

Do methods of assessment accurately reflect the priorities of conservation teaching?

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ABSTRACT

This paper considers a range of assessment methods available in conservation, evaluates aspects by which they can be described and evaluates the priorities expressed by stakeholder groups. Responses show that there is a strong community of practice where all conservators have similar priorities for conservation assessment, with conservation practice being the priority for all. The authors use this data to rate the applicability of the different assessment methods to the stakeholders' priorities based on their specific use in a conservation teaching context at Cardiff University. This illustrates how educators can review forms of assessments to ensure that what the students are assessed in, and therefore what they learn, matches with the expectations of different communities.

INTRODUCTION

It is well established in educational theory that students focus their learning on the areas in which they will be assessed (Gibbs 1992). The nature of the assessment process therefore shapes students' learning. The expected achievements of learners in higher education are described in learning outcomes which summarise what students should be able to do, know or understand as a result of their learning. By aligning assessment with intended learning outcomes, appropriate learning is encouraged (Biggs and Tang 2007).

If conservation training is to be relevant to the communities that we serve, then their priorities for learning should correlate with the methods of assessment. This paper sets out to investigate the relationship of the conservation community with assessment of conservation students in higher education.

Three groups with a stake in the education of students are considered in this paper: conservation teachers, students and the conservation employers for whom the quality of the graduate conservator has a significant value. Because assessment directs learning, each community of stakeholders should be as concerned with the outputs of conservation teaching (measured by assessment) as they are with the inputs (the content of the syllabus). The authors contend that in comparison with the content of the syllabus, assessment, and by implication the focus of learning, has received less attention than it should.

TYPES OF ASSESSMENT

There are a range of assessment methodologies that may be used in conservation education, from the traditional essay, exam and dissertation through the more discipline-specific portfolio and practical skills assessment to the specific skills embodied in oral presentations. This paper considers only seven of the most common formats used in conservation. The seven assessment types discussed are summarised in Table 1.

ASPECTS OF ASSESSMENT METHODS

In order to investigate and evaluate assessment methods, it is necessary to identify aspects by which they can be judged. An obvious aspect of

Table 1
Forms of assessment (adapted from QAA 2011)

Form of Assessment	Descriptions
Written exam	A question or set of questions relating to a particular area of study.
Written assignment including essay	An exercise completed in writing.
Dissertation	An extended piece of written work, often the write-up of a final-year project.
Portfolio of practical work	A collection of work ... which has been produced over a period of time.
Report	A description, summary or other account of an experience or activity.
Oral assessment and presentation	A conversation or oral presentation on a given topic, including an individual contribution to a seminar.
Practical skill assessment	Assessment of a student's practical skills or competence.

assessment to evaluate is how reliably it provides a measurement of student achievement. Other features can be considered such as measuring what the students can do and what skills they have, as could more pragmatic concerns such as resources needed for the assessment. Six aspects of assessment are defined and used to deconstruct the value of different forms of assessment (Table 2).

Table 2
Aspects of assessment categorised

Aspect of assessment	
Discipline-specific theory	Knowledge from the area of practice.
Standard of practical work	Skills and application of a range of techniques in complex contexts.
Transferable skills	Generic skills that can be utilised regardless of profession.
Feedback (opportunity for & quality)	Timely, personal feedback with advice on how the student has performed and how to improve quality of work.
Reliability	Offers an objective assessment and creates results that could be repeated with precision. Corresponds to industry standards.
Effective use of resources	Time, equipment and space required to conduct assessment.

Discipline-specific theory

This aspect of cognitive learning is perhaps what most people will associate with university learning and relates to academic skills applied to a specific discipline. Expected benchmark levels of achievement are well set out at programme, institutional, national and international levels (QAA 2008). There is also the possibility to link these levels to professional standards (ICON 2008). Graduates from any programme would be expected to learn about and be assessed upon knowledge from their area of practice, have an ability to handle data, solve problems and offer a critical evaluation of their own academic and professional work in context.

Standard of practical work

This aspect of assessment captures learning outcomes which relate directly to practical skills. The specific skills can be varied depending on the exact course studied, but may include both cognitive and practical skills and abilities utilised to deliver a specific tangible outcome. For conservation assessment, students would be assessed on their skills for a range of techniques on complex contexts, with the breadth and complexity being correlated to the academic level being pursued. Students would be assessed

on their ability to translate theory into practice, to extract data from non-written sources and to solve problems autonomously, understanding and utilising the resources available to them. Professional practice requires reflective learning and showing a critical awareness of context and one's own limitations.

