

International Education Paper for Professional Accountants

Assessment Methods



**International Federation
of Accountants**

IFAC's Education Committee has approved this Paper for publication.

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The Education Committee welcomes comments on this Paper; specific discussion questions are included at the end of the document.

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Preface

International Education Papers for Professional Accountants

International Education Papers for Professional Accountants promote discussion or debate on education issues affecting the accountancy profession, present findings or describe situations of interest relating to education issues affecting the accountancy profession.

Purpose and Scope of this Paper

IES 6, *Assessment of Professional Capabilities and Competence*, prescribes the requirements for a final assessment of a candidate's professional capabilities and competence before qualification. IES 6 addresses, in particular, the assessment of the professional capabilities acquired through professional education programs.

In addition to their capabilities (i.e., the attributes held by individuals to enable them to perform their roles competently) newly qualified accountants also need to be able to demonstrate the competence to use those capabilities appropriately. These competences are likely to be more easily acquired through practical experience as dealt with in IES 5, *Practical Experience Requirements*; acquisition of these competences can be assessed in the workplace or through workplace simulation.

The purpose of this paper is to assist IFAC member bodies to discharge effectively their responsibilities to ensure that suitable assessment procedures are in place and that candidates admitted to membership are appropriately qualified.

This paper considers the key concepts in assessment, provides a summarized evaluation of relevant assessment methods and then considers, in a non-prescriptive fashion, the assessment methods that are best suited to test different capabilities and competences, both knowledge-based and practically focused.

Introduction

In the course of producing the International Education Standards that were issued in October 2003, it became evident to the IFAC Education Committee that there were a number of important areas where further assistance to member bodies would be helpful in the implementation of Standards. Assessment of capabilities and competences was identified as an area in which early assistance would be very beneficial.

As part of the work of the Education Committee to assist in the preparation of this paper, the Committee commissioned a research project from The Robert Gordon University, Aberdeen, Scotland. This research report was entitled “Assessment Methods Report” and was produced by the University’s Centre for Enhancement of Learning and Teaching in conjunction with the Department of Accountancy and Finance (Professors David Lines and Elizabeth Gammie). The full research report is available on the IFAC Education Committee Web site.

This paper is based entirely on the research report prepared by Professor Lines and Professor Gammie. In particular, comments on issues such as validity and reliability and the assessments of inherent validity and reliability are drawn directly from that report, as are the tables matching assessment methods to capabilities and competences.

Key Concepts in Assessment

Assessment has three purposes. It is designed to support and enhance learning, it provides certification for advancement, and it can be a form of accountability (quality assurance) for stakeholders.

Either *formative* or *summative* assessment methods are used to support these purposes. Formative assessment is ongoing, providing both teachers and students with information about current progress in order to support future learning. Summative assessment provides information about the level of a student's performance at certain points in the learning process, usually at the end of a course of study.

Another technical term of relevance to this work is *high-stakes assessment*. High-stakes assessment is where the result of a summative assessment has the potential to alter the course of a candidate's life in some way: the greater the impact, the higher the stakes. Final qualification examinations in accounting are good examples of 'high stakes, summative assessments.'

Validity and reliability

In evaluating assessment methods, it is important to consider both *validity* and *reliability*. In simple, perhaps simplistic terms, an assessment task is said to be valid when it tests that which it sets out to test, while a test will be reliable if the result is exactly the same across all occasions, tasks, observations and settings. Some commentators have gone so far as to say that reliability is the first test of validity. A fuller discussion of the concepts of validity and reliability is contained within the Lines and Gammie report.

There can be an element of trade-off between *validity* and *reliability*. For instance, multiple-choice tests, especially those marked by computer, have almost 100% reliability. However they may not be valid as they cannot test certain intellectual domains and are not necessarily good predictors of future performance. In contrast, essay questions, which may test higher order skills can be unreliable – two examiners can, for quite legitimate reasons, arrive at quite different scores on exactly the same work.

A partial answer to the reliability/validity trade-off is to have an array of tests. However, more examinations mean more stress on candidates; they divert time and energy away from the core business and may even, as is the case in some countries, create their own 'mini-industry' within the accountancy profession. Furthermore, having large numbers of tests begins to raise issues of *strategy*. In other words, for what reasons, precisely, do the examinations exist?

Such confusion over strategy suggests that the examinations may lack *transparency*, the term used to describe the extent to which all the participants in the process know the purpose of the examinations and the processes involved in achieving the final grade or marks.

An alternative way of dealing with the same reliability/validity trade off within any system of testing may be to ensure that there are adequate compensatory controls in place within such

systems. Such compensatory controls minimize the risks from inherently low validity and/or reliability.

Assessment types

An assessment *system*, derived from the assessment strategy, will often consist of a selection of *types* of assessment. However, that selection is not commonly made as a result of careful matching with learning outcomes. More often, it results from historical developments, personal preferences or bias, financial or other resource constraints. Where the selected assessment types do match desired or predetermined learning outcomes, one might consider that the assessment system meets its strategic requirements.

The criteria against which to judge assessment *types* are essentially the concepts of *validity* and *reliability* and, most importantly, the inherent trade-offs between these two.

Terminal and continuous assessment

Terminal assessment is, as its name suggests, carried out at the end of a course, by taking an examination, undergoing a practical or situational assessment of some sort, or submitting a major item or a collection of works (e.g., a dissertation, thesis or portfolio).

In contrast, *continuous assessment* is carried out on an ongoing basis while students are actually working through a course. Continuous assessment can take a range of forms, including periodic tests, essays and other types of assignments, ongoing assessment of practical work, or situational assessment.

External, tutor, peer and self-assessment

It is also possible to classify assessment in terms of who is responsible for carrying it out. Here, four basic modes are possible – external assessment, tutor assessment, peer assessment and self-assessment.

External assessment is undertaken by an external organization of some sort. Whether it be a national or regional examination board, an award-giving agency, a testing service, or a professional body, it is responsible both for setting the assessment and determining the outcome.

In the case of *tutor assessment*, the teaching staff of the host institution is responsible for setting and administering the assessment, and also for determining the outcome.

