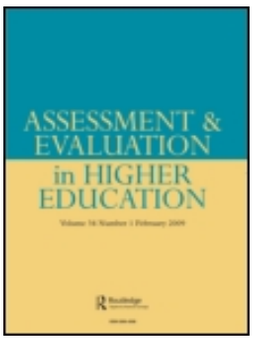

Routledge
Taylor & Francis Group

Assessment & Evaluation in Higher Education

ISSN: 0260-2938 (Print) 1469-297X (Online) Journal homepage: https://www.tandfonline.com/loi/caeh20

Establishing the critical elements that determine authentic assessment

Kevin Ashford-Rowe, Janice Herrington & Christine Brown

To cite this article: Kevin Ashford-Rowe, Janice Herrington & Christine Brown (2014) Establishing the critical elements that determine authentic assessment, Assessment & Evaluation in Higher Education, 39:2, 205-222, DOI: 10.1080/02602938.2013.819566

To link to this article: https://doi.org/10.1080/02602938.2013.819566

Assessment & Evaluation in Higher Education, 2014
Vol. 39, No. 2, 205–222, http://dx.doi.org/10.1080/02602938.2013.819566

Routledge
Taylor & Francis Group

Establishing the critical elements that determine authentic assessment

Kevin Ashford-Rowe[a]*, Janice Herrington[b] and Christine Brown[c]

[a]*Learning and Teaching Centre, Australian Catholic University, Sydney, Australia;* [b]*School of Education, Education and Humanities, Murdoch University, Perth, Australia;* [c]*Centre for Educational Development, Innovation and Recognition, University of Wollongong, Wollongong, Australia*

This study sought to determine the critical elements of an authentic learning activity, design them into an applicable framework and then use this framework to guide the design, development and application of work-relevant assessment. Its purpose was to formulate an effective model of task design and assessment. The first phase of the study identified from the literature critical elements that determined assessment as being authentic, and presented these to practitioners and experts for feedback. In phase two, it codified the elements into a framework that was then applied to the redesign of assessments in an army course. Phase three involved student evaluation of the redesigned assessment activities. This led to further review and revision of elements in phase four. The study outcomes suggest that it is possible, by identifying and codifying individual elements, to determine the ways in which the authenticity of an individual assessment activity might be enhanced. The paper concludes with a literature update on the framework elements that lead to suggestions for further research.

Keywords: assessment; authentic assessment; authentic learning

Introduction

Higher education is currently undergoing a period of significant challenge and transformation. It is likely that these challenges will, in a comparatively short period of time, lead to changes in the ways in which the higher education experience is both mediated and accessed. These changes have arisen as a result of a number of factors, including the information revolution, the consequent pace of technological innovation, the increased demand from both employers and government for a more highly skilled workforce, and the desire to increase and make more accessible the higher education experience to an increasing proportion of the overall population.

As an integral component of the education process, assessment supports learning by providing learners with the opportunity to demonstrate acquired skills and knowledge, while determining their professional, vocational and academic achievement. Boud (1995) points out ‘assessment is the most significant prompt for learning’ (36). It is what students consider important as it defines them as students. It is at the heart of the students’ learning experience (Brown and Knight 1994) and, as

*Corresponding author. Email: kevin.ashford-rowe@acu.edu.au

such, has great significance to educational designers. This view is supported by Brown, Bull, and Pendlebury (1997) who assert: 'if you want to change student learning then change the methods of assessment' (7). As Race, Brown, and Smith (2005, xi) note, 'Nothing that we do to, or for, our students is more important than our assessment of their work and the feedback we give them on it. The results of our assessment influence our students for the rest of their lives and careers – fine if we get it right, but unthinkable if we get it wrong'.

In addition, higher education has had to respond to the changing expectations of post-secondary students, who seek higher education learning experiences consistent with that provided to them in the K-12 component of their education journey. In this respect many school systems, such as in Singapore (Koh, Tan, and Ng 2012), have undertaken fundamental reviews of school curriculum and assessment systems. In Singapore's case, it is the 'Thinking Schools, Learning Nation' agenda, created to ensure that they 'nurture thinking and committed citizens to keep Singapore vibrant and successful' (136). Under the heading of 'Teach Less, Learn More', Singapore has intentionally introduced initiatives that teach for a deeper understanding and high-order thinking. It is acknowledged that, as the basis of this education process has changed, so must the assessment paradigms that underpin it. As Koh, Tan and Ng state: 'The focus on engaged learning in turn implies a shift from conventional assessment to authentic assessment' (137).

All of this has impacted upon the ways in which the higher education experience needs to be represented, and the range of alternative ways that students now expect to gain access to the knowledge and skills that will underpin their ability to both learn and perform. Further to this, higher education is increasingly being challenged to demonstrate its continued value to the broader community, especially employers, by ensuring that it provides capable, competent and informed citizens adequate to the challenges of a twenty-first century lifetime. If these principles are considered drivers for change, then it is important that the higher education sector can continue to demonstrate its ongoing value to the students who undertake it.

