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ASSESSMENT CRITERIA IN THE CONTEXT OF QUALIFICATIONS AND UNIT STANDARDS DEVELOPMENT: DEVELOPING A THEORY OF COMPETENCE

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ABSTRACT

The requirements for the registration of qualifications and unit standards on the South African National Qualifications Framework include an approach and elements which are not found in similar systems elsewhere. In particular, the system aims to have an integrated approach to education and training. As a result, the received approaches to the development of assessment criteria are inadequate.

This article discusses various approaches that have emerged since 1996 and proposes a hybrid approach to the development of assessment criteria in the South African context. This latter approach is based on a competency model and three categories of assessment criteria. The article also reflects on social learning processes and describes how the evolution of this tool demonstrates the knowledge creation process proposed by Nonaka and Takeuchi in their book *The Knowledge Creating Company* (Nonaka & Takeuchi, 1995).

INTRODUCTION

During the 1990s, in anticipation of the establishment of the South African National Qualifications Framework (NQF), trainers, providers and others involved in the field of skills development began developing outcomes-based standards and qualifications. At that time and since then, the most commonly used method of developing assessment criteria has been to list a set of four to six assessment criteria for each specific outcome. In this respect, South Africans followed the example of the United Kingdom, Australia and New Zealand. The implicit theory underlying this method is that if a learner can perform all the outcomes and meets all the criteria for each outcome, he or she can be considered competent.

The extent to which this received method is embedded in the South African consciousness this received method is demonstrated by the design of the National Learners' Records Database (NLRD) which, amongst other things, houses the unit

standards and qualifications registered by the South African Qualifications Authority (SAQA). This database is designed for the capture and publication of a set of four to six assessment criteria under each specific outcome.

In the evolution of the NQF, this was by no means the only method of developing assessment criteria, however. Another method found in the 'occupation-directed education, training and development practice' unit standards and qualifications, developed in 1998, eschewed the development of outcome-focused criteria entirely. The assessment criteria were devised merely as a framework; assessors were expected to develop assessment guides which would reflect their own specific criteria, individually developed for each assessment. This method has persisted and can be found in modified forms in, for instance, unit standards for the retail and wholesale sector, as well as the tourism and hospitality sectors.

Consolidated assessment criteria

The purpose of this article is to describe a third method: that of consolidating assessment criteria for the unit standard as a whole. This method evolved during an early pilot project in 1995 and 1996 (National Training Board, 1997) and has subsequently been applied in a number of standards-generation contexts. In brief, this method

- describes clearly the overall purpose of the skill or unit standard
- lists all specific outcomes required to achieve that purpose
- consolidates, under a separate heading, all the assessment criteria required to achieve the purpose of the unit standard, including the assessment of critical outcomes and essential embedded knowledge.

Such consolidated assessment criteria have, however, been challenged as

- not conforming to the regulations
- not being 'good practice'
- not being easy to evaluate by the National Standards Body during the submission phase
- not conforming to SAQA's business processes.

This last has proved to be the most notable obstacle, in that it is difficult to capture such consolidated criteria on the NQF database (NLRD), which was clearly designed for a different method, as described above.

This alternative method is not an arbitrary response, however; it evolved as a response to the specific requirements of the South African NQF.

This method is based on an action theory consisting of two models:

- a learning model which takes into account the elements of specific outcomes, essential embedded knowledge and critical outcomes
- a competence model.

This article outlines the context in which this method was developed, the evolution of the approach, the underlying theory and then the advantages of the approach.

THE NQF REGULATIONS – THE CONTEXT

If the outcomes described are limited to simple tasks or activities, assessment criteria are relatively easy to construct. However, the South African National Qualifications Framework extended the notion of outcomes to include general education and training outcomes while introducing additional elements, which created a very complex notion of learning and competence.

The NQF is governed by a set of regulations (RSA, 1998), published in 1998. These regulations formalised a series of discussions which had been in progress since the late 1980s and which formed part of the overall discussions to reform and re-design social and economic processes in post-apartheid South Africa. The discussions relating to reform in education and training resulted in the South African Qualifications Authority Act (SAQA) in 1995 (RSA, 1995) and the establishment of a National Qualifications Framework. The structure and underlying theory of the NQF is defined by the regulations of March 1998¹.

These regulations define a unit standard as ‘registered statements of desired education and training outcomes and their associated assessment criteria together with administrative and other information as specified in these regulations’ (RSA, 1998:5).