Peer assessment is the assessment of learners by other learners, and it is a mode increasingly used in more progressive institutions. It is particularly useful in the assessment of projects and other forms of group work, where it enables the contributions of individual members to be assessed – something that is extremely difficult to do by tutor assessment alone.

The assessment of learners by themselves is called '*self-assessment*.' Its usage is increasing as students are given more responsibility for their own learning.

Closed-book and open-book assessment

A further basic distinction can be drawn between closed-book and open-book assessment.

Closed-book assessment is the traditional mode of assessment. Students are not allowed to take notes, books or other reference material into the examination room, relying entirely on their memory to answer questions. This method is increasingly recognized as an artificial situation that bears little resemblance to the type of challenges students are likely to face in the work situation, where they will have access to any reference materials that they need. For this reason, increasing use is now being made of open-book assessment.

In *open-book assessment* candidates are allowed to refer to any material they wish to consult while answering questions. The object is to see how the students can use the information at their disposal to solve problems, carry out tasks, etc. with the memory factor being largely eliminated.

Some assessments are designed for open-book preparation and closed-book writing. Examples include questions or case studies issued in advance of the prescribed assessment.

Written, oral and situational assessment

Yet another basic distinction is that between written assessment, oral assessment and situational assessment. *Written assessment*, as its name suggests, involves producing written material of some sort – e.g., an examination answer paper, an essay or other written/word processed assignment, or a major piece of work, such as a dissertation or thesis. Traditionally, written assessment has been, by far, the most important of the three modes under this heading.

Oral assessment involves the candidate being questioned by a tutor or examiner, or being assessed on an oral presentation of some sort. Assessment may be by a panel of experts, including representatives of different backgrounds. Oral examinations have a strong tradition in some cultures and continue to have a wide use at the doctoral level. They are also widely used in assessment in competence-based courses.

Situational assessment involves assessing the ability of a learner to cope with a real-life or simulated situation of some sort. It is used, particularly in the assessment of competence-based courses, where more traditional assessment methods are often of limited value. The most common form of situational assessment is that done in the workplace.

Manual and computer assessment

Manual assessment does not make use of the computer for its administration or marking, although it may involve the use of computers (e.g., when students' keyboard or programming skills are being tested).

The use of *computer assessment* is rapidly increasing. The software needed for such assessment has been generally available for some time now. User-friendly authoring systems and templates that enable question setters to produce their own custom-designed computer assessment systems are also becoming widely available.

Conclusion

Those who are responsible for establishing assessment systems have a wide choice of types from which to choose. Deciding which is appropriate will depend on many factors, including cost and the level of expertise available. The ultimate decision, however, should depend on fairness to the candidate, so issues of validity and reliability must prevail.

The next section will evaluate different methods of assessment. From the analysis, test developers will be able to make more informed decisions as to which is most appropriate for their situations and candidates.

An Evaluation of Assessment Methods

There are a number of factors that need to be taken into consideration when choosing a suite of assessment methods. These factors include:

- (a) Educational effectiveness
- (b) Resource efficiency
- (c) Other issues, such as:
 - (i) Transparency
 - (ii) Fairness
 - (iii) Robustness

To be *educationally effective* an assessment system will need to:

- (a) Have clearly established objectives for the educational system
- (b) Have ascertained that the assessment system in place is properly aligned to the required outcomes from the education system
- (c) Be both valid and reliable

At the same time assessment systems need to be *resource efficient* i.e. *cost effective* and *manageable*. In establishing an assessment strategy, member bodies will need to consider the selection of educationally effective methods in the context of available resources.

Assessment methods designed for an era with a smaller and more homogeneous student population are less likely to be effective in a situation in which lifelong learning and wider access are increasingly the norm. As resources are increasingly stretched, demands and expectations are rising. *Transparency*, both in terms of publishing the criteria and standards used in the assessment process and allowing students access to the methods and processes of assessment, is now an increasing expectation. The cost of setting up transparent systems is potentially high and must be considered when evaluating assessment methods. Where there is a reliance on assessment methods that are conducted in a student's own time, systems are needed to detect both plagiarism and impersonation.

There is an increasing recognition that a shift in emphasis is required from the acquisition of knowledge to the acquisition of capabilities and from grading to competence. Increasing importance is being attached to assessing a wider range of capabilities and competences. While traditional methods of assessment may be efficient, they may not always be effective.

The remainder of this section examines a range of alternative assessment methods and their advantages and disadvantages. The methods are divided into three categories: 'conventional' or non work-based, work-based and those that can be used both inside and outside the workplace and include the following:

- (a) Conventional or traditionally non-work-based methods:
 - (i) Annotated bibliographies, articles and book reviews
 - (ii) Case studies and open problems
 - (iii) Extended computational exercises
 - (iv) Short answer tests
 - (v) Computer-assisted assessment
 - (vi) Extended answer tests
- (b) Work-based methods
 - (i) Critical incident accounts
 - (ii) Direct observation
 - (iii) Learning contracts
 - (iv) Learning logs and diaries
- (c) Combination – methods used inside and outside the workplace
 - (i) Self and peer assessment
 - (ii) Oral assessments and presentations
 - (iii) Portfolios

The comments in the following section are summarized from the research report prepared by Professor Lines and Professor Gammie. In particular, the assessments of inherent validity and reliability are drawn directly from that report. As assessments of inherent levels of reliability and validity, they do not address the potential impact of additional resources or compensatory controls on the improvement of the underlying rating. For example, the adoption of “blind double marking” and examiner training can significantly increase the reliability in the marking of extended answer questions.

“Conventional” or traditionally non work-based assessment methods

Annotated bibliographies, articles and book reviews

To encourage students to read more widely, they can be asked to prepare annotated bibliographies and/or book reviews. The principal advantage of this method is that it will reward students who undertake wide reading, perhaps encouraging a critical evaluation of the work, giving the student an immediate and direct benefit. It also rewards the ability to condense complex ideas in a simple and effective way.

At its worst, this method may encourage students simply to paraphrase the material and not apply their knowledge appropriately or evaluate the material. There is also a risk of overuse of Internet

or other published summaries. In terms of efficiency, it requires considerable staff time to assess, needing staff to undertake significant reading themselves. Thus, it may score poorly on both the effectiveness and efficiency criteria.

