University 2012(a): Online). The European Association of Distance Teaching Universities is also initiating a European MOOC platform called OpenUpEd. It has 12 university partners and is offering 40 courses in 12 languages. These initiatives may also contribute to the mainstream integration of alternate forms of certification for open access to free online learning opportunities in the formal post-secondary sector.

This section will introduce a conceptual framework illustrating how traditional university services can be unbundled or disaggregated from the traditional full-tuition and assessment packages offered by the formal post-secondary sector. This framework will facilitate an analysis of potential approaches for assessment, credentialing and accreditation, associated with the affordances offered by digital learning materials, which are openly licensed. Lessons learned from the analysis will be highlighted and the leverage points for scalable and sustainable approaches for the future will be identified.

Protection of economic interests associated with formal accreditation of free online learning in the for-profit sector

With reference to the commercial startups providing no-cost learning opportunities, their business model is designed to maintain and protect the exclusive economic rights associated with future accreditation of learning from the use of these open access courses. The Coursera learning materials utilise a custom-made all rights reserved license and their terms of reference specifically exclude third party credentialing services:

“You may not take any Online Course offered by Coursera or use any Letter of Completion as part of any tuition-based or for-credit certification or program for any college, university, or other academic institution without the express written permission from Coursera. Such use of an Online Course or Letter of Completion is a violation of these Terms of Use” (Coursera 2013a: Online).

The current terms of service would require licensing permissions from Coursera for third party institutions to provide accreditation services, whether by institution-based recognition of prior learning methods or credit recommendations from authorised accreditation bodies.

The restriction of economic rights for accreditation services is not unique to Coursera. Udacity and FutureLearn for example, both apply the Creative Commons Attribution-NonCommercial-NoDerivatives default license to specifically exclude use of their material. This is a legal construct to protect the economic rights associated with assessment and certification. It would appear that these

commercial startups are adopting the Silicon Valley business trajectory of “build a customer base and then figure out a business model later” (Rominiecki 2012: Online). There are, however, early signs that accreditation options in the for-profit sector will diversify as experience with the prospective business models mature because the licensing of economic rights for formal accreditation services could potentially provide a sizable revenue stream.

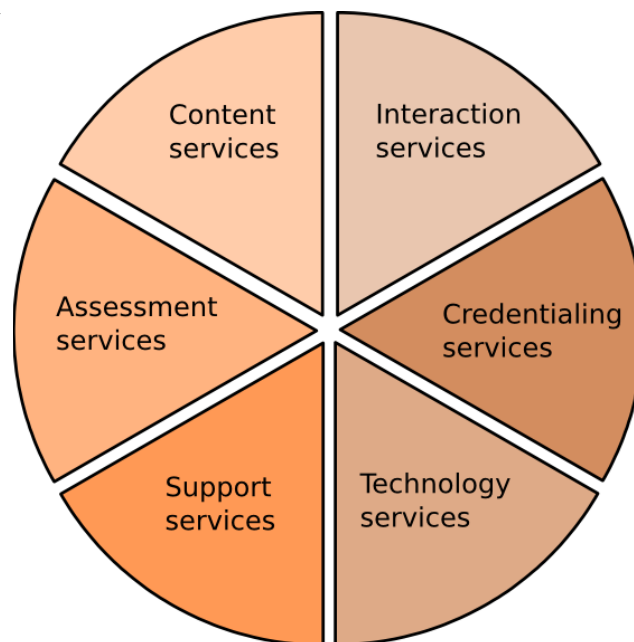
Coursera, for example, has entered into a contract to license a number of courses to Antioch University for an “undisclosed amount” (Kolowich 2012: Online). A copy of the Coursera contract with the University of Michigan at Ann Arbor, obtained by the Chronicle of Higher Education under a Freedom of Information Act request (Young 2012: Online), reveals that the partner universities may earn between 6 and 15 percent of gross revenue from these licensing arrangements for accreditation services. Kolowich (2012) reports that “Coursera’s contract also stipulates that the company will pay its university partners an additional 20 percent of gross profits from the aggregate set of courses provided by the university or instructors under this agreement.

A conceptual framework for classifying the disaggregation of traditional university services and corresponding reductions in student costs of tuition

Drawing on discount service models available to consumers in many industries, Anderson and McGreal (2012:) suggest that “disaggregation could prove to be a cost-effective way to reduce tuition payments, while maintaining quality” in higher education. The methodology of unbundling the processes of learning, assessment and accreditation provides a useful framework for analysing and evaluating the existing and potential scalable approaches to formal assessment and accreditation for digital learning. This unbundling approach was also adopted by the OERTest study funded by the European Commission involving a consortium of six European Universities, the European Foundation for Quality in e-Learning and SCIENTER (Camilleri et al 2012). The OERTest study provides a useful benchmark comparison with specific reference to the accreditation challenges of “full-unbundling” when comparing the European system with the current study.

The conventional model for the provision of quality post-secondary educational services in general and especially those provided by single-mode distance education institutions “consists of a complicated set of service provision, with many complementary and sometimes integrated services” (Anderson & McGreal 2012: 381). For the purposes of this analysis, these services can be classified under the groupings illustrated in Figure 1. The nature of these services is summarised below:

- Content services may include face-to-face lectures, online learning materials, printed study guides produced by the institution or third-party copyright



materials used under license for the payment of a fee.

- Interaction services refers to the three forms of interaction (Moore 1989) purposefully incorporated by teaching institutions into the package including:
 - student-lecturer interactions, for example answers provided during lectures, discussion forum posts or lecturer feedback provided on assignments.
 - student-content interactions, for instance, planned interventions whereby learners receive formative feedback on interactive objective items, learning activities or interacting with laboratory experiments.
 - learner-learner interactions, for example planned face-to-face small-group activities or integration of peer-to-peer online activities.
- Assessment services refer to both formative assessment interventions incorporating feedback to support the learning process and summative assessments including challenge examinations and recognition of prior learning processes, which can lead to credentialing.
- Credentialing services refers to the range of activities which support the credentialing processes at accredited institutions, including the administration of transcripts, articulation agreements, credit-transfer processes among institutions and awarding of accredited credentials.
- Support services include pastoral learning support, career guidance and counselling, library services, and academic study skills support.
- Technology services refer to the technology infrastructure and support for blended and technology enabled learning including online course delivery.

Students who register at traditional universities normally establish a contractual relationship with the accredited educational institution to provide all of the services listed above as a “full-tuition” bundle. In the public education sector, the costs of providing these services are in part funded through government grant or subsidy. In many countries, students contribute to these costs through student tuition fees and may receive government support through student loan schemes. The legitimacy of the teaching institution is an important criterion for learners to qualify for state-aided student loan schemes. Normally, the legitimacy or state recognition (institutional accreditation agency recognition in the USA) of the institution is also a requirement for receiving government grant support. Consequently legitimacy and corresponding funding models are significant factors to consider when designing learner assessment, accreditation and credentialing alternatives.

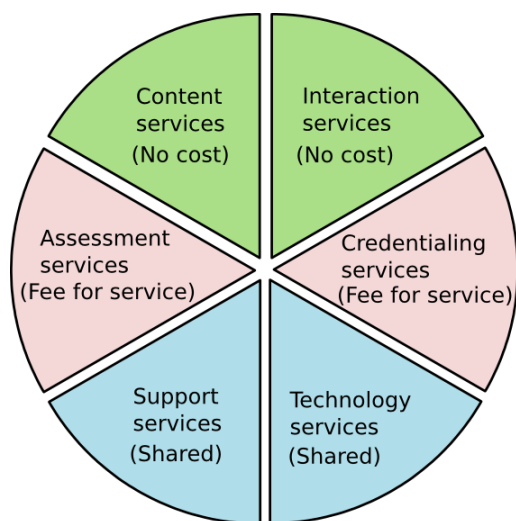
From the perspective of the institution the provision of the collection of these services generates costs that can be divided between capital costs (fixed cost) and recurrent operational costs (variable cost). Capital costs, like the investment in course development, can be spread over a number of years and tend to be fixed in that they are not affected by fluctuations in the number of student registrations. Recurrent costs, like tutorial and assessment services, are variable and increase in relation to the number of students taking courses each year. The distinction between fixed capital and variable costs is significant when designing cost-effective systems, which can scale.

Detailed cost analysis of the provision of these discrete services falls outside the scope of this report. The differences in pedagogical models and approaches should be taken into account as well as their

corresponding impact on cost behaviours, nevertheless, the highest proportion of the costs of course development for online learning involves the salaried time of academic staff, learning designers and web developers (see for example Rumble 2001). Consequently, solutions which reduce the institutional cost of course development will impact on the financial ecosystem. OER is an example of an innovation, which can significantly reduce these costs and save time associated with the development of high quality asynchronous learning materials.

The marginal cost of replicating digital knowledge is near zero, and from the perspective of the user, OER are non-rivalrous goods because “additional users in no way decrease the benefit derived from the good by the original consumers” (Casella & Frey 1992: 642). Notwithstanding the economic potential of significant cost reduction, there is reticence among institutional leaders to provide full accreditation services for informal learning based on OER courses. Many institutions are investigating alternative forms of certification, for example “badges” as a “lower risk” solution. This suggests that some institutions are concerned about losing market share by opening access to course materials, which can be expensive to produce.

This study was not able to locate any empirical research evidence from the published literature in the open education field providing evidence of reduced student registrations as a result of “competitors” opening courses. On the other hand, the OER Foundation has surveyed over 800 educators from more than 90 countries and 78% of respondents disagree that formal education institutions that open up their teaching materials will lose their competitive advantage, for example through reduced student registrations (Mackintosh 2012: Online).



As of 2013, The OER university collaboration is the only international network that has commenced with the implementation of accreditation solutions for no-cost online learning opportunities. As such, the network can be used as an international example of how the unbundling of traditional services could facilitate the provision of free learning opportunities using courses based solely on OER with pathways for learners to earn credible credentials from accredited higher education institutions (Mackintosh, McGreal & Taylor 2011).

The OER university network provides content services for learners using courses based solely on OER at no

cost to the learner. Interaction services are also provided to learners at no cost, relying on pedagogical designs, which can embed peer-to-peer learning support using social media technologies, and which can foster the development of peer-to-peer learning and an open community of academic volunteers. The OER university network is reducing the cost of support services and technology services by using shared infrastructure based entirely on open source software administered by the OER Foundation, a non-profit organisation. These services are funded by membership fees paid by the OER university anchor partners participating in the network. This

unbundling of services enables the OER university anchor partners to provide the learner assessment and credentialing services on a fee-for-service basis, at significantly reduced cost when compared to full-tuition. See Figure 2. This is a low-risk innovation because the recovery of the recurrent costs associated with learner assessment and credentialing service is guaranteed.