The key substantive components of a unit standard are described in section 7(1) of these regulations:

- 7(1)k the specific outcomes to be assessed;
- 7(1)l the assessment criteria, including essential embedded knowledge; ...
- 7(1)o a ‘notes’ category which must include the critical outcomes contemplated in regulation 7(4) supported by the unit standard; should include references to essential embedded knowledge if not addressed under assessment criteria and may include other supplementary information on the unit standard. (RSA, 1998:7f)

¹ The regulations which govern the quality assurance of the NQF followed later in September of the same year.

The 'specific outcomes' referred to in 7(1)k are defined earlier in the regulations as 'contextually demonstrated knowledge, skills and values which support one or more critical outcomes' (RSA, 1998:5).

The 'critical outcomes' referred to here are the South African version of 'key competencies' or 'generic skills' found in other countries (eg Australia and the United States of America).

In addition to the above components, the regulations also define an overall approach to assessment of education and training outcomes within the context of the National Qualifications Framework. This is called 'integrated assessment' and is defined as 'that form of assessment which permits the learner to demonstrate applied competence and which uses a range of formative and summative assessment methods' (RSA, 1998:4).

In section 5, 'Assignment of levels to standards and qualifications', the concept of integrated assessment is further spelt out:

- 5(1)b The proposers of unit standards-based qualifications shall construct ... qualifications which have exit level outcomes that are a function both of the particular component standards used, and of a process of integrating the overall outcome ... to which knowledge, skills and values in a sub-field have been acquired and the critical outcomes incorporated, into the assessable performance. (RSA, 1998:7)

Therefore, integration refers not only to the nature and style of the assessment process (the assessment of different forms of learning) but also to the nature of the assessable performance (the integration of knowledge and action).

While the primary focus in the assignment of levels (above) is on qualifications, the heading to section 5 (Assignment of levels to standards and qualifications) also includes unit standards. This means that the same concept (ie an integration of knowledge, skills and values into an assessable performance) also applies to unit standards.

In summary, therefore, assessment criteria need to incorporate the following concepts:

- integrated assessment of education and training outcomes
- an integration of knowledge, skills and values into an assessable performance
- applied competence (ie contextually demonstrated knowledge, skills and values)
- critical outcomes
- essential embedded knowledge.

What the regulations do not spell out is how Standards Generating Bodies (SGBs) should develop and reflect the assessment criteria which have to respond to such a broad set of principles and standards.

Bellis (1998), in a report for National Standards Body 03 (Business, Commerce and Management Studies) proposed that one distinguish the following: An approach which is a set of assumptions and values, concepts and principles linked to a paradigm.

- A model which is 'often depicted graphically showing all components, their relationships, often in a "systems-thinking" way'.
- One or several methodologies, 'each of which sets out a series of processes for the achievement of a certain result or deliverable. It is usually systematic or could be described as "the science" of making use of the approach and the model'.
- Methods which 'are ways, techniques, steps, tasks, in actually carrying out the processes shown in "a methodology"'.

In terms of these definitions, the NQF regulations spell out the approach (the outcomes, integration, assessable performance, critical outcomes etc) and hint at a methodology for integrated assessment. What they do not do is specify the method by which one should achieve the criteria spelled out in the regulations.

The NQF and the regulations were therefore a challenge to the community who wanted to change South Africa's education and training system. The purpose of the new system was to redress past discrimination and to respond to a new political, social and, as became increasingly clear, economic environment. The intervention theory that underpinned the NQF was that if we specified the desired outcomes of the learning process, appropriate learning programmes would be designed and implemented and we would be able to assess the results of the learning process.

While the approach was defined by the South African Qualifications Authority Act (RSA, 1995), the models, methodologies and methods were lacking. The NQF regulations challenged the community (education, training and development practitioners; users such as employers and customers and participants such as learners and professionals) to develop a coherent new system. This meant evaluating current theories and current practice before developing a blueprint for the future system.

The definition of outcomes in the new approach had been broadened to include knowledge, values and performance, as well as both specific and critical outcomes. The challenge in developing qualifications and unit standards was, therefore, to develop assessment criteria which dealt with the complexity reflected in the regulations and the complexity of the learning process in all its facets. This complexity involved not only job tasks on one hand and formal learning processes on the other, but also the extended learning process (ie workplace experience), which led to 'the ability to put into practice in a relevant context' the learning that had taken place (RSA, 1998:3).

The facilitators of and participants in standards generating processes were flung into the realm of action science. 'In action science we seek knowledge that will serve action. The action scientist is an interventionist who seeks both to promote learning in the client system and to contribute to general knowledge' (Argyris et al, 1985:36).