Validity

These methods tend to be used formatively rather than summatively because of fairly low reliability. Their validity can be high if the skills that are sought are the ones that annotated bibliographies are good at testing.

Overall validity rating: medium

Reliability

A degree of reliability is possible assuming that an identical source material (say the same article) is chosen. However, it would be important to specify the required outcomes well in advance.

Overall reliability rating: low

Case studies and open problems

Case studies are a popular method of both teaching and assessing, particularly in a business/management setting. Case study assessment has three main components: the case study material, the students' preparation based on that material and an assessment based on the case. The questions may or may not be seen before the examination. If the case study is issued in advance, then there is an expectation that the students will have undertaken some preparation. Unlike problem-based assessments, the case traditionally does not set out what the problem is nor does it lead to a single correct solution. It tests the student's ability to recognize the nature of the "problem" first, before suggesting alternative solutions. At its best, it has the potential to test a wider range of higher intellectual capabilities in a more "realistic" setting than more conventional methods.

Case studies may also be used to assess group work, evaluating such capabilities as team working, presentation, research and time-management. Peers, tutors or facilitators may assess group work. The case method of teaching and assessing can provide a powerful incentive for students to learn theoretical concepts, encouraging the application of theory to practice and the use of empirical evidence and data to support recommendations and conclusions. Crucially, it offers students the opportunity to explore theoretical limitations.

There are costs in educational and resource terms to assess through cases. If the case study is to be issued before the examination, there are issues (including timing) in relation to the distribution of the material and the administrative and delivery costs involved. Generally, case studies can focus on fewer areas of the syllabus than other assessment methods such as multiple-choice tests, thereby sacrificing breadth for depth.

From a student's perspective there can be greater risks with a case study as a form of assessment. It places less of a premium on knowledge and focuses instead on higher cognitive capabilities. In addition, if students make an incorrect judgement as to the nature of the problem presented, the risks of failure may be greater than with other forms of assessment. There are considerable educational benefits in using case studies as a method of assessment, but these benefits can come at a price.

In-tray exercises represent a form of case study. Here the candidate is faced with a number of messages (memos/letters and emails) that have arrived at once. No specific instructions are given, since the exercise is a business simulation designed to test the ability to organize information, evaluate it and then make decisions. Not only do in-tray exercises test the same high-level capabilities as case studies, these exercises, with the candidate as the decision maker, probably simulate real-world environments better.

Validity

Validity can be high, assuming the case study is attempting to teach transferable skills from a theoretical to a work-based context.

Overall validity rating: medium/high

Reliability

Reliability is similar to extended answer tests (see page xx).

Overall reliability rating: low

Extended computational exercises

Extended computational exercises give candidates a mass of data and require them to organize it in some way, thereby testing numerical capabilities and the students' understanding of some accounting principles. These tests are somewhat limited in the capabilities they assess. Figures are manipulated 'out of context' so that if the calculations are 'right,' full marks are awarded. This proves the candidate can probably calculate since, as such exercises can be rehearsed, rote learning can come into play. It is also relatively easy for students to be strategic in answering the exercise so that the sections that carry the most marks are answered first (regardless of their importance professionally) and others either left uncompleted or only responded to in the time that is strictly available for that purpose. Such exercises should be structured to ensure that the spread of capabilities among students could be identified.

A danger common to all forms of assessment in which marking is undertaken on the basis of percentages or other numeric forms is the ease with which high marks (and low ones) can be justified where clear 'right' and 'wrong' answers can be identified, but which are not given in more discursive papers. If such a situation is not handled with care, in a multi-component examination, involving calculations and extended writing or essays, the numerical papers may distort the overall mark. While it is clear that some degree of aptitude with numbers is a vital

competence for a professional accountant, it could be argued that the ability to analyze, organize and evaluate data and present it is equally, if not more, important.

Validity

In the past, the skills required of practicing accountants were closely mirrored by extended computational exercises and therefore their validity was high. This is less true today and so validity is falling.

Overall validity rating: medium.

Reliability

The high levels of numerate content make reliability high, but within such exercises, there are often more discursive elements, which suffer from the usual shortcomings associated with such types of answers.

Overall reliability rating: high/medium

Computer-assisted assessment

Computer assisted assessment (CAA) uses computers to assess students' progress. CAA format can vary considerably, from paper and pencil tests that are processed by optical mark readers to students inputting their responses directly into a computer. The nature of the assessments can also vary. There are a wide range and variety of questions that can be set in most CAA packages covering reason assertion, data response, mix and match, click and drop menus with options, as well as short answer questions. They may be used diagnostically before a student embarks upon a course, formatively to assess what progress a student is making, or summatively to give a final grade or mark. Tests can be supervised or unsupervised, depending on the circumstances.

There are several powerful advantages both educationally and in resource efficient terms in using CAA. Educationally, if used as formative assessment, it can give students important feedback about the learning they have achieved. Not only do they obtain grades quickly, they can also receive help on how to improve performance. Staff can also get important information about how well the course is being taught. Analysis of responses to questions can reveal areas causing students the most difficulty and appropriate modifications can be made to the teaching. From a resource perspective, CAA can be very attractive as it saves considerable time in supervision and invigilation, and has marking reliability, particularly with large groups.

However, there are some potentially significant disadvantages of CAA. Although it is possible to test higher order capabilities with CAA, it is more difficult, as it is harder for students to demonstrate their ability to communicate or explain their reasoning process. CAA also relies on a certain level of IT capability. Plagiarism can be a serious issue where there are machines in close proximity having identical screens, though this can be overcome by randomising the questions. However, students may still have access to information through the Internet. Enhanced computer security also needs to be in place to ensure that students cannot illegally enter the test database.

There are also technical issues associated with computerized examinations, since there is always the danger that the candidate is not the individual striking the keyboard. There are ways to control this risk, but all of these add complexity and cost to the system. There is also the important question of the reliability of the technology or the “platform” that is used to support CAA, including the need to have spare terminals. Staff development and overall development and set up costs are likely to be significant.

While it may be concluded that CAA can be highly resource efficient, there are nevertheless some important hidden costs. In addition, depending on the form it takes, it scores less well on the educational criteria.