Transferable skills

This area encompasses those skills which are non-discipline-specific and may prepare graduates from a vocational course to pursue alternative careers and include features sought by employers in general, such as communication, team work and flexibility. These skills are likely to be found embedded within many disciplines and enhance the employability of students. There are many possible transferable skills (AHRC 2011, Davies 2009), but for the purpose of this paper nine have been chosen which represent a common and recognisable list of priorities (Table 6).

Feedback

It is reported that students prioritise the opportunity for good quality feedback (Williams and Kane 2008). The student perspective on feedback in the UK is recorded centrally by the National Student Survey (NSS) and this data is presented online in a standardised form to prospective students. Results from NSS reports consistently show that feedback is the area where students report the lowest levels of satisfaction. Ensuring that assessment has good opportunities for feedback provides learning opportunities for students, with effective feedback improving the chances of students to achieve the learning outcomes (Black and William 1998). For feedback to be effective, it should be timely, personal and not only tell students how they performed, but also how to improve their performance.

Reliability

The underpinning principles of assessment are that they are valid, reliable and explicit. Some forms of assessment are naturally more subjective than others; however, there are safeguards such as second marking of essays that can mitigate against these tendencies. Factors which increase reliability are listed in Table 6. Where vocational and practical outcomes are being assessed, there is a greater degree of reliability if evidence is directly assessed, for example by observation; however, in many cases the evidence must be indirectly assessed, for example via references or the assessment of a project via a report where the subject is no longer available.

Effective use of resources

Education is a business and certainly in the UK there are ever more frequent calls to 'do more with less'. Changes in educational methods, an increased student intake and an increase in student expectation as a result of the introduction of fees for higher education in the UK (Matthews 2013) mean that the resource burden of assessment is growing. It has been argued that 'the total volume of summative assessment may have doubled as a direct consequence of modularisation' (Gibbs 2006). In conservation, where assessment may include time-consuming observations of practice and a broad range of assessment techniques, the effort required to conduct

assessment must be a factor in devising assessment strategies. The burden of assessment should be kept in proportion to the learning outcomes being measured. Some forms of assessment necessarily involve equipment, laboratory time, supervision and space, and they require that suitable cultural heritage items are available on which to demonstrate ability.

METHODOLOGY

Having identified seven types of assessment and six aspects by which they can be described, the research aimed to compare the priorities of three communities of stakeholders: academics, students and employers of conservators. Rather than asking them to evaluate forms of assessment, for example essay vs. exam, which may trigger personal biases, the stakeholders were asked to prioritise the aspects. This should avoid any strong reaction due to personal experience, such as a dread of exams, and focuses instead on what it is that conservators value from assessment.

Questionnaire

A SurveyMonkey questionnaire was distributed via a range of social media outlets during September 2013 and was started by 369 respondents from 29 countries. The survey allowed progression only if a respondent was currently in education as a teacher or student, or if the respondent was in a position to impact upon recruitment of conservators. A total of 229 respondents completed the survey (Table 3).

Table 3

Breakdown of survey respondents

Total who opened survey	Total who completed survey	No. of employers	No. of educators	No. of students	Other
369	302	140	44	45	73

Table 4

The pair comparisons

Feedback	vs.	Reliability
Reliability	vs.	Resources
Resources	vs.	Theory
Theory	vs.	Practical
Practical	vs.	Transferable
Feedback	vs.	Resources
Reliability	vs.	Theory
Resources	vs.	Practical
Theory	vs.	Transferable
Practical	vs.	Reliability
Transferable	vs.	Resources
Theory	vs.	Feedback
Feedback	vs.	Practical
Reliability	vs.	Transferable
Transferable	vs.	Feedback

Respondents were asked to compare each of the six aspects as matched pairs (Table 4) and rate their preference on a 1 to 9 scale using the verbal descriptions described (Table 5). In order to reduce bias, the pairs were presented in a random order each time to minimise any effect of prior pairing on successive judgements (Webber et al. 1996). Each aspect appeared a similar number of times on the left and right side of the table again to minimise any bias.

Table 5

Degree of preference (adapted from Saaty 2008)

Intensity of importance	Definition	Explanation
1	Equal importance	The two elements contribute equally to the objective.
3	Moderate importance	Experience and judgment slightly favour one element over another.
5	Strong importance	Experience and judgment strongly favour one element over another.
7	Very strong importance	One element is favoured very strongly over another, its dominance is demonstrated in practice.
9	Extreme importance	The evidence favouring one element over another is of the highest possible order of affirmation.