Thus, in seeking to align learning and teaching outcomes with industry expectations, educators have increasingly turned to constructivist philosophy, where competence is perceived not in terms of skill mastery, but as situational and personal, and an emphasis is placed on the need for close alignment of assessment with 'diverse and rich contexts of performance' in the real world (Wiggins 1993, 231). Alignment is thus increasingly sought through emerging technologies and authentic e-learning environments (Herrington, Reeves, and Oliver 2010), and through e-assessment (Crisp 2009).

This study sought to harness principles of authenticity to guide the design and development of more meaningful assessment activity. In essence, it sought to establish whether authentic assessment could provide an effective model of task design and assessment, consistent with the constructivist paradigm of knowledge creation and access. Two research questions underpinned the study:

(1) What are the specific characteristics of authentic assessment that facilitate design and assessment of complex and authentic tasks?
(2) How do students respond to tasks designed to incorporate the characteristics of authentic assessment?

The research questions framed and guided the following research activities:

(1) establishment from the literature of the critical characteristics or elements of authentic assessment,
(2) development of those elements into a framework,
(3) utilisation of expert analysis and feedback to enhance the design of the elements within that framework,
(4) testing of the framework by applying it to the redesign of a module, and evaluating the assessment activity from the student perspective and
(5) creation of learning principles.

An abundance of research on authenticity in assessment provides a rich pool of knowledge, with potential for extraction and formulation of a practical framework to guide the design of an authentic assessment. With this objective in mind, this study activity reviewed the literature to provide grounds for a qualitative analysis of a wide range of factors affecting the authenticity of a learning experience. The identified elements were analysed and grouped around eight aspects considered pertinent to a real workplace environment, namely: challenge, performance or product (outcome), transfer of knowledge, metacognition, accuracy, fidelity, discussion and collaboration. Determined as 'eight critical elements of authentic assessment', these are discussed below.

Eight critical elements of authentic assessment from the literature

An authentic assessment should be challenging

As Lund notes (1997), authentic assessment tasks establish connections between real-world experiences and school-based ideas; which within our context translates into the more academic higher education experience. They also present students with the full array of tasks that mirror the priorities and challenges found in the best instructional setting. Degree of challenge is a reflection of the authenticity of real-world situations and tasks. Thus, within an authentic assessment activity, students are required to demonstrate their ability to analyse the task and synthesise, from the range of skills and knowledge that they have acquired, those which will be necessary for the completion of a specific outcome, where the approach to the potentially correct response may not always be clear cut or obvious.

Degree of challenge is then a critical determinant of authenticity within a given assessment activity, referred to by Newmann, Marks and Gamora (1996, 1) as the 'challenge of constructing or producing meaning or knowledge, instead of simply re-producing meaning and knowledge as created by others'.

The outcome of an authentic assessment should be in the form of a performance or product (outcome)

'Authentic assessments focus on determining the skills and knowledge that the students are "able to demonstrate" while completing specific tasks' (Brown and Craig 2004, 2). It is, then, by means of the application of such skills and knowledge in the workplace, that a crafted outcome is produced, whether it is in the form of a performance or a product. Archbald and Newmann (1988, 33) assert that 'students

should be able to demonstrate skills and knowledge by engaging in complex performance, creating a significant product or accomplishing a complex task using higher order thinking, problem-solving and often creativity'.

It is the responsibility of designers to determine the extent to which the assessment activity requires the production of a completed outcome or product. Furthermore, it may be that the actual application of a specific set of skills and knowledge in a particular order may be subservient to the requirement to produce a functional product or acceptable performance outcome, as employers can often be reluctant to review the means by which a successful outcome has been achieved. Therefore, from the instructional designer's point of view, it is important that consideration has been given to the relationship between the requirement to demonstrate specific individual skills and knowledge in a precise way, and the importance of producing a successful performance or product. That is, the end may very well justify the means.

Authentic assessment design should ensure transfer of knowledge

This element seeks to determine the extent to which the skill, knowledge and attitude being assessed may have meaning beyond the confines of a single content area. As Tanner (1997) states, 'there should be consistency between the assessment and the real-world application for which the learner is being prepared', or, as it is stated within the Australian Qualifications Framework, 'learning outcomes are constructed as a taxonomy of what graduates are expected to know, understand and be able to do as a result of learning' (2011, 11). Thus, in authentic work performance, knowledge may often be drawn from a range of domains, yet may be applied only within a single domain to produce successful performance.

The authentic assessment activity should support the notion that knowledge and skills learnt in one area can be applied within other, often unrelated, areas. This is what Berlak (1992, 25) refers to as assessment relevance: 'the degree to which the assessment is related to what the learner is being prepared to do beyond the particular assessment setting'.