Neither a practical solution nor a verifiable theory just happens; both evolve over a period of time. This article briefly describes several processes which led to the concept of consolidated assessment criteria. Achieving this solution required a social process. This social process shares the characteristics for innovation in commercial and manufacturing companies described by Nonaka and Takeuchi as 'the knowledge spiral' (Nonaka & Takeuchi, 1995:70-73, 89-90, 155, 235-236).

Knowledge has not only an epistemological dimension but also an ontological dimension: '...[B]oth knowledge and information are context specific and relational in that they depend on the situation and are created dynamically in social interaction among people' (Nonaka & Takeuchi, 1995:59).

Nonaka and Takeuchi go on to describe five phases of knowledge creation in a social context. These stages are summarised in Table 1.

Table 1: Summary of the five phases of knowledge creation

PHASE	DESCRIPTION
Sharing tacit knowledge	Individuals interface and 'share their mental models and technical skills' (p85).
Creating concepts	The 'shared mental model is articulated into words and finally crystallised into concepts' (p85).
Justifying concepts	Concepts are tested to see if they are worthwhile, often against criteria set by 'top management' (p86).
Building an archetype	A 'model operating mechanism' is developed (p87).
Cross-levelling knowledge	The new concept 'moves on to a new cycle of knowledge creation at a different ontological level ... both intra-organisationally and inter-organisationally' (p88).

(Nonaka & Takeuchi, 1995:83-89)

Nonaka and Takeuchi further propose that the knowledge creation cycle is a spiral, where the knowledge evolves as individuals 'continue to take the knowledge... and apply it freely across different levels and boundaries' (Nonaka & Takeuchi, 1995:89).

The enabling conditions for the knowledge creation process are indicated in Table 2.

Table 2: Summary of the enabling conditions for the knowledge creation process

CONDITION	DESCRIPTION	IN THIS CONTEXT
Intention	The organisation's aspiration, vision and strategy	The vision and the details of the NQF
Autonomy	As it relates to the individual or the self-organising team	Stakeholder-based projects, working groups and Standards Generating Bodies (SGBs)
Fluctuation and creative chaos	Breaking down routines, habits or cognitive frameworks to face a challenging goal or crisis	The new social, political, education and training environment
Redundancy	Information resources available beyond those required by the task at hand, overlapping approaches, 'fuzzy' division of labour, internal competition	Working groups approaching the problem in a variety of ways, bringing together a variety of stakeholders
Requisite variety	Fast access to a wide variety of information; ability to combine information flexibly	Testing the solutions developed in other countries

(Nonaka & Takeuchi 1995:73-83)

For participants in the various processes described below, the 'fluctuation and creative chaos' (Item 3 in Table 2 above) lay in the tension between the espoused theory and the theory-in-use. 'Espoused theories are those that an individual claims to follow. Theories-in-use are those that can be inferred from action.' (Argyris et al, 1985:81-82)

The participants' espoused theory was based on the notion that, on a strictly objective basis, an assessor could evaluate only concrete, observable and verifiable facts. This invariably led to a checklist-type approach. Theory-in-use, however, suggested that judgements of competence were informed by a wider variety of cues - that judgement of competence is to a large extent a gestalt judgement, based on a multiplicity of inputs and dependent on a fairly limited set of criteria.

The challenge lay in resolving the tension between these two theories and combining them into a single new theory to support the concept of 'applied competence', which means 'the ability to put into practice in the relevant context the learning outcomes acquired in obtaining a qualification' (SAQA, 1998:3).

The emergence of a new theory was premised on the notion that '... both knowledge and information are context specific and relational in that they depend on the situation and are created dynamically in social interaction among people' (Nonaka & Takeuchi: 1995:59).

APPLYING THE RECEIVED METHOD

The development of assessment criteria in the context of the South African system began with the application of the approaches used in similar vocational awards systems, in particular those in the United Kingdom and New Zealand.

The question that arises is: Does the received model of developing a set of assessment criteria for each specific outcome adequately respond to the complexity required by the NQF regulations? If unit standards developed in this way are analysed, a number of problems can be identified:

- It is very difficult to identify an organised and systematic approach to the development of the assessment criteria.
- There is a tendency to create long lists of assessment criteria - in a draft of a unit standard viewed recently by the author of this article, 22 criteria were provided for the first outcome and 25 for the second. Included in the assessment criteria were additional skills and knowledge which were not evident elsewhere. This is an extreme case of the 'shotgun' approach to developing a unit standard, but it is not unusual.
- Many assessment criteria often reflect mere compliance with organisational rules and procedures rather than the achievement of a new skill, new knowledge or new values.
- There is often a repetition of assessment criteria from one specific outcome to the next, especially in the case of industry-related standards regarding safety, quality or compliance with organisational procedures.

