

# Competence Matters More than Knowledge

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**Abstract:** This paper develops a general framework for assessment and management of competence. It then illustrates a case study demonstrating how to pragmatically assist engineers and managers to confirm their competence, knowledge and understanding against occupational standards without placing undue pressure on their time. It proposes a form of continuous assessment over a 3-6 month period using electronic evidence provided by the candidate in response to a set of focussed emailed questions to build up a paperless portfolio. It also briefly looks how the process can be extended to maintain and update competence and possible future steps to quantify the assessed competence based on weighted performance measures.

**Keywords:** knowledge life-cycle, competence assessment, competence management, competence benchmarking

## 1. Introduction

Traditionally knowledge and its creation/acquisition, development and application have been considered by the academic and management communities albeit with different perspectives. In this paradigm, knowledge is the key commodity and the focal point of all activities hence the term Knowledge Management (KM). We propose an alternative and utility based paradigm in which realisation of value through prudent application of knowledge is given prominence over mere acquisition, development, storage, use and ownership of concepts and facts. This is broadly referred to as competence which in a systems paradigm, involves a great deal more than knowledge alone. It is argued that in a real and pragmatic world, it is competence that matters rather than awareness, creation, appreciation and ownership of knowledge. Whilst knowledge is a key and fundamental component in this paradigm, many other factors come together in a systemic form to generate the key benefits from knowledge. This is a utilitarian perspective on knowledge and strives to establish a value system where knowledge is no longer the key commodity but its application in developing solutions to a tapestry of social, technical, global and political problems which is the transformational ability referred to as competence. This by necessity is a human attribute for the time being until cybernetic systems capable of emulating all facets of competence are developed and deployed.

## 2. Knowledge life cycle

In a similar fashion to any other product or service, knowledge undergoes a number of stages from creation and/or acquisition to disposal. This life cycle perspective is instructive in managing it prudently. The key Knowledge Life-cycle phases are:

1. creation, discovery, emulation or acquisition;
2. formalising and representation;
3. capture, encoding, storage and protection;
4. retrieval, dissemination and application;
5. review and enhancement;
6. adaptation and re-deployment;
7. release and disposal.

Each phase necessitates special skills and talents to ensure success. The first phase requires identification of a strategy for acquisition which may involve research, innovation, synthesis, emulation or mere procurement/licensing. These are quite rare capabilities. Formalisation and representation in text, mathematical or diagrammatic form likewise requires the mastery of selecting the most appropriate form or encoding for newly acquired or found knowledge. Once a representation style and form is chosen, the newly acquired knowledge can be captured or translated into this form, classified, encoded, stored and where appropriate, protected. The end users would subsequently retrieve, decipher and apply the captured and encoded knowledge. This is where a combination of other capabilities is called for to ensure the desired outcome at the requisite level of quality and to the satisfaction of the clients is achieved. Given knowledge can always be augmented and improved through usage, phase five involves incorporation of newly found aspects in the formalised knowledge hence enhancement. Knowledge is also often adapted for new

environments and domains of deployment. This is where innovation is potentially the outcome since it involves synthesis and adaptation rather than creation of new knowledge in an attempt to realise new value. The phases 1-6 are necessarily iterative but, it is always possible that knowledge becomes out of date in view of discovery of new and more efficient methods and approaches to the same end. This eventually involves disposal or release of knowledge and its repository, paving the way for the new and more effective variations. In carrying out all these, some form of higher level knowledge (meta-knowledge) is required. The meta-knowledge required for successful application is called competence. It contextualises knowledge and deploys a portfolio of synergistic capabilities to realise the inherent value of knowledge in providing answers to real world issues and problems.

### **3. Competence**

The European Guide to good practice in Knowledge Management (Euro Guide 2003) defines competence as an appropriate blend of knowledge, experience and motivational factors which enables a person to perform a task successfully. In this context, competence is the ability to perform a task correctly, efficiently and consistently to a high quality, under varying conditions, to the satisfaction of the end client. This is a much more demanding portfolio of talents and capabilities than successful application of knowledge. So a competent person is much more than and knowledge worker. Competency may also be attributed to a group or a team when a task is performed by more than one person in view of the multi-disciplinary nature, complexity or the scale.