The OER university model for disaggregation of services is using OER to replace the fixed cost components of the package, and creating a scalable and sustainable mechanism for cost-recovery of the recurrent variable costs. In this way the unbundling can achieve significant cost reductions for students while widening access to educational provision. It is a no-frills, assessment-only model which is offered in parallel to the traditional full-tuition alternative at accredited institutions. By disaggregating services using OER courses, the OERu network can provide more affordable access to higher education, especially for learners currently excluded from the formal education sector for financial reasons or lack of local or in-country provision. The potential savings in tuition costs by unbundling services for learners are considerable. Consider for example that the average tuition fee for a 4-year degree in the United States from a public research university is US\$30,252 (Delta Cost Project 2010). Based on the pricing levels of the first OER university pilot course developed by the University of Southern Queensland, the equivalent tuition fees for a 4-year degree using the disaggregated model will be US\$6,759 or stated differently, 22% of the median tuition fees for a 4-year degree offered by a public university in the United States (OER Foundation 2012: Online). Jan Thomas, Vice Chancellor of the University of Southern Queensland, points out that the OER university model opens education because of “the ability to access university level courses and where cost has been removed as a barrier to learning” (OER Foundation 2012: Online). The OER university prototype is presenting early evidence to support Anderson and McGreal’s supposition (2012: 380) that disaggregation may prove to be a cost-effective way to reduce tuition payments.

While it is difficult to generalize in terms of either institutional or regional trends, educational institutions that have considered participating in the OERu initiative identified several factors as benefits of joining the OERu network. Significantly, the notion of retaining competitive advantage ranked higher than the widely advocated benefits of using OER to reduce cost and improve quality. These factors will contribute to improved competitive advantage, but it appears that a number of OER university anchor partners are potentially considering the model as a vehicle for generating new business opportunities, while serving the broader philanthropic mission of widening access to learning through an agenda of social inclusion. See Figure 3 below.

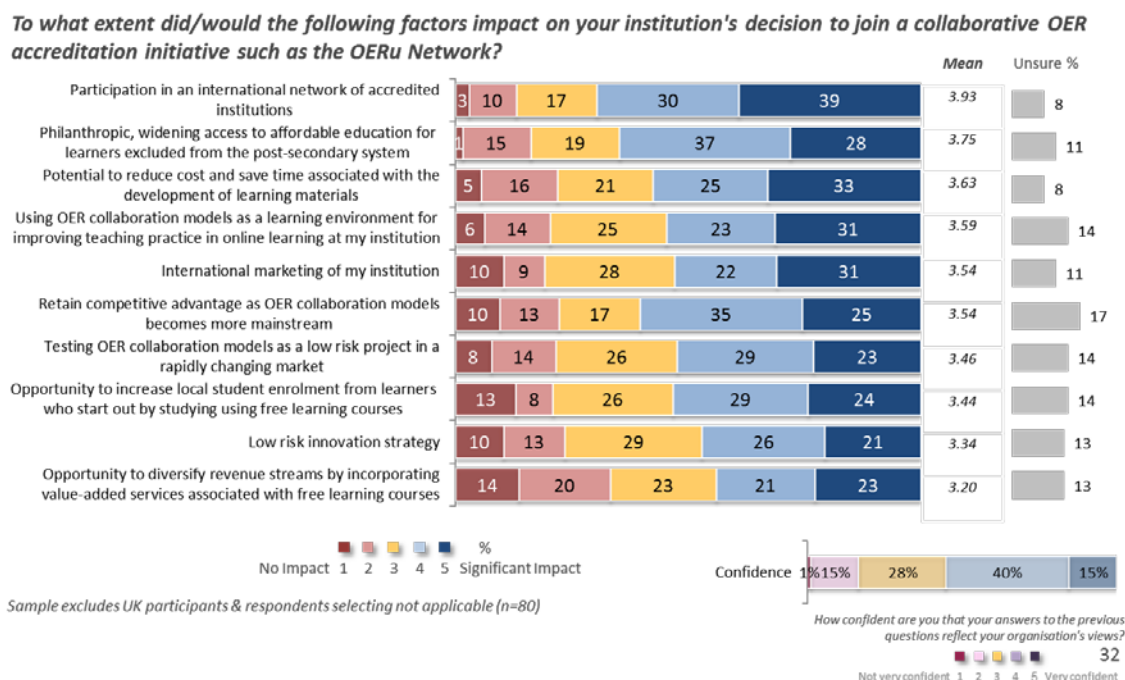


Figure 3: Reasons for participating in collaborative OER accreditation initiatives (real or hypothetical)

Traditional approaches to summative assessment and accreditation

This subsection summarises the mainstream methods of summative assessment used for learner accreditation purposes at institutions of higher education to determine the utility for learner assessment and accreditation services in a disaggregated model for no-cost learning opportunities.

The analysis is restricted to summative assessment and accreditation and consequently does not include initial, diagnostic or formative assessment methods. Methods which would be expensive or difficult to scale in a disaggregated model have not been considered for the purposes of this study. Therefore, methods like observation and simulations (Souto Otero et al 2005) have not been analysed. Finally, this summary does not consider psychometric issues concerning reliability, validity or pedagogical concerns with reference to authentic assessment or contemporary shifts reported in the literature relating to the pedagogical focus of assessment, for example: the shift from assessing outcomes to assessing processes or what is easily measured to what is valued (see for example: Shute & Becker 2010).

Proctored examinations, tests and challenge-for-credit options

Challenge examinations provide the opportunity to disaggregate teaching services from learner assessment and credentialing services to certify mastery against the specified learning outcomes of a course. Institutions, which offer a “challenge-for-credit” option are not concerned with how or where learning was acquired, but agree to accredit learning if the student can pass the examination. The challenge examination model is not a new phenomenon. The “External System” established by

the University of London in 1858 administered its first challenge examination in 1865 (University of London 2010: Online).

The challenge examination model is not widely used as an accreditation alternative, and is even less common at conventional face-to-face universities. The use of proctored examinations and tests is a common practice at many institutions for summative assessment purposes because they provide the advantage of proctored/invigilated identity validation and assessment within a controlled environment. Policy protocols, which make provision for disaggregating teaching from summative assessment for accreditation purposes are generally absent, as is any administrative infrastructure to manage examinations, which are separated from the teaching of courses. So, the “challenge-for-credit” option is not widespread in post-secondary education.

Nonetheless, there are a number of institutions, which allow for a “challenge-for-credit” or “credit by examination” option at reduced fees when compared to the price of a full-tuition for selected courses. Examples include: Athabasca University (2013: Online); Excelsior College (2013); Thompson Rivers University (2013: Online); and Thomas Edison State College (2013: Online). This provides a policy precedent for serving OER learners because the “credit by examination” option is not assessing how the learning was acquired, but whether the learner can demonstrate the specified competencies or learning outcomes.

The majority of single mode open and distance learning institutions administer managed examination centres distributed through the regions they serve (see for example Unisa 2010: Online; Open University 2012(b): Online; Open Polytechnic Undated: Online). Typically the distance education provider will identify predetermined examination venues. These venues will provide invigilators to proctor learners sitting exams for different subjects during the same session at major centres. These distance education institutions may also cater for international students and national students where examination centres are not within a reasonable travelling distance. This usually involves prearranging an acceptable venue, for example, a reputable education institution or government agency that offers invigilation as part of their normal business services and meeting the local institution requirements for invigilation and acceptable photo identity.

These distance education institutions have the necessary experience and existing infrastructure to make more effective use of challenge examinations for the assessment and accreditation of OER learning. Improved networking and collaboration among distance education providers who are able to disaggregate services could result in improved economies of scale for widening access to proctored examination venues worldwide for OER learners. The Western Governors’ University makes effective use of online secure testing, allowing students to take their examination at home while being proctored over the Internet by invigilators working for a contracted private company that specializes in proctoring (Kryterion, Undated: Online). This along with increased use of computerised testing could provide a model for cost-effective learner assessments.

Pricing of credit-by-examination models

This study attempted an analysis and international comparison of the fees charged by institutions which offer a challenge-for-credit option, to compare fees with full-tuition offerings and to determine the international range of credit-by-exam fee structures. It was not possible to generate a reliable data comparison due to a number of complexities:

- The relatively low number of institutions that have challenge-for-credit policies in operation;
- Difficulties in extracting the costs of learning materials embedded in tuition fees of a number of distance education providers when compared with institutions who specify these costs separately in the published fee schedules. (Note: for the purposes of this OER analysis students would not be paying for learning materials);
- An analysis of this nature would require a comparison using gross totals for degree study due to the differences in which initial registration, technology fees, annual administration fees, course material costs, differentiated fees depending on subject, and differences in how tuition is charged at different institutions. This is further complicated by the fact that at many institutions offering the credit-by-examination option, this alternative is restricted to identified subjects and it would not be possible to complete a full degree of study by this method, thus limiting the applicability of the ratio of credit-by-exam to a theoretical comparison.

The criteria needed to determine valid inclusion of an item in the international data set would result in a sample, which is too small from which to infer generalisations because of the small total population. For example, a number of institutions that cater for an examination-only alternative still charge full-tuition fees, but this is more about providing flexibility for the learner rather than offering a low-cost alternative. Conversely, Excelsior College (2012: Online) offers a credit-by-examination option using automated assessment in partnership with Pearson for US\$95 per course. This model is restricted to courses which lend themselves to automated assessment, and could distort comparisons with challenge-for-credit courses which cannot reliably be assessed using automated methods.

Notwithstanding these limitations, based on the table below, there is evidence to suggest that the challenge-for-credit option can be offered to students at lower cost ranging from 34% to 57% of the comparative full-tuition cost. See Table 1.

	Currency	Cost of 4-year Bachelor of Arts or equivalent degree	Indicative average full-tuition cost per course	Cost of degree using credit by exam	Ratio of credit-by-exam against full-tuition cost
Athabasca University	CAD	26635	665	14160	53.16
Thomas Edison State College	USD	26281	657	9427	35.87
Thompson Rivers U	CAD	20891	522	12000	57.44

Table 1: Challenge for credit costing survey

Note: These figures in Table 1: Challenge for credit costing survey are indicative and based on the fee structures published on the institutional websites and/or use of online fee calculators assuming in-state or in-province learners and subjective assumptions on the “average” subject choice where differential fees apply. The cost of degree using the credit by exam option is theoretical because it is unlikely that a full-degree could be acquired in this way.

Based on this restricted information, it is plausible that an examination only model within a disaggregated system could result in a reduction of student fees taking into account that these learners would not receive any tuition or support services from the conferring institution. These figures do not take into account any effects that economies of scale could have on systems purposefully designed for a disaggregated system.

Recognition of Prior Learning (RPL)

RPL refers to the systems and processes institutions may have in place to provide learners with the opportunity to have learning acquired outside of the formal post-secondary sector. For instance, knowledge gained through learning experiences such as industry-based training, professional development workshops and seminars, private study and paid and/or volunteer work experience can be recognized in the form of academic credit toward the requirements of an accredited programme or credential. The nature and extent of these practices vary considerably from institution to institution ranging from a simple equivalency mapping of the outcomes of an external training program from another institution to a local accredited course, to rigorous and learner-supported portfolio processes used to accredit work experience against the graduate profile of a credential.

RPL using portfolio assessment is the most common method of credentialing. RPL approaches are significant because many institutions already have these policies in place and would therefore not require new institutional policies to be developed in order to participate in the assessment and credentialing of OER learning. However, the portfolio process is not purposely designed for OER learning or disaggregated systems per se. The portfolio process, as a rigorous and comprehensive assessment methodology, is labour intensive and may be difficult to scale for large numbers of learners. Figure 4 below shows the preferred assessment practices for OER accreditation initiatives.