While it is not true for all unit standards based on this approach, formulating assessment criteria on an outcome-by-outcome basis seems to encourage a narrower, task-based focus which does not integrate the learner's overall skills, knowledge and values to produce an assessable performance reflecting 'applied competence' as defined by the SAQA regulations. The outcome-by-outcome approach also often tends to ignore

- cognitive activities such as planning, evaluating or trouble shooting
- a learner's ability to apply knowledge and experience in order to
 - adapt or respond to the operational context or new situations such as changes in technology
 - discuss or explain issues related to the performance.

Furthermore, the many varying approaches to the development of outcomes and assessment criteria indicate that there is no generally accepted theory of action which underpins the analysis or the development of outcomes-based unit standards and qualifications.

EVOLUTION OF THE CURRENT PROPOSALS

NQF pilot project 1996: Engineering and Manufacturing Processes

As early as 1996, the NQF Pilot Project: Engineering and Manufacturing Processes (E&MP) started listing outcomes and assessment criteria separately. This was done for four reasons:

- During a review of some two hundred unit standards, it became apparent that in many of the unit standards, some assessment criteria were repeated for several specific outcomes. Typically these assessment criteria reflected safety, quality assurance, timely response and conformance to company procedures.²
- Separate assessment criteria for each outcome often led to an over-emphasis on conformity to workplace or organisational rules and standards, instead of allowing for a description of the success measures for the newly acquired skills, knowledge and values. However, in many unit standards the result of this overemphasis on conformance was that no assessment criteria existed to reflect the learner's achievement of a unit standard's purpose. The E&MP then decided to restructure the assessment criteria as one heading, with two kinds of assessment criterion as sub-headings. These were 'outputs' and 'performance indicators':

Assessment criteria: indicate what is used to verify whether the learning outcomes in the unit standard are achieved. They reflect both the objective "hard" components as well as indicators which reflect "how" it is done. (National Training Board, 1997:9)

- This shift in approach was reinforced when the project received the draft headings (September 1996) that SAQA would be requiring for unit standards. These headings were later to appear in the regulations (RSA, 1998:7f). The project saw the separation of the items as a requirement that *specific outcomes* and *assessment criteria* be listed under separate headings.
- The draft unit standard headings also required *essential embedded knowledge* and *critical outcomes*. This implied that there also had to be assessment criteria which reflected those aspects. While it could be argued that the *critical outcomes* were embedded in the specific outcomes and were being assessed in any case, this was not always the case with *essential embedded knowledge*. It was therefore decided that separating the assessment criteria from the specific outcomes would help standards setters to ensure that assessment criteria reflected the *essential embedded knowledge* and the *critical outcomes* (National Training Board, 1997:19).

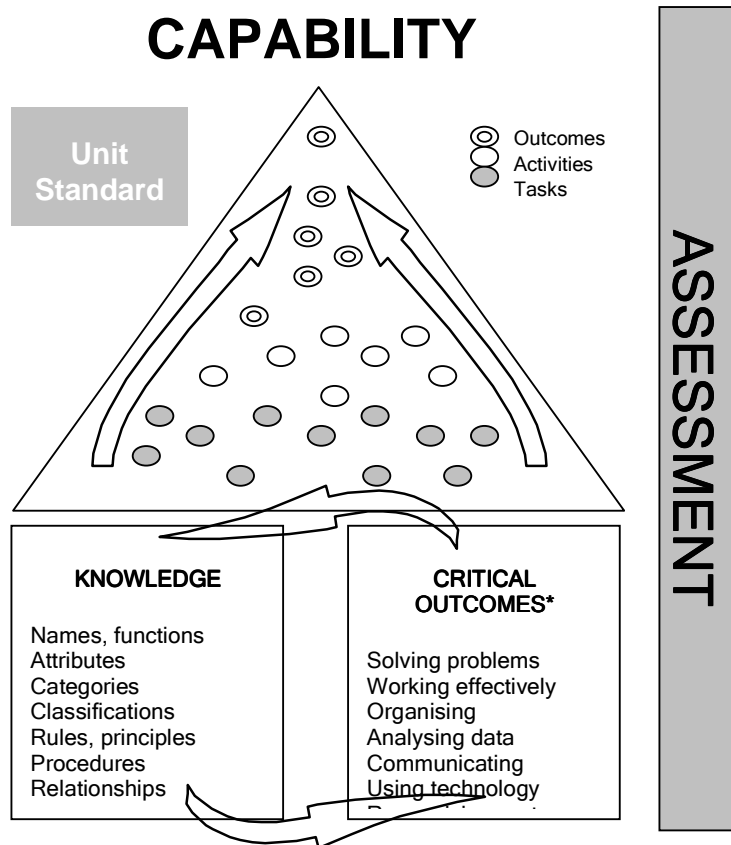
² It is a curious phenomenon that many people seem to regard conformance to company procedures or manufacturer's specifications as a basic indicator of skill achievement (applied competence); in fact, it is an adaptive behaviour one is capable of only once one has mastered the skill.