A competent person or team require a number of requisite qualities and capabilities namely;

1. The domain knowledge empirical, scientific or a blend of both;
2. The experience of application (knowing what works) in different contexts;
3. The drive and motivation to achieve the goals and strive for betterment/excellence;
4. The ability to adapt to changing circumstances and demands by creating new know-how;
5. The ability to perform the requisite tasks efficiently and minimise wastage of physical and virtual resources;
6. The ability to sense what is desired and consistently deliver it at a high quality to the satisfaction of the end client.

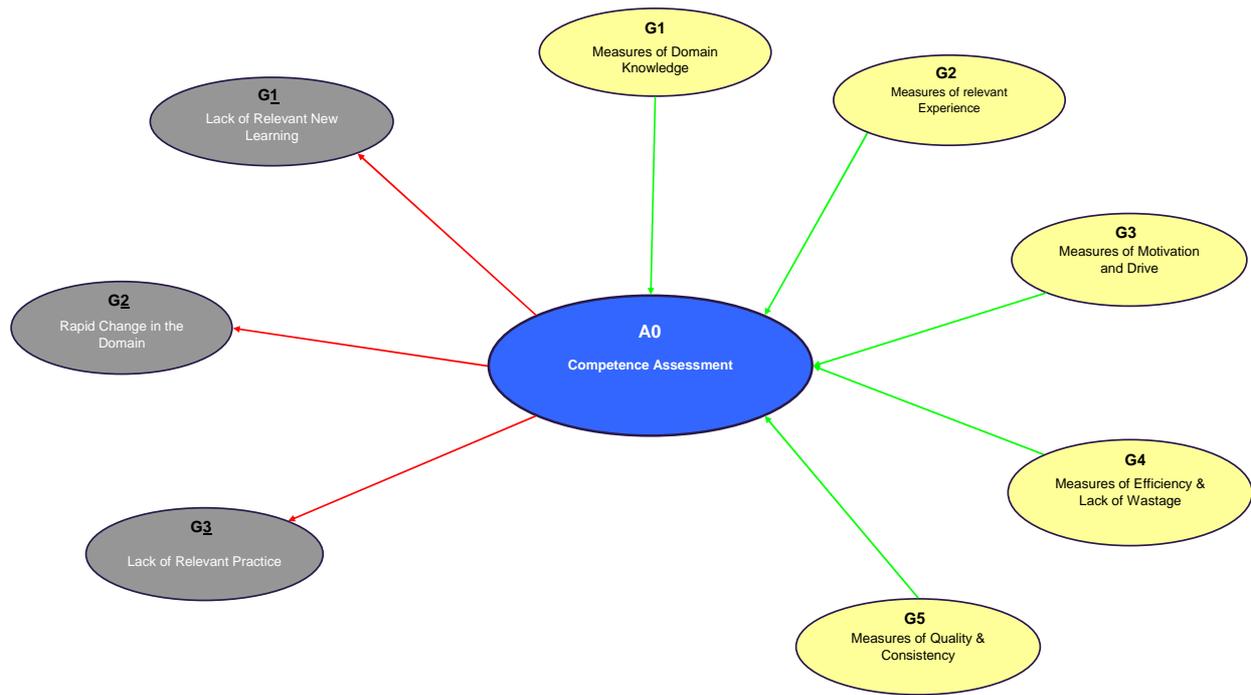
The right blend of these abilities renders a person or group of people (a team) competent in that they would achieve the desired outcomes consistently, efficiently, every-time or more often than not satisfying or exceeding the expectations of the clients over varying circumstances. Such persons/groups will be recognised for their mastery of the discipline and not just considered a font of relevant knowledge. In this spirit, competence is the ability to generate success, satisfaction, value and excellence from the application of knowledge. This supports our axiom that competence matters more than knowledge alone.

### **4. Competence assessment and management, a systems approach**

Given the six facets of competence elaborated earlier, the acquisition, assessment, development and management of competence poses a challenge beyond the traditional education and curriculum vitae. Whilst a blend of all six facets is a pre-requisite for competency and mastery in a given discipline, the significance of each is highly dependent on the context and requirements of a given domain. Whilst theoretical knowledge plays a more significant role in abstract scenarios, experience of application, adaptability and creativity may become more prominent in other domains. Whichever the domain however, a systems framework for the evaluation, development and enhancement of competence is called for. This by necessity comprises two inter-dependent frameworks, one focused on evaluation and assessment and the other on the management of competence.