In your opinion, which of the following assessment methods are most likely to be used in the future by institutions assessing learning outcomes of courses based solely on OERs for formal assessment towards credentials?

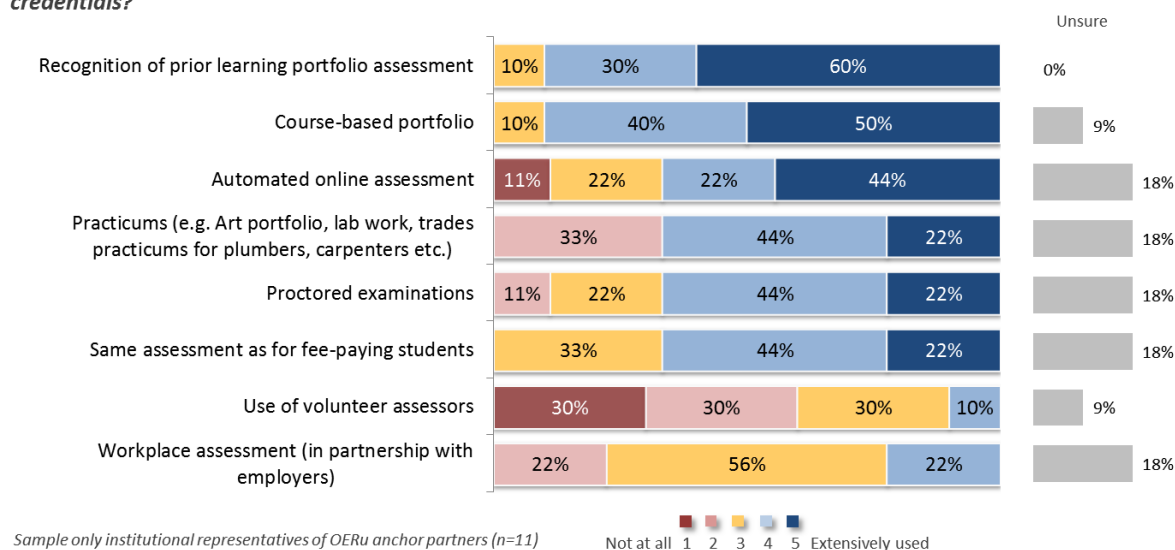


Figure 4: Preferred assessment practices for OER accreditation initiatives

Pricing approaches and cost comparison for recognition of prior learning

A variety of pricing models for RPL and related credentialing services are used by the sample of institutions selected for cost analysis. The approaches vary according to sophistication of the RPL policies in place and service-oriented approaches for registered students at the respective institutions.

The following pricing models are used by the institutions included in this analysis:

- Flat rate fee for portfolio assessment and credentialing irrespective of the number of RPL credits successfully earned towards a credential;
- Combination of a flat rate fee for portfolio assessment plus variable fee per credit successfully earned towards a credential;
- Banded fee structure for predetermined bands of credits earned through the portfolio assessment process;
- Flat rate fee plus variable fee per credit for course-based assessment of prior learning;
- Course-based fee structure for assessing prior learning against specified outcomes of courses;
- Free service for credit transfer using course-based assessment of prior learning against specified outcomes, usually restricted to in-state or national students and typically assessed at the individual school or programme level based on individual merit.

Institutions that do not have sophisticated RPL policies in place typically require a student to be formally registered at the institution to avail of the alternative assessment and credentialing services. Flat-rate fees and/or corresponding administration fees are usually non-refundable, yet the majority of RPL policies provide for student appeal mechanisms in situations where they may contest the outcome of the RPL assessment.

As in the case of credit by examination, there are many factors, which complicate comparative analysis of the price for RPL and/or related credentialing services. It is reasonable to challenge whether in fact it is appropriate or justified to make these price comparisons. RPL provides opportunities for thousands of learners who would otherwise not be able to acquire formal academic credit for learning outside the traditional classroom and the model depends on unique assessment processes.

Furthermore, there are additional complications with this kind of cost comparison, including for example: differences in the cost of living index for international comparisons; differences in the levels of government grant or subsidy for public institutions included in the study; fee differentiation for in-state or national students when compared to out-of-state or international students; difficulties in comparing models using a fixed fee versus a variable fee or combination of both; significant differences in RPL portfolio models versus course-based approaches; differences in the cost structures of distance and online learning when compared to face-to-face delivery, and individual

institutional differences regarding the maximum number of RPL credits which can be applied towards credentials at the respective institution.

Within the context of this open education study, which is exploring alternative assessment pathways towards more affordable study for learners excluded from the formal sector, it is important to demonstrate that these assessment pathways could potentially provide more affordable access in a sustainable way as part of a maturing ecosystem of post-secondary provision. To facilitate a rudimentary pricing comparison, a sample of institutions was selected from the study based on the following assumptions and limitations:

- Only those institutions which provide RPL, and/or related assessment services at an institution-wide level were included in the sample; therefore this comparison cannot make generalizable claims for the post-secondary sector.
- The comparison excludes the practice of discretionary decision-making by deans or heads of school for admission and credit transfer purposes.
- Inclusion in the sample of institutions was restricted to institutions where public data of prices and corresponding policies were readily available or could be verified through personal communications with the respective institution.
- Pricing models were based on a general Bachelor of Arts degree or equivalent, consequently prices will vary across degrees and disciplines.
- Indicative course fees may not necessarily include some administration related services, for example technology or application fees.
- The average RPL costs are based on the equivalent credits for three courses, therefore the ratio of the cost of RPL credits expressed as a percentage of indicative average course costs for full-tuition will improve for institutions incorporating a fixed fee pricing model irrespective of the number of RPL credits earned.
- Absolute cost for a Bachelor of Arts or equivalent degree is based on a 4-year Bachelor degree unless noted otherwise.
- The pricing comparisons are based on 2012 figures in local currency and assumes the use of closed course materials, therefore the figures do not necessarily incorporate cost savings which might be leveraged from OER.
- The analysis does not include the cost of materials, which students may be required to purchase for their studies.
- The analysis is restricted to the cost-to-student which may not necessarily reflect the direct institutional costs of providing these services.
- The pricing comparison in this study assumes that students will be in-state or national students acquiring services from their local institutions.

The cost comparison in Table 2 below does not provide an equitable basis to compare institutions. The institutional examples of indicative cost for three courses does not necessarily illustrate the most cost-effective price point for RPL assessment at the institution concerned. The purpose of this comparison is to validate that the current fee structures for RPL are less than the comparable full-

tuition costs for the same number of credits, demonstrating that disaggregated assessment and credentialing services can reduce cost within existing policy frameworks using RPL.

The data collected on RPL pricing approaches is summarised in Table 2 below:

	Currency	Cost of Bachelor of Arts or equivalent degree	Indicative average full-tuition cost per course	Indicative RPL cost for 3 courses	Ratio of RPL cost for 3 courses against full-tuition cost
Athabasca University	CAD	26635	665	8651	43.3%
Empire State College	USD	29465	737	9652	43.6%
Excelsior College	USD	50470	1065	1635	51.2%
Open University of Malaysia	RM	21894	547	600	36.6%
Otago Polytechnic	NZD	183543	765	7644	33.3%
Southern New Hampshire University	USD	38400	960	7505	44.7%
Thomas Edison State College	USD	26281	657	1350	68.5%
Thompson Rivers University (OL) – Course - based portfolio	CAD	20891	522	844	53.9%
University of South Africa ⁶	ZAR	34200	1140	1210	35.4%
University of Massachusetts Amherst (UWW)	USD	48340	1155	1185	34.2%

Table 2: RPL pricing Survey

1 Athabasca University charges a flat rate fee of \$750 for the portfolio assessment process in addition to the one-time general application fee. Consequently the cost-ratio will decrease if credit for more than 3 courses is awarded.

2 Empire State College uses fixed price bands for blocks of credits assessed. Students would be able to have another 2 courses assessed under the same price band in this example.

3 This is a three -year degree.

4 Under the Otago Polytechnic RPL model students can apply for cross credit where the outcomes of a similar course is assessed against the target course for a nominal fee of \$85 per course (11.1% of course fees). However, for the purposes of this comparison the ratio for portfolio assessment against graduate profiles is used.

5 Southern New Hampshire University outsources portfolio assessment to LearningCounts <http://www.learningcounts.org/#/time-cost>

6 UNISA has entered into licensing agreements with face-to-face providers including commercial education companies to provide teaching and tutorial services using Unisa learning materials. (Unisa 2012(b): Online). These learners sit the official Unisa examinations for assessment and credentialing purposes

This rudimentary pricing comparison illustrates that alternative assessment approaches can provide affordable alternatives for students to gain formal academic credit for those learners who may not be able to afford or prefer to acquire credentials without teaching services when compared to the traditional full-tuition model. The average RPL cost for three courses based on this sample of institutions is 44.5% of the comparable full-tuition costs, with 70% of the sample being able to provide these services below 50% of the cost of the full-tuition alternative. The median cost is 41%.

Third-party services for tuition, challenge examinations and portfolio assessments

There are a number of examples where teaching and assessment are disaggregated from credentialing services provided by accrediting institutions in the formal post-secondary sector. Very often these models provide more affordable alternatives for acquiring university credit when compared to equivalent assessment services offered by public universities and colleges.

Originating from the music examination system pioneered by the Trinity College of Music in London in 1872, the University of the Cape of Good Hope, which later became the University of South Africa, administered the first local music examinations in 1894 (Unisa 2012: Online). A key feature of this examination-only model is that the tuition is normally provided by third-party providers and the University's services are restricted to assessment and credentialing according to the prescribed music curricula.

Since 1998, the University of South Africa (Unisa) as a distance education provider has entered into licensing agreements with face-to-face providers including commercial education companies, now numbering 85 official "Unisa Licensees" to provide teaching and tutorial services using Unisa learning materials (Unisa Undated: Online). These learners sit the official Unisa examinations for assessment and credentialing purposes.

Developed by the College Board, the College-Level Examination Program (CLEP) offers credit-by-exam services using automated assessment methods provided at 1700 testing centres (College Board 2013: Online). The College Board administers 33 CLEP exams, which are recognised by 2900 colleges and universities. The cost of a CLEP examination is US\$80 compared with the average course price of US\$700 according to the College Board website (College Board 2013: Online).

LearningCounts is a program of the Council for Adult and Experiential Learning (CAEL) founded by an alliance between CAEL, The College Board and the American Council on Education's College Credit Recommendation Service (ACE CREDIT) (CAEL 2012: Online). LearningCounts provides an RPL support and advisory service for compiling assessment portfolios. LearningCounts has established partnerships with hundreds of universities and associations to offer convenient and affordable RPL credit transfers at very competitive prices when compared to the cost of RPL at many post-secondary institutions. Through LearningCounts, learners can earn RPL portfolio credits for up to three courses using the online self-paced resources for a cost of US\$379. There is also an instructor-led option, which incorporates a credit-bearing course on portfolio development in addition to earning credits for up to three courses for US\$750 (CAEL 2012: Online).