As part of this overall process, the project agreed on a learning model which had some impact on the way in which the assessment criteria were conceptualised. In this model, learners combined generic abilities (critical outcomes) and knowledge acquisition to perform a set of tasks or activities and developed a new capability³. (National Training Board, 1997:8 and 53)

It followed that assessment criteria should be extended to address knowledge acquisition and the development of the generic abilities (or critical outcomes). This was summarised in the following diagram:

This model provided participants with a framework for developing assessment criteria. As a result, weaknesses in many of the earlier unit standards became more evident. For example, if the critical outcome ‘working in teams’ is referenced in the unit standard, there should at least be some reference in the specific outcomes or in the assessment criteria which describe the nature of the team work required.

Figure 1: The relationship between assessment criteria, outcomes, knowledge and critical outcomes



*SAQA's term for generic abilities, essential outcomes

³ Capability was defined as ‘the expression of the successful integration of a range of generic abilities and knowledge in the performance of a range of outcomes as they relate to specific content areas and contexts. Capability describes the ultimate performance and purpose of the learning activity” (National Training Board, 1997:9).

The various items requiring assessment and the types of assessment criteria are summarised in Table 3.

Table 3: Summary of assessment criteria types and items requiring assessment

TYPE OF ASSESSMENT CRITERIA	ITEMS REQUIRING ASSESSMENT
Outputs	Specific outcomes
Performance indicators	Knowledge
	Critical outcomes

(National Training Board, 1997: 9-10, 19-20, 59-60)

While this went some way towards providing guidelines for the development of assessment criteria within the South African context, it was not widely implemented. It was further refined during standards-generation sessions with a variety of SGBs and through standards generation processes, two of which are explored below.

The Metals and Engineering Industries Education and Training Board standards generation process (1997/8)

The Metals and Engineering Industries Education and Training Board (MEIETB) embarked on an ambitious programme to develop unit standards for all aspects of their industry.

The MEIETB process worked with two slightly different categories from the categories discussed in the previous section (ie 'outputs' and 'performance indicators'), although there were parallels (Metal Industries NQF Pilot Project, 1998).

Assessment criteria were clustered under two separate sub-headings, namely:

- Observe
- Confirm.

'Observe' assessment criteria reflected what the assessor had to look for in terms of the physical manifestation of the learner's activities; 'Confirm' assessment criteria reflected those aspects of the learning that the assessor had to probe for - through questioning, looking at records or checking with others in the work context. 'Confirm' included checking the learner's understanding of the underlying principles and related knowledge listed under the item "Knowledge that will help me understand and that I will be able to explain" (Metal Industries NQF Pilot Project, 1998).

Ultimately, however, these headings reflected how the performance should be assessed without providing clear guidance on what constituted good assessment criteria.

Plastics manufacturing standards generation process (1998/9)

The SGB – Plastics Manufacturing started with the E&MP headings but realised that one more sub-heading was required: one which would focus specifically on knowledge and understanding. This emerged after trying to find ways in which knowledge and understanding should be reflected in the unit standard. The SGB eventually settled on three types of assessment criteria:

- Results achieved
- Indicators
- Understanding confirmed

In arriving at this position, the SGB was also responding to a number of challenges expressed by assessors who were undergoing training and were testing out the 'proto' unit standards in the plastics industry.

One of the persons participating in the SGB processes, although not a formal member of the SGB, was the master assessor for the Plastics Industry Training Board and had participated in the early workshops. She reported that assessors were experiencing a number of problems with the 'proto' unit standards that were being used to assess learners. Their experiences included:

- *Too many assessment criteria created a 'check list mentality'.* Assessors would compile assessment guides which consisted of lists including each criterion and would then simply tick these off as they were achieved. One of the results was that some learners conformed to the criteria listed but were actually not yet competent in terms of the purpose of the unit standard. This was due not only to the design of the unit standards but to the large number of assessments being performed at the time. Time pressures meant that the quality of the assessment process was sometimes compromised. Having a large number of assessment criteria therefore did not necessarily result in good assessment processes.
- *Many assessment criteria were vague and 'nice to have'.* It appeared that standards setters had simply brain-stormed these. More focused assessment criteria were required.
- *The language used to express many of the assessment criteria was very intimidating and learner unfriendly.* The level of language was very 'high' and used the jargon and phrasing of manufacturing standards. One of the first levels of assessment should be self-assessment on the part of the learner, but the complex language created difficulties for the learner.