Whilst Hattie, Biggs, and Purdie (1996, 29) note that 'assessment should be in context and use tasks within the same domain as the target domain', it does not preclude recognition that transfer of knowledge or skill from another domain might enhance performance. As assessments are designed to measure the learning outcome, their relevance to the work environment determines the assessment's authenticity. It also enables the educator to consider the link between knowledge, skills and attitudes taught, and their application in the workplace and to review the curriculum accordingly.

Metacognition as a component of authentic assessment

Metacognition establishes the value and importance of both critical reflection and self-evaluation for successful workplace performance, as well as personal development. The ongoing monitoring of learning via self-assessment or self-evaluation can increase overall understanding, and improve performance. In educational settings, as Custer (2000, 29) notes, 'monitoring their own learning through self-evaluation can enhance student learning'. In a professional setting, the ability to evaluate and self-monitor tasks is critical to independent work performance.

Reflection is widely acknowledged in literature as a means to enable the learner to extend their learning experiences beyond the classroom by giving them a

meaning and place in the bigger picture. It also enables links to be made both within and between content areas; enhancing the understanding of the processes by which satisfactory outcomes or performances are concluded.

The significance of metacognition to learning process is such that it stimulates deep learning. Therefore, educators who seek to connect and ground student learning experiences, thus increasing their ability to re-apply the acquired knowledge, may wish to consider the use of active critical reflection to perform the assessment activity itself.

The importance of a requirement to ensure accuracy in assessment performance

This element is two-dimensional. First, it seeks to establish the extent of the learner's intellectual input required in the development of the product or performance, as a means of determining the degree of authenticity inherent within an activity. This dimension refers not only to the learner developing understanding and applying knowledge, but also demonstrating the developmental process that has led to the final assessment outcome. This aspect links closely with discussion under the second element of this framework, namely 'performance or product as the assessment outcome'.

Second, it also seeks to determine how central-assessed skills and knowledge are to the work-related application. In a workplace, it is the degree to which a final product or performance meets its purpose that is the overall determinant of its success. An authentic assessment should simulate and measure a real-world test of ability – rather than just match items to curriculum content – through a closer alignment of the task and the conditions under which it is assessed (Herrington and Herrington 2006). While accuracy of the assessment activity in addressing the needs of the real-work environment reflects on the assessment value, it is important for the educator to ensure that students understand this connection and also perceive the assessment as valuable.

The role of the assessment environment and the tools used to deliver the assessment task

This element guides the assessment designer to consider the fidelity of the environment within which the assessment is to occur, as well as the use of any tools that would be considered appropriate to this environment. As a 'real world' environment might be sometimes hard to recreate in a training environment, the extent of simulation required to accommodate the assessment has to be determined. McLellan (1994, 6) asserts that 'if the assessment occurs within the context for which it is intended to be used, then such a context is sufficient as it is usually either a replica of the appropriate environment, or a contextual anchor which reflects the conventions of the environment'. In this respect, authenticity of the tools applied is also maximised.

It is noteworthy that, depending upon the circumstances and nature of the assessment, the definition of tools may include broader cultural elements such as language (Northcote 2002, 2003). According to Kendle and Northcote (2000, 5), 'to enable a task to be as authentic as possible, culturally appropriate language, graphics and topics are used to make the students feel more familiar with the assessment task'.

The importance of formally designing in an opportunity to discuss and provide feedback

The ability to discuss and give and receive feedback is critical to workplace performance, and should therefore be included in an authentic assessment activity. The value of feedback as both guidance and a means of determining areas for improvement is vital to improved performance. To this end, Kendle (2000, 8) assert 'it is extremely helpful to build in opportunities for feedback in assessment'. As Newmann and Wehlage (1993, 4) note, it is one means of ensuring that the assessment activity may have 'value and meaning beyond the classroom', benefiting the learner's interpersonal skills, logic and rhetoric.

It should be noted that, whilst reflection is dealt with specifically within the fourth critical element, it is acknowledged that there will always be a requirement for a degree of reflection to have occurred to enable appropriate discussion to take place and feedback to occur.

The value of collaboration

The ability to collaborate is indispensable in most work environments. The value of collaboration, as a means of seeking out external sources for gathering critical data, is integral to any business performance. Modern constructivist educators understand its importance and incorporate opportunities for collaboration into their assessment activities.

As Kendle (2000, 6) state, 'the socio-cognitive value of collaborative learning is one that is becoming increasingly recognised and also offers students the access to multiple points of view as well as some useful opportunities for modelling'. Lebow and Wager (1994, 241) advocate that collaboration provides students with the opportunities to engage in authentic learning activities that '(a) shift from all students learning the same things to different students learning different things; (b) create group problem-solving situations that give students responsibility for contributing to each other's learning and (c) help students see the value of what they are learning and choose to share'.

Like feedback and discussion, collaboration too, even though integral to the real world, has only recently been explicitly acknowledged in the behaviourist-dominated pedagogies. In successful collaborative assessment activities, educators engage student's communication skills and teamwork skills, which are often critical to successful performance in modern work environments.