As mentioned previously, Excelsior College offers a credit-by-exam option for a large number of courses using automated assessment, available worldwide for US\$85 via secure PearsonVue testing centers through a partnership agreement with Pearson (Excelsior College 2013: Online). Excelsior College have established a strategic partnership with the Saylor Foundation which has developed more than 300 post secondary-level courses using OER at no-cost (Saylor Foundation 2012a: Online). This strategic partnership will pair a number of the no-cost courses available from the Saylor Foundation with Excelsior's credit-by-exam offerings. Thomas Edison State College has made a similar agreement with Saylor (Saylor Foundation 2013: Online)

The National College Credit Recommendation Service in the United States has approved three Saylor Foundation courses for credit recommendation (Saylor Foundation 2012(b): Online). The Saylor Foundation will provide examinations for free, but for credit recommendation purposes will require proctoring services which can be purchased from a third party service provider for as little as US\$25 per examination or potentially for free if approved proctors donate their time. Under this model, learners will be able to acquire credit for three Saylor Foundation courses for US\$75 (or free) through this credit recommendation service covering 1,500 participating colleges and universities.

Based on the limited sample data reviewed in this study, it would appear that significant cost advantages for learners could be achieved through the unbundling of tuition, assessment and credentialing services. Consider for example that the average price for RPL services for three courses from the North American universities included in the small sample analysed in the previous section is US\$1,086 compared to the self-paced option from LearningCounts for the same number of course credits is US\$379. The university option is 187% more expensive than the self-paced version offered by LearningCounts. For learners who are starting their university or college learning journey, they can acquire credits for three courses for as little as US\$75 (or free) but currently subject choice is limited. For wider course choice, learners can choose the UExcel option for \$95 per course through Excelsior College for a comparable cost of US\$285 for three courses, which is less expensive than the self-paced RPL alternative from LearningCounts. Of course, universities and colleges can recognise and accredit the learning from these options, as a number of formal educational institutions already do, through their local credit transfer agreements and existing RPL policies.

Assignments and course-based e-portfolios

Written assignments are used almost universally for both formative and summative assessment purposes and can include, for example, project work, essays, research papers, items designed to validate knowledge and competencies and personal learning reflections. Most institutions use written assignments as a method to document and provide evidence of student learning as a component of summative evaluation contributing to the final grade for credentialing purposes in both face-to-face and online delivery.

Below are some considerations regarding assignments as a method for summative assessment for credentialing purposes:

- Assignments are flexible from the perspective of the range of assessment items that can be incorporated and avert the need for physical infrastructure when compared to proctored examinations. In the online learning environment, a collection of assignments can be combined and submitted as an e-portfolio which presents documentation and other supporting evidence for validation of learning (CICIC 2012: Online).
- Identity verification and validation of the work submitted in written assignments being that of the registered student can be a challenge where written assignments are submitted as a component of the credentialing requirements for summative assessment. The risks associated with academic dishonesty would be equally present at both conventional face-to-face institutions, online and distance institutions in the case of written assignments. Institutions need to consider appropriate student honesty policies and assessment design practices to minimise risks. For example, a proctored identity validation and short telephone or online oral interview with the student covering their written assignment submissions could be used.

Approaches for credit transfer

Many, if not most, institutions have existing policies and procedures in place for recognising credits for individual courses obtained at other institutions towards local credentials. Drawing on the analysis of approaches used for credit transfer at the international level for the transfer of individual course credits, practices and procedures tend to be idiosyncratic with lack of standardisation at the international level. This is in part due to the diversity of national and regional accreditation and quality assurance procedures. Consequently the international portability of university credit is riddled with complexity and very often is managed at the individual institutional level.

Europe has made significant progress in promoting a standardised credit system for matching learning outcomes to hours of study among members of the European Union. The European Commission introduced the European Credit Transfer and Accumulation System (ETCS) in 1989. ETCS was developed to promote a more transparent system for the transfer of learning experiences between different institutions, greater student mobility and more flexible routes to gain degrees. As part of the Bologna Process, a series of ministerial meetings and agreements between European countries were concluded, designed to ensure comparability in the standards and quality of higher education qualifications (European Commission 2013: Online). In short, the ETCS system defines learning outcomes, which are expressed in terms of credits, whereby a student academic year represents 60 credits and a student workload ranges from 1,500 to 1,800 hours (European Commission 2013: Online). Under ETCS, one credit generally corresponds to 25-30 notional learning hours. The system is not mandatory. However institutions that meet the prescribed requirements are awarded an “ETCS label”.

In addition to the ETCS system, in 2008 the European Commission agreed to the establishment of a European Qualifications Framework (EQF). The EQF is a reference model for the mapping of national qualification frameworks of European Union countries (European Commission 2013a: Online). The intention is to facilitate improved understanding and comparison of the levels of

qualifications of different countries and different education and training systems in European member countries. The initiative “encourages countries to relate their national qualifications systems to the EQF so that all new qualifications issued from 2012 carry a reference to an appropriate EQF level” (European Commission 2013a: Online).

The OERTest study, comprising a consortium of six European universities, explored how ETCS credits are recognised at the institutional level (Camilleri et al 2012: 21). Notwithstanding the progress of the European ETCS system and ongoing development of the EQF, the implementation of how ETCS credits are recognised at individual institutions tends to be executed on an ad hoc basis involving institutional comparisons of the learning outcomes of the source course with the learning outcomes of the target course at the receiving institution. The mechanisms for the accreditation of programmes of study also differ. In some countries study programmes are accredited by the external quality assurance agency, while in other cases programmes are accredited internally by the universities themselves (Camilleri et al 2012: 21). The OERTest study has designed and proposed the implementation of a “Learning passport” system, which combines the information and corresponding quality assurance mechanisms, which the different stakeholders in a disaggregated learning system would need to enable course articulation and accreditation (Camilleri et al 2012: 42). This provides a useful framework for further investigation to consider the portability of the “Learning passport” recommendation as one possible means of facilitating credit transfer of OER learning on an international scale.

The Commonwealth of Learning has also developed a Transnational Qualifications Framework (TQF) for use by the Virtual University for the Small States of the Commonwealth (VUSSC) (COL 2010: Online). The aim of the TQF is to support “labour market mobility in small states both between and within countries and sectors by simplifying comparisons between qualifications and enabling a better match between supply and demand for knowledge, skills and competences” (COL 2010: Online). The TQF is also a reference model to map individual courses and qualifications to the National Qualifications Frameworks of Commonwealth member states. The system is useful for countries which have existing National Qualification Frameworks, for example Australia, South Africa, Namibia and New Zealand; however many countries do not currently have national qualifications frameworks in place. The Commonwealth of Learning is encouraging the development of National Qualifications Frameworks among Commonwealth member states.

While national frameworks are beneficial for course articulation at the international level, in countries where education is regulated at the state or provincial level, different systems are used. In the United States, for example, the Secretary of Education is required to publish a list of nationally recognized accrediting agencies, including national, regional and specialised accreditation bodies as a requirement of the Higher Education Act of 1965 in the United States (U.S. Department of Education 2012: Online). Because of the large number of accreditation agencies combined with the autonomy of individual institutions regarding choices for accreditation, credit transfer for accredited courses is not guaranteed among universities and colleges in the United States. Generally speaking, however, any of the regional accreditation authorities are seen to be more reputable (Aasen 2008: Online) and in most cases, universities and colleges accept credit transfer issued under the auspices

of one regional accreditation authority to another region. In addition there are several non-profit agencies, which offer accreditation recommendation services for networks of universities and colleges, but this is not a guarantee for credit transfer to all institutions.

Canadian institutions that are recognized by their provincial governments can also transfer credit in most cases, and generally the credits are accepted in the USA as US credits are accepted in Canada. At the upper levels however, there are problems in accepting credits for specific programmes.

Not surprisingly, many survey respondents were unfamiliar with the credit transfer policies of their institutions, especially those outside of North America. Of those that did respond, two in ten respondents said their institutions would award credits for courses even in instances where more than 60% of the credits had been obtained at another institution. See Figure 5. These respondents were located mostly in North America, followed by Europe, and Africa.

Which of the following options best describe your institution's practice with regard to credit transfer?

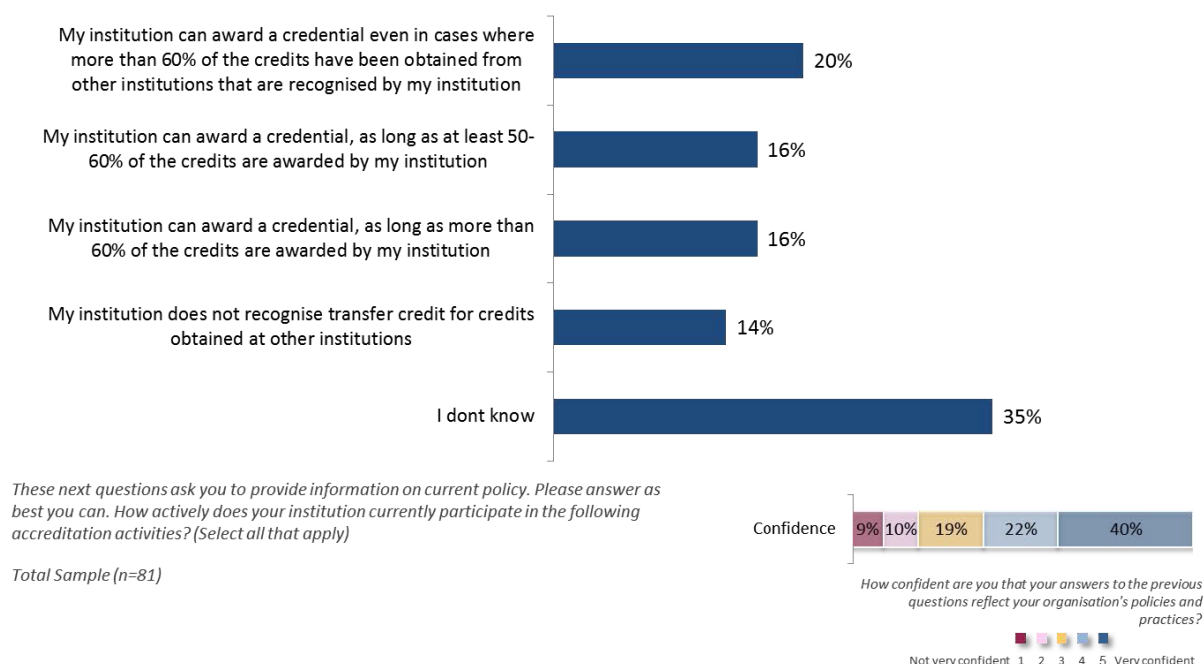


Figure 5: Institutional credit transfer practices

Given the complexities and diversity of international, national and regional accreditation procedures, individual institutions utilise a variety of methods for implementing credit transfer services including, for example:

- Maintaining individual articulation agreements between institutions for identified courses;
- Using credit-transfer guides, which may be established and maintained by regional bodies or government entities, which document institutions, courses and program transfer agreements among institutions at a provincial or national level (see for example ACAT 2009: Online);

- Institutional RPL policies, which specify recognised course credits, for example, third-party examinations like the College-Level Examination Program (College Board 2012: Online) and listed credentials from the non-formal sector;
- Lists of qualification exemptions maintained by state immigration departments where third party assessment for recognition of the credential is not required (see for example Immigration New Zealand 2012: Online);
- Course-based portfolio evaluations conducted under the relevant institutional RPL policy;
- Individual ad hoc assessments by academics to determine the equivalency of learning outcomes of a source course to be applied to a target course for credit at the receiving institution; and
- Utilising third-party services to assess transcripts or external courses for local university credit.