- *The tone and content of many assessment criteria over-emphasised compliance and conformance.* This is partly related to the point regarding language levels, but the emphasis was particularly on conforming to the organisation's rules and procedures. The emphasis should rather be on the achievement of a skill. One aspect of that 'assessable performance' that should be checked is the ability to adjust to the various criteria dictated by the context.

The assessors' recommendations to the SGB were:

- Limit the number of assessment criteria.
- Focus the assessment criteria on the key aspects of the skills, knowledge and values.
- Make the language plain and user-friendly.

After testing out various approaches, the Plastics SGB arrived at the following in their guideline document *Principles and techniques for the writing of unit standards*:

Table 4: Categories of assessment criteria in the development of unit standards

RESULTS ACHIEVED	<ul style="list-style-type: none"> ○ relate to specific outcomes ○ the 'what' ○ the tangibles which result from the performance ○ documents, reports, new conditions, process adjusted to optimum performance
INDICATORS	<ul style="list-style-type: none"> ○ probably relate mostly to critical cross-field outcomes ○ the 'how it should be done'.
KNOWLEDGE CONFIRMED	<ul style="list-style-type: none"> ○ relates mostly to embedded knowledge ○ the 'why it should be done this way' ○ the understanding of the theory relating to the practice ○ the 'what if something goes wrong?'

(SGB – Plastics Manufacturing, 1998:6)

The process followed by that SGB to arrive at this point requires that during the initial information collection phase of writing the unit standard, members list both activities and tangibles resulting during and from those activities. These are then combined to form the *specific outcomes*. The tangibles are then also used for the development of the *assessment criteria - results achieved*.

As the SGB worked with the assessment criteria categorised into the three headings, they eventually began to focus the assessment criteria under 'results achieved' more than on the achievement of the purpose of the unit standard overall and less on the minutiae of each specific outcome.

SUBSEQUENT DEVELOPMENTS

Since then this approach has been refined. Developing assessment criteria in a consistent manner requires a procedure. This section describes how this procedure was developed.

On the basis of accumulated experience, the principles which govern the development of assessment criteria are as follows. Assessment criteria should:

- promote integrated assessment of education and training outcomes
- specify what the required applied competence is (ie the contextually demonstrated knowledge, skills and values)
- assess not only the specific outcomes but also the critical outcomes and the essential embedded knowledge
- be consistent from one unit standard to the next
- be expressed in plain language and in a learner-friendly fashion
- be kept to a practical number which would not result in inordinately long assessment processes.

Developing a model of competence

As part of these standards generation processes, the author of this article has run capacity-building workshops. One of the questions that was posed relates to what participants in the workshop regard as 'measures of success'. This requires participants to discuss how they would evaluate their own 'competence' and that of others. The responses received over the years can be classified into three broad categories. Based on this categorisation, the following model of competence was compiled:

- *Achieving the purpose*: This is the desired end result or objective of the activity of the skill or performance (ie the unit standard or qualification).
- *Conforming to generally acceptable levels of quality*: The performance and the end product should also display certain properties or qualities.
- *Understanding*: The learner should also have a broader understanding of issues, aspects and concepts related to the context and the activity or process.

The purpose

The first level of assessment is related to the achievement of the purpose of the skill or activity. If learners cannot generate the required product or cannot perform the whole service or range of activities, they are not yet competent. No further assessment would change that.

The first level of assessment is then a 'go' or a 'no go' decision. If it is the latter, then the assessment process simply becomes formative in nature (ie it evaluates the evidence with the purpose of providing feedback to the learner, not assigning the associated credits).

Quality

Simply achieving the purpose of the unit standard does not guarantee 'applied competence', however; it is one factor. The assessor then has to evaluate other factors. These factors are often qualitative in nature, but those qualitative elements are also an integral part of that judgement.