One of the most common forms of CAA is multiple-choice, objective tests. Although such tests need not be administered or marked by computer, they offer virtually 100% reliability if they are. In addition, they can pose a large number of questions in a relatively short time, thus enabling extensive coverage of the course content. The examiner can also focus on specific knowledge and capabilities.

Multiple-choice tests do not offer options of questions to candidates meaning that the test is identical for all. Because items are pre-tested, their difficulties will be known in advance enabling their modification to suit the required assessment need. Often questions can be banked and re-used many times. So, multiple-choice questions score highly in terms of efficiency – they are easy to administer and mark, and candidates can take the tests at different times and locations.

Multiple-choice tests do have disadvantages. They are difficult and expensive to construct initially. If ‘banked’ they must be withheld from candidates, so transparency falls. Pre-testing is also required. From the candidates’ viewpoint, it is not always possible to determine why an answer was wrong. No credit is given for workings that display knowledge of the principles.

Furthermore, multiple-choice questions have to be analyzed for a randomization bias, meaning the tendency for one or more of the answer positions to be over-used. Guessing a multiple-choice answer is, however, common student practice and a good tactic so long as wrong answers are ignored. Overall, multiple-choice tests offer considerable advantages in a formative setting, especially if computer assisted.

Validity

Traditionally CAA has been dominated by multiple-choice questions. These tests have low validity but high reliability. However, recent technological advances have enabled more imaginative and therefore more valid tests to be set.

Overall validity rating: low

Reliability

Machine-marked tests set the benchmark for reliability, though it has been pointed out that scanning errors can occur. There is also the danger of statistical bias towards one of the choices on offer.

Overall reliability rating: high

Short-answer tests

Like multiple-choice tests, short-answer tests can offer extensive syllabus coverage and they can focus on specific knowledge and capabilities. They are also relatively quick and easy to mark, though they are difficult to mark by machine. They are easier to write and are more versatile than multiple-choice tests. However, short answer tests offer students no choice.

On the other hand, short answer questions are less reliable than multiple-choice tests, though they are better than, say, essays in this regard. They generally score quite well on validity, except where short answers simplify what are, in reality, quite complicated ideas.

Validity

Short answer questions are an attempt to answer the criticisms of a lack of validity in multiple-choice examinations. Inevitably, however, by increasing validity, reliability slips.

Overall validity rating: medium.

Reliability

If the tests can be machine-marked, as is increasingly possible, these tests can be highly reliable.

Overall reliability rating: low/medium.

Extended-answer tests

Extended-answer tests are a commonly used assessment method, with the ‘answer any 5 out of 8, 3 out of 5 of some similar subset of questions in three hours’ examination being typical. Such extended-answer tests remain popular with staff, since questions are relatively easy to set (if not so easy to mark), and are fairly popular with students, mainly because they afford scope for question spotting and ignoring difficult sections of the syllabus.

The reliability of extended answer questions, on the other hand, is highly questionable, if only one marker is involved. ‘Blind, double-marking’ can address reliability concerns, but adds to cost and complexity. Extended writing or essays remain popular especially in a summative setting but issues of marker reliability need to be addressed. Decisions on whether or not to use this form of assessment should therefore be a choice built around the strategic objectives of the test setters.

Validity

Extended written answers have long been praised for their validity.

Overall validity rating: medium/high

Reliability

The skills of the rater are critical to reliability. Highly trained, experienced examiners can achieve high levels of reliability, but such training and experience comes at a cost. Personality, environment and time all need to be controlled.

Overall reliability rating: low.

Work-based assessment methods

Work-based learning differs from more traditional learning in that it is centered around reflection on work practices and in its emphasis on learning from action and problem solving within a working environment in live projects.

Work-based learning sees the creation of knowledge as a shared, collective activity, one in which people discuss ideas and share problems and solutions. All of these elements have significant implications for assessment. Many organizations have been keen to embrace work-based learning. Such a learning organization will encourage the talents of individuals enabling staff to become ‘reflective practitioners.’ If, in order to qualify, the candidate needs to fulfill certain practical and academic tasks and requirements, many of which will be endorsed through the workplace, then assessment methods will be based much more on problem-solving. Students could have the opportunity of negotiating through learning contracts:

- what the learning outcomes are that they are seeking to achieve;
- the activities they will be undertaking to achieve these learning outcomes; and
- perhaps more controversially, what forms of assessment and evidence in portfolios they will require.

Critical incident accounts

Critical incident accounts are used to assess the lessons that can be learned from a key incident in the workplace often relating to a problem or crisis. These accounts can often be used in the workplace to encourage reflection on ways a situation might be avoided or how the reaction to a crisis might be improved. Critical incident accounts require learners to display a whole range of self-assessment and evaluation capabilities that are impossible to assess in any other way. They have considerable advantage in that such incidents will be based on real life. Used effectively, the trainee learns from the experience of compiling these accounts and, if used with others, different perspectives on the same incident can be contrasted. Thus there are considerable educational advantages to this method. The administrative costs of setting up this method are not as high as computer-assisted assessments.

There are disadvantages in that it is difficult to program ‘critical incidents’ if they are to appear “real.” Before learners embark on such assessments, they must have developed their self-evaluation and assessment capabilities. In some cultures and organizations, it may be difficult to obtain frank admissions of limitations or be self-critical.

Critical incident accounts therefore score highly on educational grounds and are relatively efficient in terms of managerial/ resource costs.

Validity

Since the critical incidents occur in the workplace, they have a high validity. Added to this, they require the student to reflect on the incident and so add to the speed of training and further validity.

Overall validity rating: high.

Reliability

Some training is required, but essentially a quite simplistic test can be applied by asking: has this incident affected the candidate's understanding of what it is to be an accountant? If the answer is 'yes,' the candidate has 'passed.' Any attempt at more refined grading would, however, be highly problematic and would dramatically reduce reliability.

Overall reliability rating: high/medium.

Direct observation

Direct observation of a candidate is central to some work-based assessment regimes. Such observations may contribute to the overall score of the candidate, with observations made at an agreed, pre-determined time and place, or over a period of time. Direct observation has considerable benefits in a formative setting because the context will be shared by both the assessor and the candidate, giving the opportunity for a constructive reflection on what was learned and an examination of possible alternative strategies.