2, 4, 6, 8 can be used to express intermediate values

The Analytical Hierarchy Process

In order to prioritise the six aspects of assessment, a technique called the Analytical Hierarchy Process (AHP) developed by Saaty (1980) was used. AHP is a technique that was developed to aid decision making, particularly where there may be several factors which cannot be easily compared or are intangible. AHP avoids a simple order of preference which might be created if respondents had been asked to rank aspects in order, and instead allows a priority or weighting to be assigned. This priority is an absolute number between 0 and 1 and signifies the relative importance or preference for one aspect over another.

The results of the pairwise comparisons carried out in the questionnaire are compiled to produce a matrix from which priorities are produced using the eigenvalue method (Saaty 1980).

Consistency

The pairwise comparison of aspects, in a perfect world, should lead to a consistent matrix being produced. For example, if $a > b$ and $b > c$ then $a > c$. Mathematically, the amount that $a > c$ should be calculable from the degree of importance assigned to it during the pairwise comparisons. As we are dealing with real people and subjective views, this is unlikely to be the case and a degree of mathematical inconsistency is allowed for in the AHP model. Initially AHP used a figure of 0.1 as being the maximum inconsistency allowable (Saaty 1980). This figure is too restrictive for many practical applications and a user-defined figure is now recommended that reflects the diversity of the process of data collection (Alonso and Lamata 2006, Goepel 2013a).

AHP is often carried out using group decisions to reach consensus on comparisons, which tends to reduce inconsistency. This survey was completed online, on an individual basis, with six different aspects to compare. Consequently the opportunity for inconsistent comparisons was large. Because of this, the authors allowed the figure of inconsistency within the matrix to reflect the nature of the survey and maximise the number of usable responses. The consistency figure was chosen to allow a statement of 95% confidence that a given matrix has been generated by virtue of consistent judgement rather than by chance (Dodd et al. 1993).

Data analysis

The data was entered into an Excel spreadsheet 'AHP template' specifically designed for AHP analysis (Goepel 2013b). Results were entered in blocks of 20 (the maximum allowable in the template) organised by stakeholder group. Matrices from individuals that were determined to be above our acceptable inconsistency level were then discarded. This resulted in the rejection of a further 7% of responses.

The AHP template calculates a consensus indicator to show the level of agreement between individuals and indicate the consensus of opinion. As a final quality check, the results within each AHP template were compared,

showing a consensus indicator ranging from 70–85%, indicating a high level of consensus.

RESULTS

The results show that employers and educators ranked the aspects in exactly the same order (Figure 1). All three of the stakeholder groups placed practical skills at the top of the ranking. It is notable that the resources required to deliver assessment is considered the least important factor by every group. Employers, as with all other respondents, ranked transferable skills in fifth place out of six. The second most important priority for students is feedback, but for employers and educators this was placed third, after reliability. It is noteworthy that only one respondent scored each of the aspects equally, showing that conservators accept that there is a hierarchy of priorities for assessment.

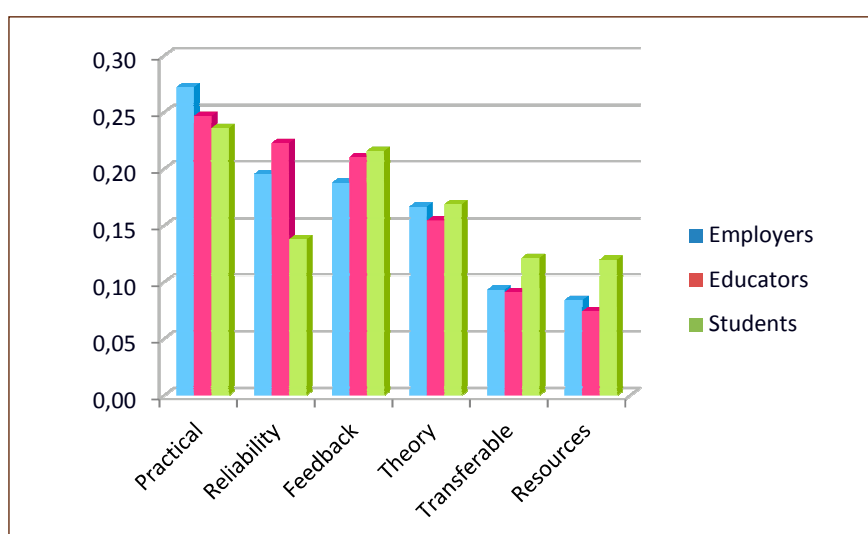


Figure 1
Summary of stakeholder priorities using AHP

ANALYSIS

The results seem to destroy some myths that exist within the education sector: that educators are out of touch with employers; that students are chasing grades, not skills; and that employers want transferable skills above all else. Whether these results reflect a wider societal view or simply the views of conservators is not shown by the data.