Existing approaches for managing credit transfer were not designed for a system where university services could be disaggregated. In other words, the current systems were designed for an environment where the majority of learners would be acquiring the majority, if not all of their credits from one conferring institution. The mainstream implementation of disaggregated university services will necessitate further refinements to the “cottage-industry” approach of the current systems for international credit transfer to minimise unnecessary duplication, improve cost-efficiencies and to implement solutions which will scale for large numbers of learners.

Matriculation requirements for graduation

In the context of this study, matriculation requirements refer to the minimum number of credits, which must be completed at the conferring institution in order to qualify for the graduation requirements at that institution. Institution-based knowledge of local matriculation requirements is low with 35% (n=81) of respondents in the study indicating that they were not aware of the local policy specifications (Murphy 2012). However, 20% of respondents maintain that their institutions will be able to recognise up to 60% of the credits earned from other recognised institutions towards the local credential (Murphy 2012). 52% of the respondents confirmed that the local institution would be able to recognise up to 40% of the credits earned from recognised institutions towards credentials at the conferring institution (Murphy 2012). This suggests considerable scope for universities and colleges in the formal sector to accommodate credit transfer toward local credentials without the need for local policy revision where teaching and assessment services are disaggregated from credentialing services. See Figure 5 on credit transfer practices.

Lessons learned and conclusion

Studies confirm that the concept of OER is becoming known among educators working in the formal sector. International data collected by the OER Foundation reports that 78% (n=800) of the respondents were aware of the concept of OER (Mackintosh 2012). The small-scale survey in higher education also reports that 78% (n = 90) of respondents had a high level of awareness of OER. See Figure 6. (However, this survey was largely targeted at individuals who were members of various OER communities or mailing lists.) A study on the adoption use and management of OER at higher education institutions in Australia reports that 66% (n=93) of respondents rated their knowledge

above the beginner category with 52% at the intermediate and 14% at the advanced categories respectively (Bossu, Brown & Bull: 2012). On the other hand, in Canada, Quirk, Anderson and McGreal (2013) reported that few respondents (n= 91) in their survey were familiar with the OER concept and of the few that did, most had an imperfect understanding of it.

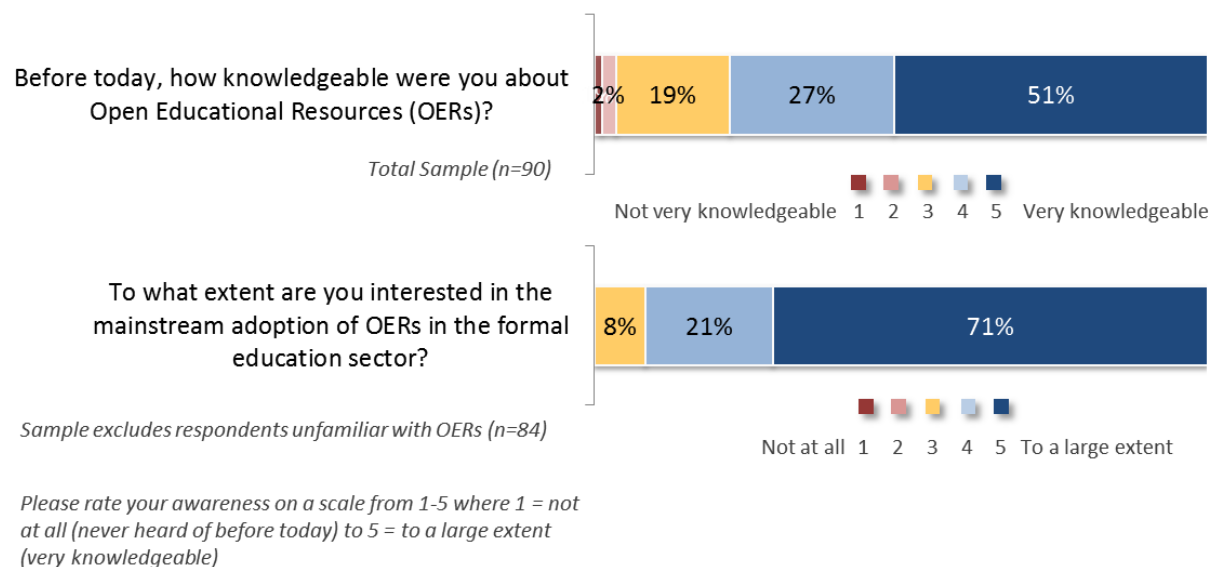


Figure 6: Knowledge of and interest in open educational resources

Despite the interest in OER amongst survey respondents, the practice of assessing learning from courses based solely on OER is not common, with only 6% of the institutions surveyed in the study on benchmarking OER use and assessment in higher education reporting that they currently provide assessment services for OER learning, and only 18% of institutions surveyed saying they would consider doing this in the near future. See Figure 7. There seems to be an implementation gap between knowledge of the concept and mainstream adoption of OER at institutions of higher education, or perhaps this is a gap between the (highly positive) views of the practitioners who filled in the survey, and the more hesitant views of senior management who are responsible for creating policies and strategies to enable the use and reuse of OER at those institutions.

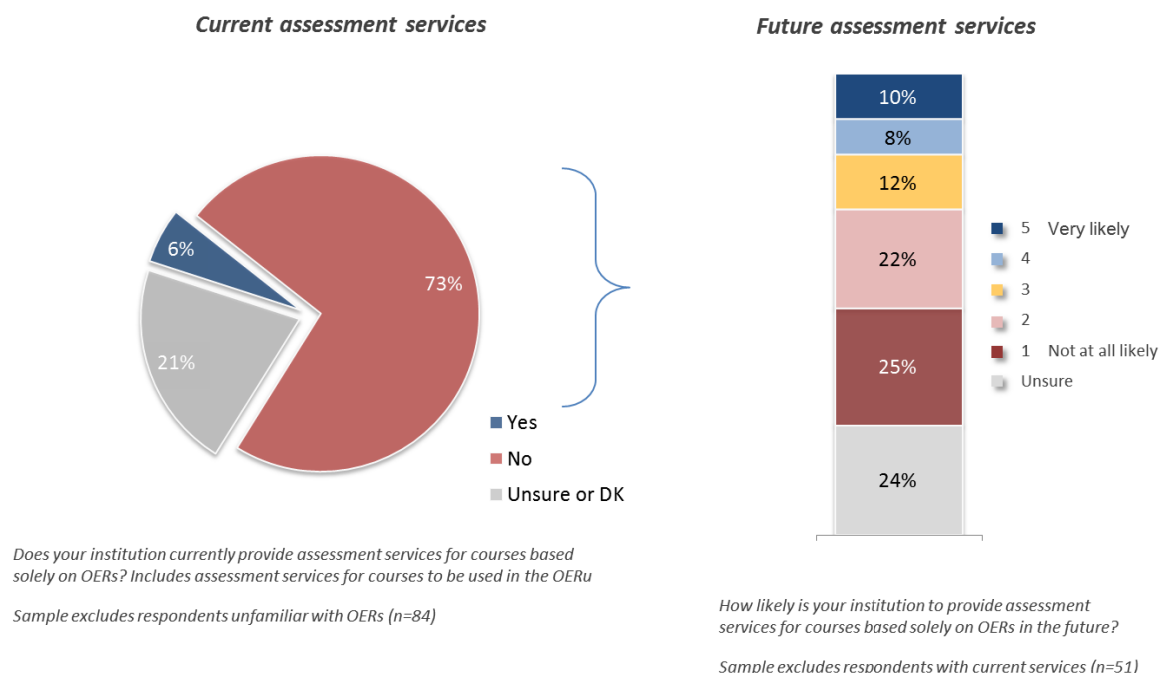
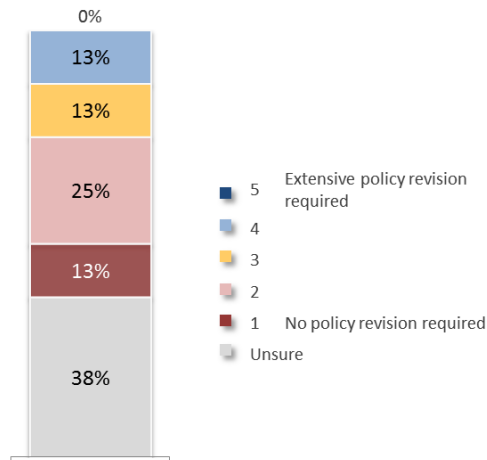


Figure 7: Current and future assessment services for open courses

Traditional methods of summative assessment for credentialing purposes including challenge examinations, RPL, assignments and e-portfolios are already used by a large number of universities and colleges and can be reused for disaggregated systems. While challenge-for-credit options are not widespread, there are policy precedents where these methods have been deployed successfully. Many RPL policies make provision for recognition of credits earned from exam for credit methods.

Existing policies do not appear to be the barrier for adoption. The reuse of these traditional methods for assessment and credentialing services in a disaggregated model for OER learning is possible within existing institutional policies without requiring substantive policy change or refinement. While individual knowledge of institutional policy on assessment and credentialing services is low, with 38% of OER university respondents indicating they were not sure of policy requirements for adoption, 59% of the respondents confirmed that no changes or only minor adaptations may be required for the adoption of the disaggregated model being developed for assessing and credentialing OER learning. See Figure 8. In addition, existing matriculation requirements would enable the assessment of OER learning towards credible degrees to widen access for a large number of learners given that the majority of institutions could recognise credit transfer for up to 40% of the credits towards local qualifications. See Figure 5.

To what extent will your institution be required to change existing policies to successfully implement assessment services for courses based solely on OERs (including courses offered through the OERu)?



Insights into existing policies that support assessment services for courses based solely on OERs:

- *Already have RPL and accreditation services. For RPL where the knowledge is obtained is irrelevant, as long as it can be demonstrated.*
- *Existing RPL policy, accelerated assessment for many programmes*
- *Advanced RPL policy in place. The OERu model is designed to operate within existing policy frameworks. We already have a Creative Commons Attribution intellectual property policy and are integrating OER and OERu into the learning and teaching policy currently under revision. We anticipate minor refinements to accommodate operational aspects of the OERu model.*
- *RPL policy provides an opening for alternative access and accreditation.*

Sample only institutional representatives of OERu anchor partners (n=11)

Figure 8: Institutional policy change requirements to participate in OER accreditation initiatives

The analysis suggests that there is room for improvement in the pricing models of credit-by-examination and RPL services offered by universities and colleges when compared to scenarios where these services are outsourced, with due consideration to the limitations of a small data sample and complexities in drawing reliable pricing comparisons. This would require further research to consider the cost behaviours of providing these services in conjunction with quality comparisons among the methodologies deployed and investigation of alternatives regarding how these services could be packaged and priced within a disaggregated model.