These factors are then formulated as indicators based on broader sets of criteria:

- Does the performance conform to the 'rules of the game' (ie the rules; policies; regulations; legislation and occupational, organisational or social norms)? Example of these are:
 - safety, health and the environment
 - complying with the quality assurance system
 - complying with commonly accepted practice or ethical standards.
- Does the performance conform to the generally accepted level of competence? Examples are:
 - acceptable output rates
 - performing within generally acceptable time frames
 - solving problems and dealing with contingencies and abnormal conditions
 - being able to deal with the unexpected.
- Does the learner display the appropriate value system in terms of good practice in relation to the performance in dealing with:
 - people (ie customers, team members, patients, learners)
 - tools, equipment, instruments, vehicles
 - information, data, documents
 - other factors and resources associated with the performance, such as money and time?
- Is the performance consistent and repeatable (ie not a once-off)? Does the performer display the confidence and certainty which indicate that the performance is well-learned and practised? Is there evidence that it has been done repeatedly or over a period of time? Can the performance be repeated to the same level of competence in a variety of situations?

Understanding

The final component of competence relates to the performer's understanding of the activity (ie to having the requisite knowledge and experience to deal with issues and problems in a meaningful way).

Understanding can be as simple as using the correct terminology to describe the activity, context or components involved or as complex as reflecting on the systemic features, implications or repercussions of changes or problems.

CONVERTING THE COMPETENCE MODEL INTO A TOOL

Assessment criteria can then be structured according to these three characteristics of competence.

To convert the competence model into a method, a tool was developed by Vorwerk (2003) to guide participants in the standards-setting processes by means of establishing the criteria for a specific skill. As previously defined, methods are 'ways, techniques, steps, tasks, in actually carrying out the processes' (Bellis, 1999). A conceptual tool thus becomes an aid to implementing a method in a repeatable, consistent way.

The tool is used in two ways. The first use enables participants to understand the nature and purpose of what they are doing. The second enables participants to be consistent during the standards-setting process. This is described in terms of

- results to be achieved
- indicators of performance
- confirmation of understanding.

Results

What should be achieved?

- The required result (the conditions, output, product or service that results from the performance).
- The storage, processing, submission or presentation of required records, reports and other documentation relating to the result.

By 'conditions' we mean an altered state as a result of the intervention or activity. For example, if the unit standard were about optimising a production process, the new state would be an enhanced set of operating conditions.

Note: It could happen that the required result has a qualitative flavour, in which case the indicator *Quality of the result* would fall away.

Indicators

How or how well should it be done?

Table 5: Table summarising indicators of quality within assessment criteria

TYPE OF QUALITY INDICATOR	QUALITY INDICATORS
Quality of the result	<ul style="list-style-type: none"> ○ Conditions, output, product or service meet quality standards
Quantitative measures	<ul style="list-style-type: none"> ○ Results are produced or achieved within given time constraints. ○ Targets are met. ○ Output rates are achieved.
Quality of performance	<ul style="list-style-type: none"> ○ Activity is performed consistently and confidently without hesitation or undue delays. ○ Problems are anticipated and quickly resolved. ○ Relevant procedures are followed and understood. ○ The activity is performed in a range of contexts. ○ The learner responds to a range of conditions. ○ Unexpected events are dealt with.
Contextual quality (attitude, values, good practice)	<ul style="list-style-type: none"> ○ Work practices reflect due care for safety and health of self and fellow workers and care for the environment in general. ○ Work area is kept clean and tidy. ○ Equipment and tools are cared for, maintained and stored appropriately. ○ Collected data, calculations and reports are completed accurately and in time. ○ People are treated appropriately: customers, staff, team members, patients, learners are treated respectfully, courteously, supportively and sensitively.

Confirmation of understanding

Understanding can be established by asking the following questions:

- Why are things done in a particular way?
- What can affect the process?
- What are the key issues that influence the process or context?

The responses to these questions are relatively unstructured and can be adapted to the level of the unit standard on the NQF and the type of skill.

Examples

At lower levels

The participants respond to 'What?' and 'Why?' questions related to:

- the process
- the materials
- the equipment.

At intermediate levels

The participants explained and discuss principles, concepts and issues. These relate to:

- trade or technical theory
- key scientific, safety, health and environmental principles related to the performance, equipment or processes
- difficulties, problems or incidents
- key quality factors.

At higher levels

The participants described and discuss:

- strategies
- options
- choices.

(Adapted from Vorwerk, 2003:3f)

USING THE TOOL

The use of the tool is not limited to standards generation and can also be used for the development of learning programmes and materials, as well as assessment. Two uses and the benefits of the tool are discussed below.

Standards generation

During the development of unit standards and qualifications, all the activities and tasks related to the skill are clustered into outcomes (specific outcomes and exit level outcomes). Thereafter, the key knowledge items and critical outcomes are determined.