The results show that there is a clear common understanding between conservation educators and the future employers of conservation students about the requirements of the work place. This suggests there is a clear community of practice with a shared understanding of where education is attempting to take students (Lave and Wenger 1991).

The sample of employers comprised only those that employed conservators, so their preference for practical conservation skills over transferable skills is understandable. However, in the light of sector call for conservators to be trained in a broad range of skills (Aitchison 2013), this survey shows that when the conservation community is asked to choose, they place

2.5 times the importance on practical conservation skills over generic transferrable skills. If the values for discipline-specific theory and practical skills are combined, the ratio increases to over 4:1. Educators can take consolation that their precious teaching time can focus on conservation practice and theory in proportion to the priorities of the conservation community. Although the idealism of not allowing resources to determine the assessment method is common, in the light of education funding this may become unsustainable.

Student demand for feedback is a request for advice on how to improve and is ranked by them as significantly more important than reliability. This suggests that improving performance is more important than the mark that the work receives. The relationship being described here is that conservation students look to assessment for learning rather than to the pursuit of grades, in contradiction to the rather unpleasant description of students as 'grade grubbers' that has been present in some academic discourse (Academia Stack Exchange 2013).

It may be surprising that educators prioritised both feedback and reliability of assessment above the measurement of theory. The authors have no provable rationale for this, but question whether the NSS criticism of feedback has in some way channelled focus onto the assessment process.

EVALUATING FORMS OF ASSESSMENT IN CONSERVATION TEACHING

In order to examine the relationship of the aspects of assessment (Table 2) and types of assessment (Table 1), the authors scored assessment formats for their ability to deliver on each aspect. As the experience of assessment process will be different in different institutions, the MSc in Conservation Practice taught in Cardiff University is used as a case study to illustrate how assessments across a programme can be compared against the needs of a community of stakeholders.

Case study: Assessments for the MSc in Conservation Practice, Cardiff University

The authors scored each of the forms of assessment between 1 and 9 against the six criteria using a scoring grid (Table 6). The scores are specific to this programme: so, for example, in Cardiff, practical work is assessed by a combination of outcomes and a reflective learning log (Manti et al. 2011); dissertations include experimental research whether analytical, treatment-based or collections care; and all summative feedback is personal to the student, scored against marking criteria, double marked and moderated by an external examiner. In other educational contexts the allocated scores could be different. It should be noted that the highest score is not necessarily the best. Assessment should be fit for purpose and if an oral presentation assesses communication skills, but not team working, it is valid as long as it is used in conjunction with other forms. For example, a portfolio of work was given a score of one for discipline-specific theory, but a score of eight as evidence for standard of practical work. The results are presented in Figure 2.