This framework of eight principles of authentic assessment was used to guide the design and implementation of a learning environment that was then evaluated in the study. The study employed a design-based research approach (Reeves 2006; McKenney and Reeves 2012) over four phases, each of which had a separate but iterative intent. The rationale of the first phase was to explore the problem in depth through an analysis of the literature and consultation with practitioners.

Phase one results

Within the first phase, a series of informal discussions with 13 education practitioners was utilised to test the perceived relevance of the characteristics provided, and seek advice as to how best these broader characteristics might be represented in an applicable framework. It was the outcomes of these discussions that prepared the

ground for the more detailed, structured expertise of three selected academic and vocational experts, with special interests in the field of educational design and assessment. Their reviews and a series of systematic consultations provided the insight from the practitioner's perspective on the eight elements that allowed for further reflection and construction of a workable framework.

Phase two results

In the second phase, the rationale was that of developing a solution by undertaking three key activities:

(1) develop draft elements to guide a solution to the problem,
(2) obtain further practitioner consultation and expert review of these draft elements to refine them and
(3) apply the elements in the redesign of a learning module.

As a result of practitioner and expert feedback, each of the critical elements was captured in the form of a question. Experts considered that the answer to each question could more explicitly determine the assessment's relevance to a workplace environment. The eight critical questions were effectively applied to form a heuristic framework to guide design and development of an authentic assessment activity as set out below:

(1) To what extent does the assessment activity *challenge* the assessed student?
(2) Is a *performance, or product*, required as a final assessment outcome?
(3) Does the assessment activity require that *transfer* of learning has occurred, by means of demonstration of skill?
(4) Does the assessment activity require that *metacognition* is demonstrated, by means of critical reflection, self-assessment or evaluation?
(5) Does the assessment require a product or performance that could be recognised as authentic by a client or stakeholder?
(6) Is *fidelity* required in the assessment environment? And the assessment tools (actual or simulated)?
(7) Does the assessment activity require *discussion* and *feedback*?
(8) Does the assessment activity require that students *collaborate*?

The framework was implemented and evaluated in a learning environment to verify its effectiveness in a practical setting. The eight critical questions were applied to facilitate a comprehensive redesign of a learning module of the Australian Army's *Computer Based Learning Practitioners Course*, namely *Evaluating Educational Multimedia*, with particular focus on the learning outcomes and assessment criteria. The intent of this module was that of providing training to newly appointed army instructional designers in the general principles and practices of the evaluation of educational multimedia, and their particular application to the evaluation of army computer-based learning packages. However, it had become evident from the evaluation of previous courses that the students who undertook this course did not consider that it was providing them with the necessary competencies to ensure that they could be effective when they sought to put these newly acquired skills into practice. On this basis, it was critical that the redesign of the module

Table 1. Proposed application of the critical questions to the redesign of assessment in evaluating educational multimedia.

Critical question	Assessment before	Proposal for assessment after redesign	How and why changed – designer rationale
1. To what extent does the assessment activity *challenge* the assessed student?	Assessment requires the student to answer non-applied theory questions as a test of memory	Assessment will require students to apply the theoretical content in practice	The intention was to increase the degree of challenge on the student by expecting them to apply what they had learnt in theory to achieve an applicable outcome
2. Is a *performance, or product*, required as a final assessment outcome?	Assessment requires student to answer questions in narrative (sentences/paragraphs) format	Assessment will require student to design and develop a workplace applicable tool	The intention was to ensure a stronger link between knowing theory and applying it to the design and development of a workplace applied tool
3. Does the assessment activity require that *transfer* of learning has occurred, by means of demonstration of skill?	Assessment requires limited transfer of knowledge in undertaking of a non-applied theory test	Assessment will require transfer of theoretical knowledge in the design and development of a workplace applicable tool	The intention was to reinforce the transfer of theoretical knowledge with its application to the design and development of a workplace applicable tool
4. Does the assessment activity require that *metacognition*, is demonstrated, by means of critical reflection, self-assessment or evaluation?	Assessment has limited or no requirement for metacognition	Assessment will require that students reflect critically and self-assess their own designed outcome	The intention was to give the student an opportunity to be able to reflect on the design decisions that they had made and self-assess the outcome in the context of both the theory and the work of colleagues
5. Does the assessment require a product or performance that could be recognised as authentic by a client or stakeholder?	A teacher, who is effectively functioning in the role of client, determines the outcome of assessment, but this is not overtly obvious to the students	Student attention will be drawn to the success of the assessment outcome being determined by its application in practice, and that the teacher, functioning as a client will assess it on this basis	In the original assessment activity the students were not made aware of the function of the teacher as a client and instead the teacher was viewed more in the traditional role of assessor. In the revised assessment, student attention was drawn to the assessment tool that would be applied in practice and assessed by the teacher in that context