A significant lever for future adoption of reusable, scalable and cost-efficient solutions for a disaggregated model to provide assessment and credentialing services for OER learning lies in the improvement and potential for standardisation of international practice for course articulation and processes for credit transfer. In short, shifting from a cottage-industry model to mass-standardisation or mass-customisation of approaches for international credit transfer.

Scenarios for the future of assessment and credentialing of OER learning in a disaggregated system

This scenario consists of a short case study using a OER course designed to offer free learning opportunities with pathways for formal accreditation. It is used to illustrate alternatives for the unbundling of design, delivery assessment, and pedagogical approaches enabled by the use of OER. This will provide the basis for illustrating a number of mini-scenarios for reusing and remixing assessment for accreditation in an open model and disaggregated model.

Regional Relations in Asia and the Pacific course: A case study illustrating the unbundling of open course components.

Regional Relations in Asia and the Pacific is a first-year level bachelors degree course developed openly by the University of Southern Queensland (University of Southern Queensland 2012: Online). Drawing on frameworks from International Relations and the Social Sciences, the course provides basic information about, and analysis of, contemporary regional relationships, current affairs and societies in Asia and the Pacific regions. The course enables learners to develop personal and social skills that will facilitate better international cooperation and cross-cultural communication in Asia and the Pacific.

The course adopts a broad interpretation of the Asia / Pacific region and is defined as any country or economy bordering the Pacific Ocean. With over 45 economies in the Asia / Pacific region the course covers a wide range including, for example, Australia, Canada, Indonesia, New Zealand, Pacific Island States, People's Republic of China, Russian Federation, United States of America, the Western countries in South America, etc.

Content services and pedagogical approach

The teaching materials were designed for independent self-study using a Creative Commons Attribution license. In particular, the course was designed so that the teaching can be unbundled from the institution that developed the course. The course implements a “pedagogy of discovery” using structured e-learning activities, drawing Salmon’s (2002) framework of “e-tivities” to guide learners in navigating open access materials. The growing inventory of OER and open access materials available on the web provides the opportunity to develop courses using a “free range” learning strategy where learners can customise the content to suit their own needs and interests within the

context of a university-level course (Taylor 2012). This “free range” learning model enables the course to unbundle prescribed content from the learning outcomes. A key feature of this course is how digital and learning literacies required for the 21st century have been integrated into the teaching strategy (Beetham et al 2009: Online).

Technology support services

The course materials are hosted by the OER Foundation (and not by the University of Southern Queensland) for delivery to OER university learners utilising shared technology infrastructure. This facilitates the unbundling of the course materials from the institutional learning management system. The course materials were developed openly in WikiEducator (the OER university community’s main communication platform) using wiki technology. It is possible to unbundle the core resources from the learning management system which enables each of the OER university anchor partners to remix, reuse and integrate the materials into their own locally hosted delivery technologies for parallel delivery. In this way, the online course materials have been unbundled from specific delivery technologies facilitating greater potential for reuse.

Interaction services

The interaction strategies for the course have been designed for scalability, incorporating a number of MOOC-like features. Apart from the courses being open, a MOOC is distinguished from conventional e-learning delivery models because: it is a network that enables learners to utilise their own personal learning environments, and brings interactions from diverse sources on the internet together (Downes 2012(a): Online). Building on the ideas of the gRSShopper application pioneered by Downes (Undated: Online) to define communities of RSS feeds, to aggregate content from those feeds and to organise it, the OER Foundation developed technology which aggregates learner interactions from a variety of sources for the course.

The Regional Relations in Asia and the Pacific course uses a number of distributed interaction technologies and social media, including learner posts using microblogs, blogs, and discussion forums. Learners have considerable choice in choosing their own service providers for these technologies, which encourage learners to create their own personal learning environments and to develop corresponding digital and learning literacies for the 21st century. Enabled by RSS, the posts from a variety of technology sources are automatically aggregated into a timeline using the course code contained in these interaction posts. The course also uses a community-based question and answer forum where questions are posted and anyone (academic volunteers and learners) can provide answers. The community-based

questions and answers are also integrated into the aggregated feed. The question and answer technology uses a badge and karma points system where points are earned for posting good questions and answers as voted by the community thus providing an example of a scalable solution for technology supported peer-to-peer learning support and assessment.

Learner-content interactions are enhanced by the Regional Relations Database where learners report, annotate and share relevant OER they find in achieving the learning outcomes. Database entries are also aggregated in the course feed. The aggregated feed generates a stream of digital information and peer-to-peer support from the learning community across 24 international time zones. Apart from utilising social media to enhance learning support and interaction services, this approach is scalable from a technology infrastructure perspective because computing resources are distributed across the Internet, reducing the dependencies on any centrally hosted technology.

Assessment and credentialing services

The summative assessment is comprised of three project-based assignments. Each assignment includes a detailed assessment rubric listing the specified learning outcomes and criteria for performance standards for achievement of the grade levels. The first two assignments focus on a summative piece of assessment ranging from 1,250 to 1,500 words and are weighted 20% and 30% respectively of the final grade. The final assignment is a combination of summative assessment (based on selected e-learning activity outcomes) and a reflective journal based on the course objectives and the approach of the course. This assignment is worth 50% of the total marks. OER learners can submit and pay for assessment services from the University of Southern Queensland. The total cost for assessment and credentialing services is AU\$200 and learners will submit and pay for the assessment of each assignment individually (\$50 for Assignments 1 and 2 and \$100 for Assignment 3.) Learners that register for assessment and who are successful will have their credits recorded on the university transcript which can then be accredited toward the Bachelor of General Studies at the University of Southern Queensland. In this summative assessment example, the payment of the constituent components for accreditation have been unbundled. Moreover, the assessment model is designed for reuse and could be substituted with alternative assessments depending on local institutional requirements.

Distinguishing features and affordances of the course design

The Regional Relations in Asia and the Pacific course (University of Southern Queensland 2012: Online) was purposefully designed to facilitate disaggregation of course design, teaching, assessment and credentialing services using OER materials. The course design demonstrates several features, which would be difficult to replicate using a traditional closed model:

- Given that the course content covers more than 45 different countries and economies from the Asia / Pacific region, it would not have been possible to identify closed textbooks covering this range of content for learners to adapt the learning materials to suit their own needs and interests. The course has succeeded in providing a more learner-centred approach using the pedagogy of discovery when compared to traditional closed resources.
- The pedagogical design has resulted in significant savings in the cost and time for course design and development when compared to traditional independent study models because the majority of course materials, estimated to be 85% of the notional learning hours of study, are assembled from existing OER and openly accessible materials that learners source on the Internet in order to achieve the learning objectives.
- The course can easily be replicated for delivery as a stand-alone course or offered in parallel using a local learning management system. This was demonstrated at a professional development workshop presented by the OER Foundation at the University of the South Pacific in 2012, where the *Regional Relations in Asia and the Pacific* course was installed on the local institutional learning management system in less than five minutes. This demonstrates the ability for a regional university like the University of the South Pacific, which serves twelve Pacific island countries, to implement a high quality university course without expending any costs on course development or paying copyright fees in twelve jurisdictions. Recurrent costs can be recouped through assessment and credentialing services. The only barrier to adoption would be local institutional processes for recognising the course under an appropriate credential at the University of the South Pacific.
- The course design enables the disaggregation of assessment in two ways: first, institutions can replace the assessment package with their own local assessments reusing the core learning materials. Or, institutions can reuse the original assessment package for credentialing services at the local conferring institution.
- The course adopted an open and transparent design model from conceptualisation of a design blueprint through to implementation of the first pilot. In this way the course design, development and peer

review process is disaggregated from closed institutional-based course development. This creates opportunities for improved reuse potential because open feedback combined with an incremental design approach can achieve a better fit for multiple reuse scenarios at different institutions.

Reuse and remix scenarios when unbundling teaching, assessment and credentialisation of free OER learning.

Using the *Regional Relations in Asia and the Pacific* course as a case study, it is possible to explore a number of reuse and remix scenarios. These scenarios provide a conceptual framework to explore different configurations of assessment reuse and local credentialing options to provide insights into opportunities and corresponding implementation barriers to advise future research and policy development.

Potential scenarios involve the interaction among:

- Options for providing assessment services and reuse alternatives within a disaggregated system;
- Types of summative assessment including assignments, challenge examinations and RPL methods;
- Processes and systems associated with national, regional and cross-border credit transfer and cross credit options; and
- Flexibility of credentials at the conferring institution with regard to unspecified elective credits versus approved courses within a programme of study.

For the purposes of these scenarios, two categories of institutions are identified:

- OERU1: This refers to the university or college which develops the original OER course. This covers both courses developed by the institution and released under an open content license and courses which are assembled from existing OER and open access materials (produced by other institutions).
- OERU2+: A university or college other than the original developer who reuses components of the original course development where services are unbundled. OERU2+ also incorporates the third, fourth and subsequent institutions that may provide assessment and credentialing services within a disaggregated system.

Potential configurations for assessment and credentialing services and possible reuse alternatives for courses and assessments include:

1. OERU1 (or OERU2+) develops own assessment package for OER learning and offers assessment and credentialing services.

2. OERU2+ reuses (or adapts) the assessment package from the original developer (OERU1) and offers assessment and credentialing services.
3. OERU2+ uses local RPL portfolio processes to provided assessment and credentialing services.
4. OERU2+ uses local credit transfer policies for recognition of credits assessed and awarded at OERU1 towards credential at OERU2+.

The purpose of these scenarios is to generate a conceptual framework for considering alternatives for the future when unbundling traditional assessment and credentialing services, taking into account the fundamental assumptions, existing policies and practices associated with the traditional model of providing a composite package. These scenarios may assist with the interpretation of the present model using a picture of future possibilities. The mini-scenarios introduced in this section are not intended to cover all possible configurations, but have been selected to highlight a number of policy and implementation considerations.

Scenario 1: Single institution parallel delivery for free learners

OER course developed by	Learner requests assessment services from	Assessment developed by	Assessment provided by	Assessment type	Learner uses credit at	Credentialing mechanism
OERU1 (http://wikieducator.org/USQ)	OERU1	OERU1	OERU1	Course assessment package	OERU1	OERU1 Home institution assessment for own qualification

This scenario depicts the traditional model of a full service package and provides the baseline example for disaggregating components of the classical delivery model. What is significant with distributed open resources is the ability to support access for thousands of learners who can learn for free without significant increases in the marginal cost of delivery for the institution (see for example Downes 2012(b): Online). Moreover, this can be done in parallel with the full-tuition students taking the course for credit under the traditional campus offering.