#### **4.1 Assessment of competence**

The competence assessment framework provides an integrated perspective on competence in a given context whilst additionally empowering the duty holders or the organisation to benchmark each aspect, measure, assess and where necessary take actions to enhance various elements in the framework. This is illustrated in the Weighted Factors Analysis (Hessami 1999), schema of Figure 1. The latter aspects of benchmarking, evaluating, assessing and potentially enhancing competence are inherent in the underpinning WeFA methodology (Hessami & Gray, 2002) and not elaborated here.



**Figure 1:** The systemic competence assessment framework

The determination, benchmarking, evaluation and quantified performance assessment of five *driver* and three *inhibitor* Goals in the above WeFA schema is carried out as follows;

#### 4.1.1 Driver goals

The requisite domain knowledge in a given context as depicted in the driver Goal 1 (G1) is broadly supported by relevant industry’s skill/competence frameworks. There are a number of such frameworks in use mainly within various engineering disciplines in the UK, for example OSCEng (2006), IRSE (2007) and IET (2007).

The composition and extent of relevant experience in a given context as depicted in the driver Goal 2 (G2) in the assessment framework is supported by subsequent decomposition of G2 into lower level WeFA structures, the so called Level 2 and Level 3 goals. This principally helps determine the driver and inhibitor goals for the higher level goal, the domain experience.

The nature and degree of motivation and drive in a given context as depicted in the driver Goal 3 (G3) in the framework is supported by subsequent decomposition of G3 into lower level WeFA structures in WeFA. This principally helps determine the driver and inhibitor goals for motivational and drive aspects.

The essential determinants and degree of efficiency in carrying out tasks and avoidance of wastage of resource in a given context as depicted in the driver Goal 4 (G4) in the framework is supported by subsequent decomposition of G4 into lower level WeFA structures.

Finally, the key determinants of quality and consistency in carrying out tasks in a given context as depicted in the driver Goal 5 (G5) in the framework is supported by subsequent decomposition of G5 into lower level WeFA structures, drivers and inhibitors respectively.

#### 4.1.2 Inhibitor goals

The key aspects and the extent of absence of relevant new learning in a given context of application as depicted in the inhibitor Goal 1 (G<sub>1</sub>) in the proposed framework is supported by subsequent decomposition of G<sub>1</sub> into lower level WeFA structures, the so called Level 2 and Level 3 drivers and inhibitors in WeFA.

The key determinants and the extent of change in a given domain/context as depicted in the inhibitor Goal 2 (G<sub>2</sub>) in the proposed framework is supported by subsequent decomposition of G<sub>2</sub> into lower level WeFA structures to aid clarity and presentation.

Finally, the key predictors and the extent of the currency of relevant practice in a given context as depicted in the inhibitor Goal 3 (G<sub>3</sub>) in the framework is supported by subsequent decomposition of G<sub>3</sub> into lower level WeFA structures.

A suitably developed and validated WeFA schema for competence assessment in a given role, context/domain additionally requires a measurement scale for each goal (driver or inhibitor) as well the weights, i.e. the strengths of influence(s) from each goal on higher level goals. Once established, the weighted framework lends itself to application for assessment and management of individual's or groups' competence in fulfilling tasks in the particular context as depicted by the framework. This would render a number of advanced features and benefits namely:

- Up to 5 levels of competence comprising apprentice, technician, practitioner, expert, leader in a given role/domain;
- Identification of the gaps and training/experience requirements;
- A consistent and systematic regime for continual assessment and enhancement.

It should be noted that assessment here is devised and intended as a tool in the service of systematic approach to staff development and should not be misconstrued as an adversarial instrument for classification of people's contributions to the organisation.

## **4.2 Management of competence**

The deliverables of the engineering process applied to the creation and realization of parts, products, systems or processes often follow a life cycle from concept to decommissioning as popularised by engineering standards typically comprising;

2. Concept & Feasibility
3. Specification & Design
4. Development
5. Commissioning
6. Deployment
7. Maintenance & retrofit
8. Decommissioning

In this spirit, the human resource involvement/employment within an engineering environment, organisation or project likewise follows a life-cycle comprising seven key phases essential to the systematic and focused management of knowledge namely;