6. Is *fidelity* required in the assessment environment? And the assessment tools (actual or simulated)?	Assessment makes limited or no attempt to situate the activity in a workplace relevant context and does not require application of actual workplace tools (software)	Assessment activity will be situated within a high fidelity working environment and the tools applied in practice (software) will be those applied in the workplace	The intention of the revised assessment is to ensure that it is conducted in an environment that is as close as possible to the actual workplace environment. In addition, the software tools made available to students are to be the same as those used in the workplace
7. Does the assessment activity require *discussion* and *feedback*?	Assessment provides little or no opportunity for either *discussion* or *feedback*	The revised assessment activity will be remodelled to ensure that students have to *discuss* and receive *feedback* from students and the teacher	The requirement for *discussion* and *feedback* is integral to successful assessment performance
8. Does the assessment activity require that students *collaborate*?	Assessment provides little or no opportunity for *collaboration*	The revision to the assessment activity will ensure that students are expected to *collaborate* with one another in the completion of a successful assessment performance	The opportunity for student *collaboration* is integral to successful assessment performance

would ensure that redesigned assessment activities would be more work-relevant, or authentic, and thus better prepare students undertaking the course for their work role.

The module itself comprised three distinct learning outcomes with their related assessment criteria. The first of these learning outcomes – *Explain educational multimedia evaluation models* – was intended to provide students with an understanding of the importance of being able to quality assure educational multimedia content by means of its evaluation, whilst taking into account the necessity of understanding and being able to apply such models in practice. The following three assessment criteria were designed to assess this learning outcome:

- explain educational multimedia,
- outline the main approaches in the delivery of educational multimedia and
- describe the types of evidence to be gathered from the evaluation of educational multimedia.

The intention of the second learning outcome – *Outline the structure of an educational multimedia report* – was to ensure that the students had a consistent and applicable model with which to be able to report upon the outcomes of the evaluation that they would undertake. In order to assess this learning outcome the following three assessment criteria were applied:

- list the approaches and methods for evaluating elements of an educational multimedia report,
- identify the elements to be evaluated and
- describe the components of a revision plan.

The third and final learning outcome – apply the process of educational multimedia evaluation to a Training Technology Centre developed computer-based learning product – was designed to ensure that students, once grounded in the theoretical concepts of educational multimedia evaluation, and then provided with means to report the outcomes of such evaluation, were then able to apply this specifically in the workplace for which they were being trained. This third learning outcome was assessed against the following two assessment criteria:

- identify the aims of a particular computer-based learning package and
- report on the value of that computer-based learning package.

Table 1 provides an outline of how the critical questions were applied to the existing course's assessment design with a further description of how and why the assessment design was changed.

Phase three results

The third phase was the implementation of the learning module, its evaluation, and the collection and analysis of the data that arose from it. This was undertaken to investigate the effectiveness of the framework itself, as defined in the second phase, in the provision of an alternative model for the development of tasks in a flexible learning environment. This phase also sought to both isolate the specific design

Table 2. Consideration of the students' responses with reference to the eight critical questions and their experience of the redesigned tasks.

Critical question	Sample of individual student responses	Summary of all students' responses
1. To what extent does the assessment activity *challenge* the assessed student?	• Assessment activity must be challenging to the student undertaking • Activity had been high value on the basis that it provided for a better appreciation of the evaluation instruments • Assessment had required 'thought and research' • Students required to demonstrate the ability to synthesise from the range of skills and knowledge that they have acquired	• Students felt a degree of challenge in undertaking the activity • Challenge inherent to this activity largely determined by this being the first time that they had designed and deployed an evaluation tool for this purpose • Necessary response required the synthesis of a range of skills and information into the formulation of a potentially correct response
2. Is a *performance*, or *product*, required as a final assessment outcome?	• Performance measured by means of the production of a specific work related performance or product • Success in the world beyond the educational environment is then often defined by the quality of the final performance or product that is developed on request • The existence of the product as the final assessment outcome and the value of having measurement of development of a product as a valid determinant of assessment outcome	• The importance of producing a crafted outcome had been central to the successful completion of the module • Development of the product as the intended outcome, as opposed to its application
3. Does the assessment activity require that *transfer* of learning has occurred, by means of demonstration of skill?	• Ability to apply knowledge, skills or attitudes from one domain to another is often dependent upon the understanding, and application, of knowledge from other domains • Delay in opportunity to practise this skill within the workplace could lead to a degradation of the skill and a diminishing of the degree of any eventual transfer that might occur from the learning to the working environment	• Opinion amongst the students as to whether transfer of learning had been adequately or appropriately applied within the context of this module remained divided • Transfer from the training environment to the workplace would occur

(*Continued*)

Table 2. (*Continued*).