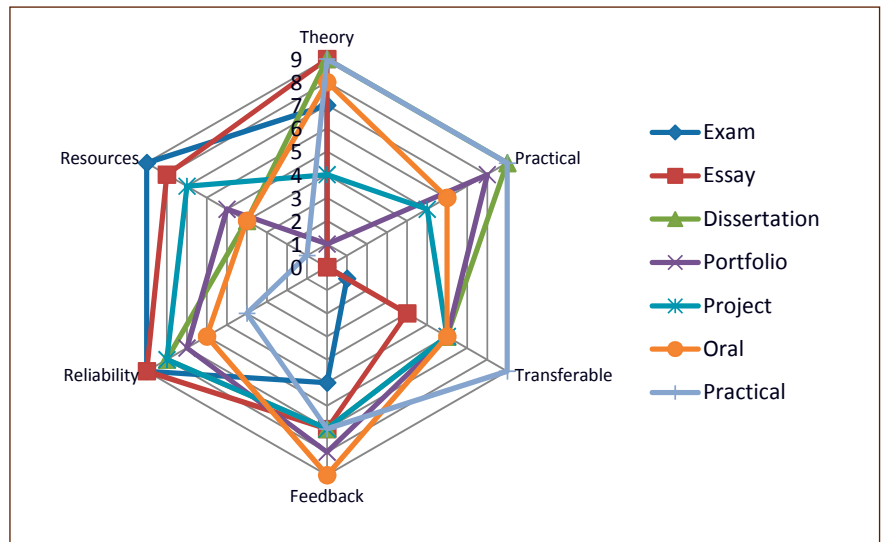


Figure 2
Allocation of scores to assessment method

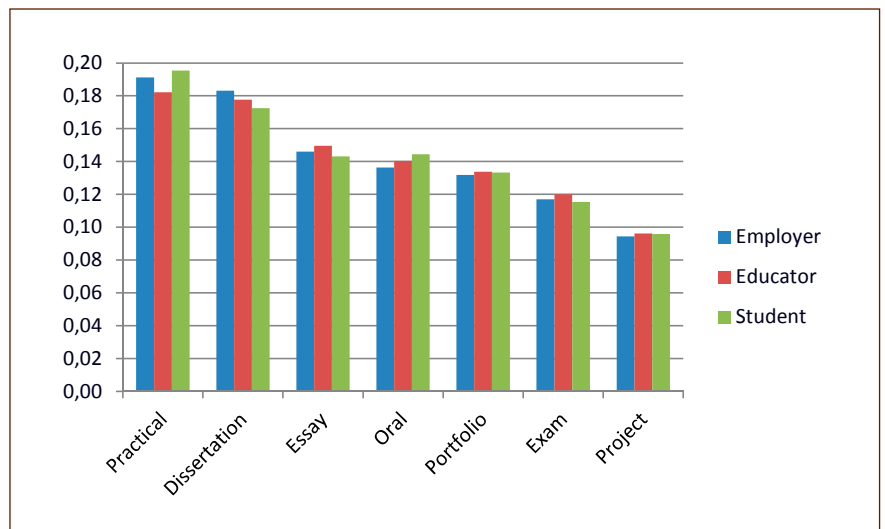


Figure 3
Alignment of assessment methods with priorities

Using these scores, the forms of assessment were compared against each other using AHP, resulting in a weighting for each form of assessment against each aspect of assessment. Finally, the weightings that were placed on the aspects of assessment by each stakeholder group were combined with the ability of each form of assessment to deliver those aspects (Figure 3). This shows that assessment of practical work is the most comprehensive mechanism to demonstrate the student's ability to deliver on stakeholder priorities. This highlights to educators the importance of ensuring that this form of assessment is a significant feature in conservation education, despite the practical challenges of delivering it. Dissertations are consistently the second priority, but it should be noted that this result reflects dissertations at Cardiff, where practical and experimental work is included. Projects score low because in this context these are single-aspect forms of work and act to reinforce only one specific area. Of more significance is the rating for exams which, as a mode of assessment with a strong focus on the measurement of theoretical knowledge, is evidently not a comprehensive form of assessment and should be used in moderation if aiming to correlate with the priorities of students, educators or employers. On the basis of

these results, an academic review of a conservation programme may therefore consider the weight of assessment credit tied to practicals compared to exams.

Table 6
Scoring grid for assessments

Aspect		Score
Discipline-specific theory	<ul style="list-style-type: none"> • ability to collect data • ability to use data • ability to analyse data • planning research • problem solving • awareness of academic approach • awareness of context • fresh perspective • evaluate own and others' theoretical work 	1 point for each
Standard of practical	<ul style="list-style-type: none"> • theory into practice • extract data from non-written sources • problem solving • understanding technological resources & options • effective use of technological resources • awareness of context • work autonomously • quality of outcome • evaluate own and others' practical work 	1 point for each
Transferable skills	<ul style="list-style-type: none"> • research and analysis • construction of argument based on evidence • communication • teamwork • initiative • project management • flexibility • interpersonal • organisation 	1 point for each
Feedback	<ul style="list-style-type: none"> • timely • how the student performed • advice on how to improve 	3 points immediate 2 points 1–3 weeks 1 point over a month 3 text plus mark 1 mark alone 3 individual / personal 2 provided as a group 1 none
Reliability	<ul style="list-style-type: none"> • anonymous • audibility • objective • assessors have relevant expertise • existence of marking criteria • evidence is reported via 2nd person (reference) / form of communication (report on treatment) 1 point or evidence directly from practice (observation or inspection in and on practice) 2 points • 1 for 1 marker, 2 for 2 or more 	1 point for each
Effective use of resources	<ul style="list-style-type: none"> • staff time • space and equipment • cultural heritage resources 	0–3 points each for considerable to none

CONCLUSION

The quality of education can be understood in a significant part by understanding the quality of assessment. Where conservation education is being offered for a specific community, it follows that this method could be utilised with that specific group so that their identity and needs can be crystallised to correlate them with the priorities of others and the mechanisms for teaching, learning and assessment in a programme. This

study offers a tool for encouraging further discussion on the ‘fitness for purpose’ of current assessment methods within a programme or module. From the data collected, educators should continue to ensure that, regardless of operational challenges, practical skills are a central element of the assessment of conservation programmes and should remain so if the needs of the conservation community are to be satisfied.

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