When used summatively, the pressure on the candidate increases considerably, especially if the number of observations is limited. A single observation in an entirely atypical situation could provide a distorted view of competence. The observations can also be affected by the very act of observation.

The fact that observations are, by definition, unique, makes reliability a major problem. Two observers of an identical situation may, for quite legitimate reasons, have completely different views. Extensive training is required to counter this. Any attempt to grade such observations, other than on a pass/fail basis, should be treated with the utmost caution.

Validity

Observing a trainee accountant 'being an accountant' is arguably the most valid test available.

Overall validity rating: high.

Reliability

Simple pass/fail reliability can be high, especially with training. Other, more refined grading reduces reliability significantly.

Overall reliability rating: medium/high.

Learning contracts

Learning contracts are used to construct an individual's program of learning based upon an assessment of the learners' current competences, compared with the level they wish to achieve. Learning contracts can be used both in an educational environment and in the workplace, principally as part of the assessment of the "sandwich" element of degree programs. The individual program covers:

- Developing an initial profile of the student's capabilities, knowledge and understanding.
- Carrying out a 'needs analysis' specifying the learning outcomes to be achieved.
- Developing an action plan to identify learner actions, timescales and resources.
- Evaluating whether or not the learning outcomes have been achieved.

There are significant advantages to using learning contracts. The contracts allow learners to negotiate non-standard programs reflecting their own and employer needs. The contract spells out the respective roles of the learner, employer and educational provider.

The major disadvantage of learning contracts is that they require the learner to have the necessary capabilities to properly assess their own capabilities and competences. It also requires students to be able to carry out a needs analysis requiring a good deal of staff input at the outset to achieve the required level of competence. There is not usually a problem with verifying that the contract is the learner's own work, since the process of drawing it up is a cooperative one with learning logs and diaries often being used. Although much of the curriculum planning and execution passes to the learner, the assessment burden on tutors is shifted from being a provider of knowledge to a facilitator of learning. This is a highly effective assessment method but, like similar methods, it is likely to be particularly resource intensive.

Validity

In this sense that the contract is negotiated between the learner and the tutor/workplace mentor, validity is high, since both parties must agree on when the contract has been met.

Overall validity rating: high

Reliability

Given the individualized nature of the contract, reliability is likely to be a problem, although it is possible to set minimum standards and, so long as the test does not extend beyond pass/fail, it is likely to be satisfactorily reliable.

Overall reliability rating: medium/low.

Learning logs and diaries

Learning logs and diaries involve students keeping notes over an agreed period of what goals or objectives have been set and how they have been achieved. They may list the activities they have been involved in and reflect on what learning has taken place. This method is therefore particularly suited for work-based assessment.

The key educational advantage of logs and diaries is that they provide a tangible record of what learning has taken place during a work placement. They are therefore “constructively aligned” with the learning outcomes associated with work-based learning, making them a valid method of assessing work-based learning.

The major drawback with the use of such methods is that they can simply become a descriptive diary of events. They may become repetitious and show no evidence of learning by doing. If students have no experience of self-assessment, they may simply lack the necessary capabilities to undertake the task, though this is an issue that can easily be solved through adequate training. Achievement logs (which set out prescribed competences which are evidenced by a tick in the requisite box) may alleviate repetition but are arguably weak on evidence and lack the potential for reflection.

Assessment of logs and diaries can be problematic. Grading using this method is difficult, especially if it is used summatively. Logs and diaries are most commonly used in sandwich programs that have a placement element as part of the assessment of work-based learning with their veracity confirmed by an in-company mentor. They are also commonly assessed on a completion/non-completion basis with no grade assigned.

To some extent, the evaluation of such logs and diaries depends on how they are implemented. If the logs and diaries are seen as part of a suite of assessment instruments for assessing work-based learning that becomes part of a student’s portfolio, then they can be highly effective. Critical incidents accounts, required as part of the assessment of experiential learning, can be dated and referenced and recalled later using the learning log/diary. Also, if in-company mentors verify them as part of an appraisal system, the incentive to cheat is reduced. If logs and diaries are assessed on a completion/non-completion basis, then time and effort in grading is significantly reduced. Used as formative assessment, learning logs and diaries can be extremely valuable for students. In these circumstances, learning logs and diaries can be both effective and efficient, especially in providing evidence to support the acquisition of the necessary capabilities and competences gained in the workplace.

Validity

These offer similar degrees of validity to critical incidents.

Overall validity rating: high.

Reliability

Like other forms of ‘unique’ workplace assessment, reliability is a problem, though it can be overcome by limiting the grading to pass/fail and also having observations confirmed by a second mentor/tutor.

Overall reliability rating: medium/low

Combination assessment methods that can be used both inside and outside the workplace

Self and peer assessment

Self and peer assessment by students has long been considered an important method of assessment. The development of self-assessment capabilities is important for becoming a life long learner. If successfully achieved, this skill can underpin many valuable assessment methods, especially those in the workplace.

Self and peer assessment can be unreliable, but it should be noted that the benefit of self assessment comes not so much in getting the grade or mark right (important though this might be), but in the process of reflection on how the work or performance in the task could have been improved. Peers are more likely to over-grade a learner’s work than under-grade it, and the danger of collusion is always likely to be present. Weaker students can ‘hide’ in more active and stronger groups and so benefit from the ‘free ride.’ Strategies for countering such effects add to the costs of implementation but need to be considered.

While recognizing that, if implemented properly, peer assessment offers valuable learning opportunities, it is nevertheless slightly less favorably evaluated on both effectiveness and efficiency grounds. It also, crucially, has a problem with basic credibility across many stakeholder communities, especially perhaps for those outside education.

Validity

Research has shown that validity can be high.

Overall validity rating: high

Reliability

Studies have shown that reliability is generally high, though there are consistency limitations that need to be accounted for when introducing this method.

Overall reliability rating: medium/high.

Oral Assessments and Presentations

Good communication capabilities in accountants are highly valued. Oral examinations are a good way of assessing communication capabilities and of examining students’ competences. Oral assessments allow for follow-up questions and probing in a way denied to other forms of assessment. Oral assessments also have the advantage of immediacy and make it difficult to cheat. However, oral assessments are very time-consuming as they are normally done on a one-

to-one basis (or possibly involving a small panel of assessors) and are, therefore, a very expensive and cumbersome assessment vehicle with large numbers of students. Oral assessments, by providing students the opportunity to demonstrate their capabilities, send the message that these capabilities are important. In summary, it would appear that this type of assessment scores well on educational effectiveness criteria but rather less well on efficiency criteria.