Critical question	Sample of individual student responses	Summary of all students' responses
4. Does the assessment activity require that *metacognition* is demonstrated, by means of critical reflection, self-assessment or evaluation?	• Able to apply metacognition by means of critically reflecting upon and self-assessing or self-evaluating the assessment outcomes that they were producing	• Students considered that both critical reflection and evaluation had been integral to the assessment activity for this module • Noted the two stage process of reflecting upon their own work initially and then reflecting on it again based on the comments received from peers • Handover of work to a colleague for peer review had encouraged deeper and more critical self-reflection and evaluation of the work handed over, to ensure that it was of a sufficiently high standard • Critical reflection, self-assessment and evaluation had improved the quality of the feedback students were able to provide to each other • Students felt that it was not necessary to describe the different ways in which metacognition might be represented
5. Does the assessment require a product or performance that could be recognised as authentic by a client or stakeholder?	• Importance, particularly within the work environment, of ensuring that a required product or performance is accurate, or, to the required standard • Role that environment plays in determining the ability of an individual to perform at or to a required standard • Accuracy is both context and outcome dependent	• Students expressed some concern as to the way that in which they felt that this element had been applied within the assessment for this particular module • Students considered that the actual determination of the level or degree of accuracy required was a function of that expressed in the learning outcome • The assessment outcome had been too removed from the workplace

6. Is *fidelity* required in the assessment environment? And the assessment tools (actual or simulated)?	• Consideration was given to the fidelity of the tools that are provided within the assessment environment	• Tools that they had applied to the completion of their own assessment activity had represented a high degree of fidelity • Time that had been allocated for the completion of the tool had not been adequate and thus reduced the degree of authenticity
7. Does the assessment activity require *discussion* and *feedback*?	• Rarely that an individual undertakes the completion of a work activity without the benefit of discussion with colleagues and the ability to receive and benefit from their feedback • Peer review component of the assessment activity assisted in the enhancement of a greater degree of focus in discussion and also an increased degree of feedback	• Students had observed and utilised a requirement to discuss and both give and receive feedback in undertaking the assessment activity • High level of requirement for discussion and feedback, both student to student, as well as student to facilitator • Discussion and feedback was the central mechanism for the learning that was taking place • Discussions had aided the assessment process • Peer review component of the assessment activity assisted in the enhancement of a greater degree of focus in discussion and also an increased degree of feedback • Would have been of value to have included a mechanism to enable students to submit the improved evaluation tool to peers for further review
8. Does the assessment activity require that students *collaborate*?	• Collaboration is more about sharing, where two or more students are enabled to work collaboratively in the completion of a shared assessment outcome • The role of the teacher becomes that of a guide while students collaborate to, 'make connections between new ideas … and prior knowledge'	• No students sought the opportunity to collaborate with a fellow student in the development of a shared outcome • Students recognised the overall value of collaboration to an activity such as this

(*Continued*)

Table 2. (*Continued*).

Critical question	Sample of individual student responses	Summary of all students' responses
	• Importance of collaboration is that it recognises within the workplace that there is very often a requirement to perform as a member of a team and that the final outcome may only be achieved through the active collaboration of a designated group • The requirement for peer review had ensured that collaboration had been able to occur during this process • Ways in which they sought to collaborate with one another tended to vary on an individual basis • At least one student reported that the degree or extent of collaboration evidenced by an individual student may, to some extent, be a function of an individual preferred style of learning	

characteristics of the assessment activity, at least in so far as they reflected authentic assessment practice, and to assess both the importance of, and relationship between, the defined elements.

During the conduct of student training, and at its completion, a range of methods were employed to seek to determine whether the authentic assessment characteristics designed into the course had provided a more effective model for task design and assessment. Evaluation data were obtained from four types of sources:

(1) face-to-face interviews conducted with six students upon completion of the module,
(2) observation notes taken during module's delivery,
(3) video recordings of student activities and
(4) the collated student responses to two evaluation questionnaires, completed upon conclusion of the module, comprising student feedback on the critical elements of authentic assessment and their application to this particular module.

The analysis of this data offered a good insight into student opinion on the eight critical questions applied to redesign the module, and student perspective on participation in the activities guided by the principles of authenticity. Table 2 presents examples of student responses to the individual critical questions, followed by their response to the experience of the redesigned tasks.

The fourth and final phase considered the extent to which authenticity provided an effective model for task and assessment design, and led to the refinement and production of a further revised framework of critical elements, based upon the data collected in phase three.

Phase four results

Two of the eight critical questions framing authentic assessment activity design were refined at this stage – questions one and four. The first of the elements that focused upon the importance of determining that a student will be challenged by an assessment activity was amended as: to what extent does the assessment activity *challenge* the student?

The fourth question, which focused upon the requirement for a student to be able to be able to apply critical reflection, self-assessment or evaluation, was amended to: does the assessment activity require that *metacognition* is demonstrated? Within this element the designer is asked to reflect upon the degree to which a student, in undertaking the assessment activity, is given an expectation that the ability to successfully complete an authentic activity will often necessarily require the application of critical reflection, self-assessment or evaluation.