While many MOOCs do not offer alternatives for formal academic credit, the credit option was used by a number of the early pre-MOOC pioneers including for example: Introduction to Open Education (INST 7150) hosted by Utah State University in 2007 (Wiley 2007: Online); Social Media and Open Education (EC&I 831) first offered by the University of Regina in 2007 (Downes 2012(b): Online); and the first MOOC: Connectivism and Connective Knowledge (CCK08) course hosted by the University of Manitoba and facilitated by George Siemens and Stephen Downes (Downes 2009: Online). While participation in the open version of these courses was free, the model did provide a parallel for-credit option. However, learners interested in formal academic credit were required to register and pay full-tuition fees. The Introduction to Openness in Education course offered by

Brigham Young University in 2012 has experimented with issuing open digital badges for the free learners in parallel with the students who enrol for credit at the university (Wiley 2012: Online).

As noted in the sidebar, The Regional Relations in Asia and the Pacific course developed by the University of Southern Queensland (2012: Online) is one of the first OER courses in the world purposefully designed for disaggregating assessment and credentialing services from the teaching of the course. The disaggregated model enables the University of Southern Queensland to provide assessment and credentialing services at significantly reduced cost when compared to full-tuition. The course assessment package consists of three assignments, which are submitted individually and learners pay for assessment services on the submission of each assessment item. The University of Southern Queensland will provide feedback on each assignment under the current pricing levels of AU\$50 for the first two assignments and AU\$100 for the final assignment. In theory it would be possible to offer a cheaper assessment price for grading without formative feedback, thus unbundling formative feedback from assessment and credentialing services.

Scenario 1 would be relatively easy to implement at most institutions because the model operates within existing assessment practices of the traditional delivery model. The model can be implemented as a standalone assessment-only course or in parallel mode with full-tuition students. When offered in parallel mode, full-tuition students will have the benefit of interacting with an international free learning cohort and the free learners would benefit from scalable peer-to-peer learning support. Credits earned from OERU1 could also be applied towards a credential at OERU2+ using local credit transfer protocols.

Policy and implementation considerations

A university's student administration and financial system will need to accommodate the ability for payments of individual assignments submitted for assessment which could be problematic with systems that require formal student registration under the traditional model before payments can be processed or before credits can be recorded on the university transcript. The Open Access College at the University of Southern Queensland will administer the assessment system for the Regional Relations in Asia and Pacific course as this university college is able to register learners for non-degree purposes and process individual assessment payments. The Open Access College also has the mechanism to record and recognise credits for identified university courses within the University of Southern Queensland system.

Within a disaggregated model, credit transfer and course articulation could be curtailed where the receiving institution's policy requires appropriate identity validation. This is needed to ensure that the work submitted was completed by the person claiming the credits for the respective assignments. The identity validation concerns could, for example, be addressed by including a proctored photo identification and short telephone interview, where the assessor validates that the work of the assignments was completed by the respective student through appropriate questioning. This alludes to an area of future research to explore networked solutions for minimum quality assurance standards in assessment and credentialing of OER learning.

Scenario 2: Reuse OER course with own assessment package for unspecified credits

OER course developed by	Learner requests assessment services from	Assessment developed by	Assessment provided by	Assessment type	Learner uses credit at	Credentialing mechanism
OERU1 (http://wikieducator.org/USQ)	OERU2+	OERU2+	OERU2+	Course assessment package	OERU2+	OERU2+ Assessment using own assignments for unspecified elective credit for own qualification.

This scenario portrays the potential for implementing a scalable approach for assessing and providing credentialing services through reuse of existing OER courses developed by other institutions. OERU2+ institutions retain autonomy for all aspects of the local assessment and adherence to local credentialisation policy. This scenario highlights the potential savings associated with OER because local cost is restricted to the time for developing the local assessment package. This scenario depicts a cost-effective alternative for universities and colleges to diversify local curriculum offerings without incurring course design and development costs.

This scenario also illustrates the flexibility of programmes of study, which incorporate the inclusion of unspecified credits and flexible course electives. Unspecified course credits circumvent the challenges of mapping the learning outcomes to determine equivalence of the source course (OERU1) with the target course at (OERU2+) institutions assuming that the course aligns with the level and more generic graduate profiles.

The components of Scenario 2 would also apply for developing local assessment packages for specified course credit towards a local credential. This would require additional work to consider the equivalency of the learning outcomes of the source course or alternatively mechanisms for approving new courses within existing programmes of study.

Policy and implementation considerations

Scenario 2 provides a relatively low inertia and low risk threshold for institutions that would like to trial and experiment with assessment and credentialing services for OER learning in a disaggregated model. Operating within the parameters of existing assessment practices means that no new policies are required and provides a low risk and low cost opportunity to gain tacit knowledge and experience with disaggregated service models.

Focusing on programmes of study, which incorporate the option for unspecified credits would enable institutions to implement a process of incremental development starting with the paths of least resistance. Scenario 2, using unspecified credits, would not require approval for new courses or

additional time for determining equivalency of learning outcomes between an external source course and local target course within an existing credential.

Scenario 3: Reuse OER course and use local RPL policies for assessment (or credit transfer) towards local credential

As reported earlier, RPL using portfolio assessment methods was deemed to be the most likely method for credentialing with 60% of the OER university respondents reporting that they expect to see this approach being extensively used for assessing OER learning. See Figure 5.

OER course developed by	Learner requests assessment services from	Assessment developed by	Assessment provided by	Assessment type	Learner uses credit at	Credentialing mechanism
OERU1 (http://wikieducator.org/USQ)	OERU2+	OERU2+	OERU2+ or OERU1 assessment plus credit transfer at OERU2+	RPL Course portfolio	OERU2+	OERU2+ Assessment using RPL processes for credits towards course in own qualification.

RPL could be used as a method for course articulation at OERU2+ institutions to recognise credits towards the local credential in cases where the learners are seeking to transfer credits assessed by OERU1 assuming no articulation agreements exist between these institutions. However, this method may result in unnecessary duplication of assessment activities on the part of the learner and additional cost. RPL course-based portfolios could be used to assess whether the outcomes of OER learning meet the target course for which credit is sought at OERU2+, for example, where the learner has not participated in summative assessment at OERU1.

The advantage of the RPL approach is that the majority of institutions already have RPL policies in place for providing credentialing services. Consequently RPL provides a productive avenue for further investigation in providing credentialing services in a disaggregated model.

Policy and implementation issues

Currently, the pricing of RPL at many institutions is a more expensive option when compared, for instance, to outsourcing of automated assessment or the course assessment package model used by the Regional Relations in Asia and the Pacific course at the University of Southern Queensland. A comparative activity-based cost analysis could provide a productive area for future research to explore opportunities for improving efficiencies of RPL in a disaggregated service model and exploring cost behaviours when applying RPL processes at large scale.

The credentialing services within a disaggregated service model may benefit from the implementation of hybrid credentialisation approaches, for example, where the conventional RPL course-based portfolio is substituted with a pre-designed course assessment package. This may

prove to be more scalable than conventional RPL methods and further investigation could highlight areas for potential improvement, for example institutional mechanisms for streamlining course approvals.

Scenario 4: Reuse OER course for local delivery in parallel mode, using own course assessment package, for credits towards own credential

OER course developed by	Learner requests assessment services from	Assessment developed by	Assessment provided by	Assessment type	Learner uses credit at	Credentialing mechanism
OERU1 (http://wikieducator.org/USQ)	OERU2+	OERU2+	OERU2+	Course assessment package	OERU2+	OERU2+ Assessment using own assignments for credits towards course in own qualification.

This scenario illustrates the potential for savings in the capital costs associated with course design and development by reusing existing OER courses. The potential for cost-saving is emphasised by the fact that the course could also be reused for providing tuition services to full-fee students at OERU2+ in parallel with free OER learners who may opt for assessment-only services within a disaggregated model. The scenario presumes greater institutional autonomy to align assessment with local course outcomes and local assessment policies when they are developed in-house. The scenario also illustrates the notion of parity of esteem in the quality of assessment divorced from the delivery model, because full-fee students will be using the same assessment package as the free OER learners (without tutorial support).

Policy and implementation considerations

The introduction of specified credits in Scenario 3 introduces the issues of alignment of learning outcomes between the source course and target course specified in the credential. It is plausible that assessments developed in-house could contribute to better alignment with the local specified learning outcomes. However, where there are identified gaps between the local course outcomes and those of the original OER course candidate for reuse, institutions could adapt the original course materials to suit local needs, or alternatively adapt the local specified outcomes in the program of study to better match the OER course being reused. This alludes to the potential for greater flexibility in the opportunities for refining local processes for course approvals to accommodate greater diversity. This is a prime area for future research.

In theory, it should be possible for a university or college to use the same assessment package for a course, for instance, “Introduction to Microeconomics” using the existing closed version requiring purchase of prescribed texts in parallel with an OER version using open access materials. This could potentially be used as a migration strategy where existing courseware is constrained by third-party

copyright. If the assessment-only, self-study OER learners can pass the course using open resources by achieving the outcomes using the same assessment for the “closed” alternative of the course, this could provide a catalyst for incremental migration to an open model.

Scenario 5: Reuse OER course and assessment package for credits towards own credential (as standalone or parallel mode delivery)

OER course developed by	Learner requests assessment services from	Assessment developed by	Assessment provided by	Assessment type	Learner uses credit at	Credentialing mechanism
OERU1 (http://wikieducator.org/US(UK Q	OERU2+	OERU1	OERU2+	Course assessment package	OERU2+	OERU2+ Reuse of course and assessment package for credit toward own credential

This scenario illustrates one of the most cost-effective implementations for the provision of assessment and credentialing services based on OER courses where learning outcomes are difficult to assess using automated assessment approaches. The Regional Relations in Asia and the Pacific course developed by the University of Southern Queensland provides an example of a course, which any tertiary education institution could implement today.

In this scenario, the assessing institution does not incur any upfront development cost and reuses the course as well as the existing assessment package. Recurrent cost of this model is restricted to the assessor’s time in grading the assessment package submitted by the student. Operational costs can be recouped by providing the assessment and credentialing services on a fee-for-service basis or alternate revenue sources, for example, government subsidy for an assessment-only model. OERU2+ institutions could implement the model as a standalone assessment-only course at the local institution but could also offer the course to full-tuition students as a replacement for a closed course or as an additional course diversifying the local curriculum offerings.

Managers may question the business rationale for a model of making their courses freely available. A number of institutions in the OER university network are supporting this approach for philanthropic reasons by donating courses and corresponding assessments as part of their institution’s community service and social inclusion agenda to widen access to educational opportunity. Philanthropy was ranked as the second most important reason for institutions participating in the international OER university network. See Figure 9. However, the model provides an example of smart philanthropy because tacit knowledge and experience gained through the network can be ploughed back to improve efficiencies of mainstream operations.

To what extent did/would the following factors impact on your institution's decision to join a collaborative OER accreditation initiative such as the OERu Network?