Validity

The ability of oral assessments and presentations to test some of the core, emerging skills of the accountancy profession makes them a highly valid, if expensive, form of assessment.

Overall validity rating: high

Reliability

The unique circumstances of this form of assessment set particular challenges, making detailed grading quite difficult. The presence of an external, trained moderator usually ensures that reliability is sufficient.

Overall reliability rating: medium/low.

Portfolios

A portfolio is essentially a collection of items, rather than a single piece of work, attempting to produce multiple sources of evidence to verify claims for achievement of learning outcomes over a period of time. Portfolio assessments are popular in some professions and are increasingly seen as an attractive option to test capabilities and competences in the workplace, given the increasing realisation by employers and professional bodies that conventional assessments often test only a narrow range of knowledge and capabilities. For the accountancy profession, the use of portfolios raises concerns over complexity, cost effectiveness, client and organizational confidentiality and difficulties as to whether at the point of qualification a student would have completed on his or her own an appropriate and sufficient range of discrete tasks.

Portfolios will normally have four key elements:

- (a) Evidence: Evidence would typically include characteristic forms of working records of the discipline or profession. For accountants, typical evidence may be accounts, spreadsheets, financial models, tax computations, minutes of meetings, briefing notes and various reports such as due diligence, valuations and audit reports. Examples from a range of these sources of evidence would be included in a portfolio that covers a learner's achievements. Little evidence may have been produced specifically for the portfolio, with the items being drawn from documents produced in the workplace.
- (b) Labeling of the evidence: Labeling of the evidence is usually needed to understand it. As a minimum an assessor would need to know the author(s) of any evidence. If work were produced collaboratively, then the creator of the portfolio would need to specify his or her role in its production and have this verified independently. The date of its production

would also be needed to assess its currency. If it is in a non-print form, then it will be necessary to specify how the evidence can be accessed.

- (c) Structuring and signposting the portfolio: Without clear and explicit signposting and structure, a portfolio can become a daunting document for both the learner and the assessor. Portfolios may be structured in a variety of ways such as pre-specified learning outcomes, with evidence cited to “prove” achievement or against a given set of capabilities or competences. Evidence could be structured on a time-line basis to show development, drawing on evidence from learning logs and diaries or from critical incident accounts.
- (d) Critical reflection: Critical reflection is a specially prepared piece of work that will involve the learner standing back from the disparate details of the evidence. It involves having another look at the assembled evidence and highlighting its strengths and its weaknesses. It will, at its best, show how the learner has learned to learn and achieved outcomes demonstrating self-awareness.

Portfolios could be a valid form of assessment that demonstrate the attainment of the specified learning outcomes. Provided that there are not too many separate and prescribed learning outcomes that must be attained, the portfolio can be a reliable method of assessment. The portfolio will only be reliable if the outcomes are few and clearly stated. The criteria need to be clear, and assessors briefed and trained in portfolio assessment techniques with close agreement over the criteria. Openness is particularly critical with this form of assessment.

When the assessment process involved with portfolios moves out of the classroom or examination hall to the workplace, some of the assessment costs are transferred from one stakeholder to another. There are issues surrounding the authenticity of the evidence presented and comparability of assessment results. These can be addressed through trusted third parties authenticating evidence. Assessment criteria can be weighted in such a way as to reward referencing and especially critical review. Plagiarism becomes more difficult as the task is more geared to individual learners, and their interests and experiences. However, there does remain the problem of variability or indeed lack of work experience. A portfolio approach would be problematic in this case.

Discussion about the portfolio approach formed a significant part of the Lines and Gammie research report. While no summary assessment of validity and reliability was documented with regard to this assessment type, there is extensive commentary within the body of the research report.

Consideration of cost-effectiveness

The suite of possible assessment methods, their educational effectiveness and resource efficiency are mapped onto the following evaluation grid. The exact positions on this grid are of course subjective and therefore open to debate. Different stakeholders will have different perspectives on the educational benefits and the resource costs incurred. In particular, the issue of implementation is critical. Badly implemented, any assessment method will have the potential for minimizing the benefits while increasing the costs. The reverse is also true: additional resource dedicated to a system may have the capacity to maximize benefits from an assessment system that would otherwise carry inherently lower ratings.

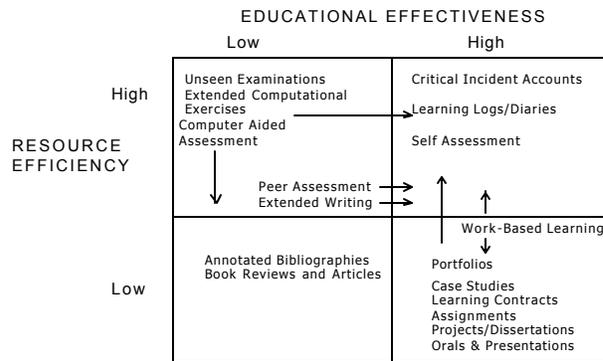


Table: Assessment Methods Report (Lines and Gammie 2004)

Matching Assessment Methods to Capabilities and Competences

Introduction

This section maps the different assessment instruments, identified in the previous section, against the capabilities specified in IES 3, *Professional Skills* and IES 4, *Professional Values Ethics and Attitudes*. In the tables that follow, the words ‘strengths’ and ‘weaknesses’ have been used to denote the effectiveness of the process to assess the particular skill. A degree of subjectivity is inevitable, but the evaluations result from a literature review both within and outside the accountancy profession. A commentary has been included after each table to explain the rationale behind the judgments, where justified.