Thus, the refined eight key questions or critical elements are:

(1) To what extent does the assessment activity *challenge* the student?
(2) Is a *performance, or product,* required as a final assessment outcome?
(3) Does the assessment activity require that *transfer* of learning has occurred, by means of demonstration of skill?
(4) Does the assessment activity require that *metacognition* is demonstrated?

(5) Does the assessment require a product or performance that could be recognised as authentic by a client or stakeholder? (*accuracy*)
(6) Is *fidelity* required in the assessment environment? And the assessment tools (actual or simulated)?
(7) Does the assessment activity require *discussion* and *feedback*?
(8) Does the assessment activity require that students *collaborate*?

The resilience of the eight critical design elements

It would appear from the students' feedback that they responded well to a task that had been designed to incorporate the characteristics of authentic assessment. Of particular note was their clear understanding of the ultimate workplace benefits of having to produce authentic outcomes within authentic environments, with the use of authentic tools as part of learning assessment. The minor concerns raised by the students addressed mainly the way in which the elements of authenticity were applied, rather than the elements themselves (as illustrated in Table 2).

Data collected during the conduct of this study demonstrated that it had been possible to identify the critical elements of authenticity, design them into applicable framework and, at least in this instance, use them in the redesign of an assessment activity that was considered valuable to students. It is possible to deduce from the data collected by this study that authenticity, once deconstructed to determine its critical component elements, can present an effective model for task design and assessment. Moreover, it is by considering the ways in which the individual elements of authenticity have been addressed, within the design and development of a given task or assessment, that a designer of educational outcomes can state in any measured way that a task or assessment is authentic.

As this research activity was undertaken within a design-based research framework, the requirement for subsequent research is an acknowledged component of this iterative process. The first recommendation for further research in this area is the implementation of the proposed framework in the redesign and delivery of a learning activity, and that particular attention be paid to the evaluated outcomes of those questions that were not revised on this occasion based upon insufficient student feedback; that is, the third, fifth, sixth, seventh and eighth critical questions. In this context, it would be of value to apply the critical questions individually as a means of seeking their value relative to one another, that is, to establish whether there might be an applicable order of priority in the application of these elements. In undertaking this activity each of the elements, and the ways in which they are described, in particular the sixth element that focuses upon the area of 'fidelity', might be better contextualised and phrased.

In order to assist future research, it is recommended that the framework of critical elements of authentic assessment itself be developed into a heuristic tool, for application by educational designers in the assessment design process. This would enable the designer to more formally consider authenticity as a factor in good assessment design, and, at the same time, provide them with a means of measuring the degree of authenticity applied into their assessment designs.

There are a number of other ways in which subsequent research might add additional value to this work, more particularly within the current assessment and quality assurance regimes. First, it would be of use to conduct additional research upon

the application of these elements to specific authentic assessments, to consider and review their specific value. In addition, it would be of immense use to the sector if it better understood the level of teacher development required to be able to embed the implementation of authentic assessment design within the curriculum.

In recent years, the conversation around assessment has shifted markedly, particularly within higher education. Within this sector, there is a move to teach and then assess the development of a broader range of skills (often referred to as graduate attributes). This topic has dominated much of the narrative seeking to define the role and relevance of a 'higher education' to a twenty-first century educational consumer. In this respect the ability to provide students with these, often more work-related, competencies and skills has led to a requirement to be able to assess them in increasingly authentic ways. In this regard, there is beginning to appear in the higher education sector the acknowledgement that, as Meyers and Nulty note (2009, 567), 'to maximise the quality of student learning outcomes, we, as academics, need to develop courses in ways that provide students with teaching and learning materials, task and experiences which are authentic, real-world and relevant'.

In conclusion, it is worth acknowledging that the current organising framework for Australian education and training, the AQF (2011) is described as a 'taxonomic structure of levels and qualification types each of which is defined by a taxonomy of learning outcomes' (11) These are then described as learning outcomes which describe both the 'knowledge' and 'skills' for each of the relevant levels as well as how each will be applied in terms of the demonstrating their acquisition. It is within the context of this more rigorous and applied higher education framework that the consideration and implementation of more authentic forms of assessment becomes important.

Notes on contributors

Kevin Ashford-Rowe is a professor and director of the Learning and Teaching Centre, Australian Catholic University, Sydney, Australia.

Janice Herrington is a professor of Education, Murdoch University, Perth, Western Australia.

Christine Brown is an associate professor and head of the Centre for Educational Development, Innovation and Recognition, University of Wollongong, Wollongong, Australia.

References

Archbald, D., and F. M. Newmann. 1988. *Beyond Standardized Tests: Assessing Authentic Achievement in the Secondary School*. Reston, VA: National Association of Secondary Principals.