The tool is implemented by asking the questions listed in the tool in relation to the specific outcomes (activities and tangible outputs), knowledge items and critical outcomes identified during the analysis phase. The participants then generate the specific requirements for that particular unit standard or exit level outcome. Some items in the tool may not be relevant for a particular skill or context. There are occasionally criteria which do not conform to this tool. If they are relevant, they are included and not discarded because they do not conform to the tool. If participants of a standards generating process develop a long list of assessment criteria (ie too many to be practical), the facilitator assists them to reduce the number of items on the list.

In the case of exit level outcomes for the qualification, the number of assessment criteria is generally restricted to the two or three most critical, and so only the most essential qualitative indicators are chosen.

Assessments

Where unit standards are not structured in this way, assessors can still use this tool to develop assessment guides and tools. They can use the tool to sort unstructured assessment criteria, to identify overlaps and gaps and to determine how to deal with these. They can also use it to sort and cluster criteria for individual outcomes into an assessment of the unit standard as a whole.

Clustering the assessment criteria in this way allows assessors to structure the judgement process and thereby arrive at credible and justifiable decisions. Although no research has yet been done, anecdotal evidence suggests that assessors using this approach find that the quality of the assessment process improves. They feel their judgements have a more secure basis than was previously the case.

Benefits of the method and the tool

Consolidating assessment criteria according to an agreed model of competency ensures that both the development of the assessment criteria and the application of those criteria during the assessment process are consistent and take place within a coherent framework.

Since the method focuses on the 'total' performance, the SAQA objective of integrated assessment is given a specific shape. In addition, both standards generation and assessment processes benefit from increased speed, greater consistency and improved reliability.

Participants in working groups and SGBs indicate that this approach gives structure to what has previously been a 'hit-and-miss' affair.

There is also a caveat: the use of the tool and the method alone do not guarantee that the results will always be good. The facilitator of the process also needs to ensure that the tool is applied consistently and comprehensively.

CONCLUSION

While it is possible to develop assessment criteria on a specific outcome-by-specific outcome basis, a more systematic approach to developing assessment criteria (ie the use of a formalised tool or process) leads to a more focused set of criteria which simplify the assessment process and lead to greater consistency and clarity.

So that they focus on the overall purpose of the learning and in order to facilitate integrated assessment processes, assessment criteria should be consolidated under a single heading separate from the specific outcomes. Furthermore, so as to be consistent across all kinds and levels of skill, the assessment criteria should be developed according to an underlying theory of competence. This theory is described in the form of a model and applied using a tool.

This approach has now been adopted by a number of standards-generating bodies or their working groups in a variety of standards-generation processes for the manufacturing, motor and the engineering trades. What is emerging is support for the position that the alternative approach yields greater consistency of assessment criteria.

Furthermore, the development of this approach is embedded in an extensive social process. The NQF created the situation where people had to examine carefully both their beliefs (espoused theories) and their practice (theories-in-use) in order to adjust to the new situation in South Africa.

Finally, the evolution of this concept demonstrates the concept of knowledge creation in a social context as proposed by Nonaka and Takeuchi (1995). Table 5 maps the five phases of the knowledge-creation process in the evolution of the competency model and the assessment criteria tool described in this article.

Table 6: Mapping the five phases of knowledge creation to the E&MP pilot project

PHASE	DESCRIPTION	NATIONAL TRAINING BOARD, 1997
Sharing tacit knowledge	Individuals interface and share 'their mental models and technical skills' in a field of interaction' (p 85)	The pilot project and its membership (p:i - v)
Creating concepts	The 'shared mental model is verbalized into words and finally crystallized into insert explicit concepts' (p delete 86)	The final project report and the figures continued in it (NTB, 1997:53- 54)
Justifying concepts	Concepts are tested to see if they are worthwhile, often against criteria set by 'top management' (p 86)	Testing the concepts against the emerging criteria from SAQA (NTB, 1997:59- 61)
Building an archetype	A 'model operating mechanism' is developed (p 87)	Template for developing unit standards (NTB, 1997:57)
Cross-levelling knowledge	The new concept 'moves on to a new cycle of knowledge creation at a different ontological level ... both intra-organizationally and inter-organizationally' (p 88)	Subsequent pilot projects, SGBs' capacity building processes

(Nonaka & Takeuchi, 1995 and National Training Board, 1997)

Since then, the spiral of knowledge creation has persisted, and the crude ideas from the original pilot project have been refined and have evolved into both a more sophisticated model as well as an application tool.

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