Non work-based assessments

Table 1 maps assessment instruments that are generally non work-based against the IFAC capabilities and competences. These instruments are:

- (a) Annotated bibliographies
- (b) Cases, open problems, in-tray exercises
- (c) Computer assisted assessment
- (d) Short answer questions
- (e) Extended answer questions
- (f) Extended computational questions
- (g) Oral assessments and presentations

Table 1 - Mapping of non work-based assessment instruments to capabilities and competences

		Intellectual capabilities	Technical & functional capabilities	Personal capabilities	Interpersonal & communication capabilities	Organizational & business management capabilities	Professional values & ethics
Annotated Bibliographies Overall validity rating: medium/high Overall reliability rating: low	Strengths	Location and enquiry.	Literacy.	Self management, prioritise resources	Written communication, effective reading.	Global outlook, political awareness, dependent on topic.	-
	Weaknesses	Unstructured problems.	Numeracy, IT proficiency, risk analysis and measurement.	Ability to change.	Team working.	All other identified capabilities.	Unlikely to address.
Cases, Open Problems In-Tray exercises Overall validity rating: medium/high Overall reliability rating: low	Strengths	All identified capabilities	All identified capabilities	Select and assign priorities	Present, discuss and report. Listen and read effectively.	Planning, organisation, political awareness, global outlook	Possible, but no guarantees that actions will reflect recognition of issues.
	Weaknesses	-	-	Self management, initiative, influence and self learning. Adaptability to change.	Working with others. Negotiation.	Delegation and motivation, Leadership. Ability to work in teams.	-
Computer Assisted Assessment (including multiple choice) Overall validity rating: low Overall reliability rating: high	Strengths	-	Numeracy IT proficiency	Self learning when used formatively	-	-	-

Table 1 - Mapping of non work-based assessment instruments to capabilities and competences (Continued)

		Intellectual capabilities	Technical & functional capabilities	Personal capabilities	Interpersonal & communication capabilities	Organizational & business management capabilities	Professional values & ethics
	Weaknesses	Weak on all aspects.	Literacy. Risk analysis and measurement.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.
Short Answer Questions Overall validity rating: medium Overall reliability rating: low/medium	Strengths	-	Numeracy.	-	-	Possibility for global and business outlook	-
	Weaknesses	Limited on all capabilities.	Limited on other capabilities.	Fails to address any of the identified capabilities	Fails to address any of the identified capabilities.	Weak in other areas.	Fails to address any of the identified capabilities.
Extended Answer Questions (essays) Overall validity rating: medium/high Overall reliability rating: low	Strengths	All identified capabilities.	Literacy. Risk analysis and measurement.	-	Written communications.	Possibility for global and business outlook.	Possible but no guarantees actions will reflect recognition of issues.
	Weaknesses	-	Numeracy and IT proficiency.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.
Extended Computational Questions Overall validity rating: medium Overall reliability rating: high/medium	Strengths	All identified capabilities.	Numeracy, risk analysis and measurement.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.
	Weaknesses	-	Literacy and IT proficiency.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.	Fails to address any of the identified capabilities.

Table 1 - Mapping of non work-based assessment instruments to capabilities and competences (Continued)

		Intellectual capabilities	Technical & functional capabilities	Personal capabilities	Interpersonal & communication capabilities	Organizational & business management capabilities	Professional values & ethics
Orals and Presentations (non work - based) Overall validity rating: high Overall reliability rating: low/medium	Strengths	All identified capabilities.	All identified capabilities with the exception of below.	All identified capabilities.	All identified capabilities with exception of below.	-	Possible but not guarantee actions will reflect recognition of issues.
	Weaknesses		-	-	Ability to work with others	-	-

Table: Assessment Methods Report (Lines and Gammie 2004)

Work-based assessments

Table 2 maps assessment instruments that are essentially work-based against capabilities and competences. These instruments are:

- (a) Critical incident accounts
- (b) Self and peer assessment
- (c) Direct observation
- (d) Learning contracts, learning logs and diaries.

Table 2 - Mapping of non work based assessment instruments to capabilities and competences

	Strengths	Intellectual capabilities	Technical & functional capabilities	Personal capabilities	Interpersonal & communication capabilities	Organisational & business management capabilities	Professional values & ethics	Notes
Critical Incident Accounts Overall validity rating: high Overall reliability rating: high/medium		All identified capabilities.	Risk analysis.	All identified capabilities.	Yes, but limited by work based context.	Possible dependence on specific incident.	Possible dependence on specific incident.	The 'critical incident' need not be major to be an effective learning mechanism
	Weaknesses	-	Literacy, numeracy and IT proficiency.	-	-	-	-	To be effective depends on: <ul style="list-style-type: none"> • The context; • The capabilities of the mentor.
Self and Peer Assessment Overall validity rating: high Overall reliability rating: high/medium	Strengths	All identified capabilities dependent on context.	All identified capabilities dependent on context.	All identified capabilities dependent on context.				
	Weaknesses	-	-	-	-	-	-	Effective self assessment is not intuitive in all people.

Table 2 - Mapping of non work based assessment instruments to capabilities and competences (Continued)

		Intellectual capabilities	Technical & functional capabilities	Personal capabilities	Interpersonal & communication capabilities	Organisational & business management capabilities	Professional values & ethics	Notes
Direct Observation Overall validity rating: high Overall reliability rating: high/medium	Strengths	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	
	Weaknesses							Observations must be formalised to be effective
Learning Contracts, Learning Logs and Diaries Overall validity rating: high Overall reliability rating: medium/low	Strengths	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	All identified capabilities.	Forces individuals to be reflective
	Weaknesses	-	-	-	-	-	-	-

Table : Assessment Methods Report (Lines and Gammie 2004)

Conclusion

This paper has set out to discuss, in somewhat summary fashion, the range of methods and techniques that are available for assessment purposes, and to consider the capacity of different techniques to test the achievement of certain identifiable professional capabilities and competences. In addition to the discussion in the foregoing sections of this paper, there are two further tools we believe should be helpful to anyone seeking either to establish an assessment system or to evaluate an existing system.

There has been much work already done - both specifically applied to assessment in the field of accountancy education and training, and in the more general field of assessment. The IFAC Education Committee has established a reference source of electronically accessible material. The reference material covers both illustrations of the application of new assessment methods in practice, with particular reference to accountancy education, and also includes references to sites dealing with the theory and practice of assessment and, in particular, new developments in the field of assessment. An up to date on-line reference site is considered likely to be of more lasting benefit to users of this document than a hard copy appendix, which would be out of date almost as soon as published. The links are available online at www.ifac.org

In addition to this resource directory, in preparing this paper the Committee has developed a series of questions designed to help anyone who is involved in professional education and training and who is charged with either developing a new assessment system or evaluating an existing system. This questionnaire forms **Appendix 1** to this document. The questionnaire is very broad ranging, and it is anticipated that anyone answering the questions about his or her own system of assessment will be both stimulated and challenged by the questions. Certainly at the completion of such an exercise, it is clear that an evaluator will be in a position to discuss the strengths and weaknesses of a system in considerable depth and also be in a position to defend the integrity and robustness of the assessment system under review.