Australian Qualifications Framework. July 2011. Accessed October 08, 2012. http://www.aqf.edu.au/Portals/0/Documents/Handbook/AustQuals%20FrmwrkFirstEditionJuly2011_FINAL.pdf

Berlak, H. 1992. "The Need for a New Science of Assessment." In *Toward a New Science of Educational Testing and Assessment*, edited by H. Berlak. Albany, NY: State University of New York Press.

Boud, D. 1995. "Assessment and Learning: Contradictory or Complementary?" In *Assessment for Learning in Higher Education*, edited by P. T. Knight, 35–48. London: Kogan Page.

Brown, G., J. Bull, and M. Pendlebury. 1997. *Assessing Student Learning in Higher Education*. London: Routledge.

Brown, G., and M. Craig. 2004. "Assessment of Authentic Learning." Accessed September 13, 2012. http://www.coe.missouri.edu/~vlib/glenn.michelle's.stuff/GLEN3MIC

Brown, S., and P. Knight. 1994. "Assessing Learners in Higher Education." In *Teaching and Learning in Higher Education*, edited by J. Stephenson. London: Kogan Page.

Crisp, G. 2009. "Towards Authentic E-Assessment Tasks." In *EdMedia World Conference on Educational Multimedia, Hypermedia and Telecommunications 2009*, edited by G. Siemens and C. Fulford, 1585–1590. Chesapeake, VA: AACE.

Custer, R. L. 2000. *Using Authentic Assessment in Vocational Education. Information Series* No. 381. ERIC Clearinghouse on Adult, Career and Vocational Education: Columbus.

Hattie, J., J. Biggs, and N. Purdie. 1996. "Effects of Learning Skills Interventions on Student Learning: A Meta-Analysis." *Review of Educational Research* 66 (2): 99–136.

Herrington, J., and A. Herrington. 2006. "Authentic Conditions for Authentic Assessment: Aligning Task and Assessment." In *Research and Development in Higher Education*, Vol. 29, edited by A. Bunker and I. Vardi, 146–151. Milperra, NSW: HERDSA.

Herrington, J., T. C. Reeves, and R. Oliver. 2010. *A Guide to Authentic E-Learning*. London: Routledge.

Kendle, A. and M. Northcote. 2000. "The Struggle for Balance in the Use of Quantitative and Qualitative Online Assessment Tasks." Proceedings of the 17th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education. Coffs Harbour: ASCILITE.

Koh, K. H., C. Tan, and P. T. Ng. 2012. "Creating Thinking Schools Through Authentic Assessment: The Case in Singapore." *Educational Assessment Evaluation and Accreditation* 24: 135–149.

Lebow, D., and W. W. Wager. 1994. "Authentic Activity as a Model for Appropriate Learning Activity: Implications for Emerging Instructional Technologies." *Canadian Journal of Educational Communication* 23 (3): 231–244.

Lund, J. 1997. "Authentic Assessment: Its Development and Applications." *Journal of Physical Education, Recreation, and Dance* 68 (7): 25–28.

McKenney, S., and T. C. Reeves. 2012. *Conducting Educational Design Research*. New York: Routledge.

McLellan, H. 1994. "Situated Learning: Continuing the Conversation." *Educational Technology* 34 (10): 7–8.

Meyers, N. M., and D. D. Nulty. 2009. "How to Use (Five) Curriculum Design Principles to Align Authentic Learning Environments, Assessment, Students' Approached to Thinking and Learning Outcomes." *Assessment & Evaluation in Higher Education* 34 (5): 565–577.

Newmann, F. M., H. M. Marks, and A. Gamoran. 1996. "Authentic Pedagogy and Student Performance." *American Journal of Education* 104 (4): 280–312.

Newmann, F. M., and G. G. Wehlage. 1993. "Five Standards of Authentic Instruction." *Educational Leadership* 50 (7): 8–12.

Northcote, M. 2002. "Online Assessment: Friend, Foe or Fix?" *British Journal of Educational Technology* 33 (5): 623–625.

Northcote, M. 2003. "Online Assessment in Higher Education: The Influence of Pedagogy on The Construction Of Students' Epistemologies." *Issues In Educational Research* 13 (1): 66–84. http://www.iier.org.au/iier13/northcote.html

Race, P., S. Brown, and B. Smith. 2005. *500 Tips on Assessment*. 2nd ed. London: Routledge.

Reeves, T. C. 2006. "Design Research from a Technology Perspective." In *Educational Design Research*, edited by J. van den Akker, K. Gravemeijer, S. McKenney, and N. Nieveen, 52–66. London: Routledge.

Tanner, D. E. 1997. "The Long (Suit) and the Short (Comings) of Authentic Assessment." Paper presented at the Annual Meeting of the American Association of Colleges for Teacher Education, 49th, Phoenix, AZ, February 26–March 1.

Wiggins, G. 1993. *Assessing Student Performance – Exploring the Purpose and Limits of Testing*. San Francisco, CA: Jossey-Bass.