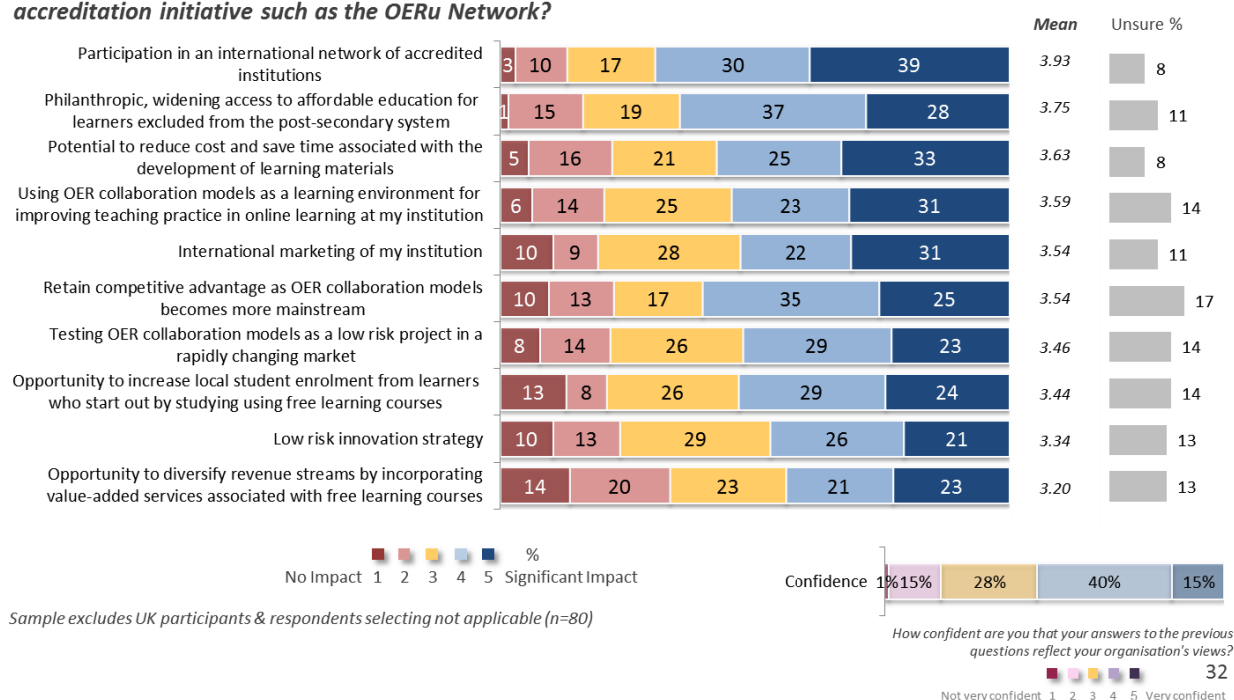


Figure 9: Reasons for participating in collaborative OER accreditation initiatives

Policy and implementation considerations

Open and transparent course design and development approaches provide greater flexibility for OERU2+ institutions to highlight aspects of the assessment design, which may curtail reuse and local adoption of the resultant course and assessment model. Using a system of open peer-review and feedback, the course design can be adapted to maximise the reuse potential in different institutional contexts.

Scenario 5 illustrates the potential to diversify local curriculum offerings without upfront investment, but scalable implementation would require streamlined policy revision and corresponding processes for local course approvals taking into account requirements for accreditation and quality assurance. Currently most institutions would require mapping of the outcomes of the source course with the outcomes of the target course, which can be a time-consuming and expensive process.

Discussion

The mini-scenarios included in this section do not cover all the configuration alternatives. For example, scenarios exploring the inclusion of automated assessment methods, which could be outsourced to commercial third party providers, were excluded as this was discussed in the subsection on third-party services for tuition, challenge examinations and portfolio assessments.

A more substantive opportunity, which has not been considered in these introductory scenarios, is the potential for networked and collaborative solutions based on open, dynamic and self-organizing models afforded by open content licensing and transparent development approaches. For example, remixing components of courses developed by OERU1, OERU2 and OERU3 where assessment is developed by OERU3 and OERU4 and administered by OERU5 and the existing stakeholders applied for credit at OERUx. The economic advantages would scale because the costs of course development when shared, for instance, among ten institutions, is cheaper than developing a course at a single institution. New opportunities for remix and technology-based innovation is also likely to improve in ways, which are difficult to predict.

During the first decade of OER development, the question of how to achieve sustainable open education projects without reliance on third-party donor funding has been an important area for consideration. It is reasonable now to consider that the disaggregation of traditional university services may shift the OER question for the next decade to how institutions will remain sustainable without the mainstream adoption of open education approaches.

Summary of findings and considerations for further analytical work

The practice of providing free online learning opportunities and corresponding solutions for assessment, certification and credentialing services will continue to evolve. Judging by the growing interest in MOOCs, it is reasonable to anticipate further developments in the range of certification and credentialing options in the formal education sector.

Consider for example that the American Council of Education (ACE) has commenced with a project to explore whether credit recommendations from the Council can provide a viable pathway for accreditation of MOOC learning (Fain 2012). This forms part of a \$3 million investment by the Bill & Melinda Gates Foundation in several MOOC related investigations including the Association of Public and Land-grant Universities (APLU) that will create an interactive learning consortium to study the potential of MOOCs for public community colleges and universities and the Ithaka S+R research group that will work with the University System of Maryland to test and study the use of MOOCs across the system (Fain 2012).

Moreover, following the adoption of the 2012 Paris OER Declaration at the UNESCO OER World Congress, governments of member states of the United Nations will be encouraged to adopt policies that require teaching and learning materials produced from public funding to be released under open content licenses (UNESCO 2012: Online). This may lead to new policy imperatives for publicly funded universities and colleges to consider diversifying formal assessment and credentialing services for their citizens using OER courses as they can provide cost-effective pathways for widening access to post-secondary education.

Key findings

The disaggregation of traditional university services provides a useful conceptual framework for the analysis of assessment and credentialing alternatives for digital learning. This study suggests that the disaggregation of these activities within the formal university sector have “yet to evolve from the handicraft, one-of-a-kind cottage industry mode to the mass production enterprise of the industrial age” (Duderstadt 1997: 82). Drawing on the analysis of this study, there is sufficient evidence to justify that the unbundling of traditional services used in conjunction with OER can provide more affordable access to tertiary education with pathways to achieve formal academic credit. A small number of institutions are already utilising these opportunities as part of their existing delivery models. It is reasonable to assume that the inventory of full programmes of study that will be available under an assessment-only model will grow in the coming years. For example, in 2012, Otago Polytechnic announced that the new Graduate Diploma in Tertiary Education approved by the New Zealand Qualifications Authority will be based entirely on OER and will also cater for assessment-only options for prospective learners (Otago Polytechnic 2012: Online).

The mainstream assessment approaches used for summative assessment and credentialing under the traditional model can be reused effectively within a disaggregated system. The study did not identify any material policy barriers for assessment and credentialing that would curtail the implementation of a disaggregated model. The majority of post-secondary institutions would be able to implement assessment-only models within existing assessment policy frameworks. However, minor adaptations and refinements with reference to operational management, for example, student administration and processing of payments within a disaggregated model, may be required.

Considerations for future research

RPL methods and approaches are considered by the majority of OERu institutions to be the main vehicle for assessment and credentialing services of OER learning in a disaggregated model. Preliminary analysis of the costs to student for RPL services provided in the formal sector are expensive when compared with other credentialing alternatives for example, automated assessment and course assessment packages. These alternative methods should not be considered as substitutes for RPL because portfolio assessment offers opportunities for assessment and accreditation of learning acquired outside of conventional course delivery. For many learners, traditional RPL is the only option available to gain formal recognition of their learning. However, there may be specific RPL processes, which could be reused, repurposed and repackaged to augment and support assessment and credentialing services for OER learning in a disaggregated system.

Further research and analytical work focusing on the following areas of RPL is recommended:

- Process and activity analysis of RPL assessment to identify those processes which can be reused, repurposed and repackaged for assessment and credentialing services of OER learning in a disaggregated system;
- Activity-based costing analysis of RPL processes to
 - identify cost-behaviours of corresponding RPL activities;
 - investigate possible solutions for cost-effective and scalable RPL processes when working with large numbers of learners; and

- analyse alternatives for packaging RPL assessment and credentialing processes and corresponding pricing for sustainable operations in a disaggregated system.

Current institutional processes for international credit transfer and course articulation are idiosyncratic with lack of standardisation when working across regional and national borders. As such, the current course articulation processes are not well suited for credentialing services within disaggregated systems for OER learning. This is potentially the most significant policy barrier for scalable implementation of unbundled service provision for OER learning. Current institutional processes may result in unnecessary duplication and inefficiencies for cost-effective implementation of assessment and credentialing where cores services are unbundled to support OER learning. Further research work is required to explore alternatives for cross-border credit transfer and course articulation in an open and disaggregated system. As institutional accreditation is closely associated with quality assurance mechanisms, this research work will need to consider corresponding implications for quality assurance processes in a disaggregated system.

Conclusion

Academic boards and senates at many universities are reticent to reuse openly licensed courses and corresponding assessments, which are formally approved by another accredited university, even though these open courses can be adapted locally at no cost and offered in parallel to diversify curriculum offerings at the home institution. This reticence may prove to be short-sighted and poor business strategy. The commercial sector will be quick to appreciate the business value of building assessment and credentialing services from assets, which do not require any upfront investment. And, governments hard pressed to reduce fiscal deficits may consider alternatives for a more cost-effective post-secondary sector favouring the disaggregation of traditional university services.

Other significant barriers to OER identified by faculty and administration are fears of change; confusion over copyright issues and the use and reuse of OER; concerns regarding the effort required for implementation of OER initiatives; and the possibility of conflict with commercial publishers and other special interest groups. The greatest barriers to participation in open assessment and accreditation practices are identified as the lack of availability of committed staff members to support such activities, and the potential costs of redeveloping courses as OER. Lack of support for OER-based courses from senior management is also a great concern. These “barriers” can be countered by incentives such as the low cost of entry and use of OER; minimal or non-existing licensing requirements; ability to localize and update the content and make other changes without restriction; acceptance by students; and the potential to increase institutional reach.

The key institutional success factors for the provision of open assessment and accreditation services appear to be a reliance on a strong base of support within institutions – both in terms of leadership and resources, and an existing culture of openness, including policies and practices around the creation and use of OER, as well as policies that enable either open access or recognition of prior learning via credit transfer or RPL. Institutions that are already characterized by these features are likely to be best placed for the implementation of assessment and accreditation of OER-based learning, and could provide models for other organizations that would like to participate in collaborative open education, assessment and credentialization initiatives in the future. The formal post-secondary sector has a unique opportunity to play a leadership role in determining their own futures because the token esteem of a university credential is still valued by society and the economy, as Brown and Duguid articulated as follows:

... in our highly commodified society it is naïve to believe that access on its own is enough. Those who have the label but not the experience present one problem. But those who might have the experience but not the label face another. Experience without a formal representation has very limited exchange value -- as those whose only degree is from the university of life well know. (1996: 10)

The university, as an institution, has the knowledge, experience and trust of society to accredit formal learning for those seeking formal academic credentials. The disaggregation of assessment and credentialing services for OER learning provides a viable pathway for more affordable access to post-

secondary education and formal academic recognition while simultaneously serving the core academic missions associated with the dissemination of knowledge and community service.

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