What is also clear at this stage is that there are no absolutes in the field of assessment:

- The grading of assessment methods is subjective, and there will be degrees of difference in the assessment of reliability and validity criteria for the different techniques in use.
- There is no single assessment method or technique that will test the full range of capabilities and competences an accountant needs to demonstrate to be admitted to the profession.
- Depending on the mix of identified capabilities required by different qualifying bodies, there may be further need for differentiation in assessment methods.
- Any system will need to take account of both work-based and non work-based assessment methods; the balance between these two may differ validly in different circumstances, but it is difficult to visualize an acceptable assessment system that will not have significant elements of both work-based and non work-based methods of assessment.

- Development of assessment methods is a continually evolving process, particularly as technological advances in the field introduce new possibilities.

In designing an assessment system for the purposes of admitting a newly qualified accountant to a professional body, it will be critical that the education system clearly understands the capabilities and competences that are identified as being essential; that the education system is structured in such a way as to ensure that the learning opportunities are created to enable the student learn and acquire the necessary skills; and that the education providers and the qualifying body (which may or may not be one and the same organization) both clearly accept that the assessment system in place meets the needs of all stakeholders (students, qualifying body, educators, employers, public interest). An acceptable system will need to be fair, effective (in both validity and reliability), transparent and efficient (cost-effective).

Those providing and responsible for assessment systems will hopefully find this paper, and in particular, the tools referred to in the Appendix and on the IFAC website, useful in satisfying themselves that their systems meet the needs identified above.

Appendix 1

Assessment Methods: Some possible questions

Each member body is responsible for determining the appropriate set of assessment methods to be used in assessing candidates' competence as professional accountants. It should be recognized that there is a level of trade-off between the various methods and the criteria listed below.

The following series of questions are designed to assist member bodies in selecting and reviewing their assessment methods and in determining the appropriate mix of methods suitable to their environment and circumstances:

1 Educational Effectiveness

- Objective of assessment: What are the objectives of each assessment? Have specified learning outcomes been determined for each? What is the most appropriate way to assess these? To what extent are the methods closely linked to desired skills and competencies? Are these competencies regularly and rigorously validated through periodic practice analysis?
- Assessment alternatives: Has appropriate consideration been given to alternative assessment methods? What are the strengths and weaknesses of each assessment method used? To what extent are the methods used educationally valid? Is there over-reliance on one assessment mode such as formal unseen examinations?
- Assessment setting: What is the most appropriate setting for the assessment? Have alternatives such as work-based assessment been considered?
- Validity: How valid is the method chosen? Does the assessment test what it sets out to test? Would an array of tests be more appropriate? To what extent does the test provide a reliable assessment of how someone will perform in a professional setting? Where there is more than one test or where there are alternative assessments (e.g., each candidate receives a different set of multiple choice questions), do both assessments provide a consistent result? Does the test assess those attributes it is supposed to? Is the assessment consistent with the syllabus and its objectives? To what use will the assessment be put? Arguably it is the use to which the assessment will be put that determines its validity.
- Reliability: How reliable are the proposed methods of assessment? Can the result be repeated in a re-mark situation? What level of re-marking and review is required? How dependable are the review systems? Are there wide variations in marker reliability between assessment methods?
- Appropriateness of the assessment: Does the assessment method match the task and outcomes? Are the assessment methods "constructively aligned" to the stated outcomes?

2 Resource Efficiency

- Cost effectiveness: Are the selected methods cost effective?
- Manageability: What are the resource implications for the assessing body of the selected methods chosen? Are there sufficient resources available to ensure that methods chosen can be implemented effectively?

3 Other Considerations

- Fairness to the candidate: To what extent is the assessment fair to the candidates concerned, and are appropriate allowances made for special circumstances? Appropriate allowances should be made for candidates with disabilities. Are there variations in the demands being made on students between different assessment methods? Are students overloaded with materials leading to ineffective learning?
- Frequency of assessment: How often will candidates be assessed? Will increasing frequency affect the candidates' stress so as to affect the assessment's reliability?
- Transparency of system: Do students, staff and external bodies, such as external examiners, professional bodies and stakeholders, understand the criteria employed in the assessment method and what they are designed to assess? Are there appropriate appeals procedures in place?
- Robustness of system: Is the system robust enough to support the numbers of candidates likely to be assessed, and is this appropriate to the resources available to the member body?
- Environment: Are the assessments taking place in an appropriate environment? Are there any factors for which allowances may need to be made? Are there any security issues arising should the assessment take place at several locations at different times?
- Stakeholder expectations: To what extent does the assessment system meet with stakeholder expectations? Are considerations of timing and inputs from stakeholders considered?
- Establishing required outcomes: Have the competences that an assessment system address been validated on a current basis?

Discussion Questions

The IFAC Education Committee welcomes comment and feedback on the content of this Paper. Comments may influence future updates to this document. In addition to general feedback, the Committee would be interested in responses to the following questions:

1. IFAC member bodies already use a wide range of assessment techniques. Please describe the techniques used in your member body.
2. In considering the content of this Paper, which of the described techniques might lead you to review the range and weighting of assessment tools currently applied?
3. To what extent do you agree or disagree with the ratings of validity and reliability provided in this Paper? Why?
4. How does your member body determine the trade-off between reliability and validity, effectiveness and cost when selecting assessment techniques?
5. What do you consider to be the implementation challenges associated with the techniques described in this Paper?
6. The implementation of IES 7, *Continuing Professional Development*, will provide many examples of assessments. How is your member body planning to assess the competence of members through CPD?
7. To assist IFAC member bodies, are there any areas of principle, or specific applications of the described techniques, including relating to the implementation of IES 7, that you consider the IFAC Education Committee should research further?



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