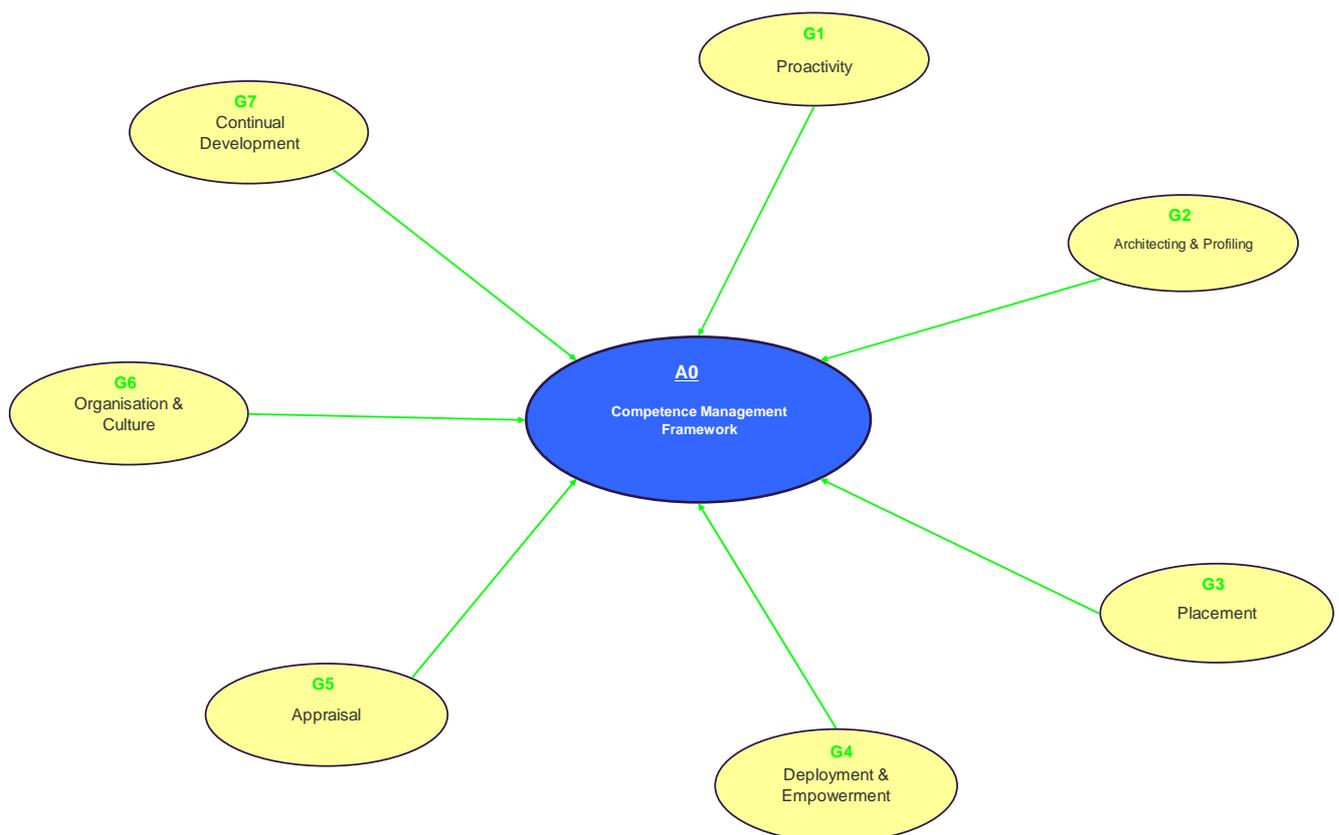
1. Proactivity: comprises corporate policy, leadership, mission, objectives, planning, quality assurance and commitments to competency and service delivery for the whole organisation;
2. Architecting and Profiling: which comprises specification and development of a corporate structure aligned with the strategy and policy objectives together with the definition of roles and capabilities to fulfil these;
3. Placement: this essentially involves advertising and attracting candidates matching the role profiles/requirements involving search, selection and induction. Selection relates to deriving role focused criteria and relevant tests to assist with the systematic assessment, scoring and appointment tasks. Induction, involves a period of briefing, familiarisation and possibly training the extent of which is determined by the familiarity and competence of the individual concerned and the complexity and novelty of the role.
4. Deployment & Empowerment: this involves a holistic description depicting the scope of the responsibility, accountability and technical/managerial tasks associated with a specific role and empowering the individual to fulfil the demands of the role. This would include training, supervision, coaching, resourcing, delineation of requisite authority and accountabilities, mentoring and potential certification as means to empowerment for achievement and development;
5. Appraisal: which involves the planning and setting performance objectives, and identification of the performance indicators/predictors synergistic to the demands of a role and the individual's domain knowledge, aimed at ensuring all relevant and periphery aspects of the role are adequately addressed and the necessary provisions are made for learning where a need is identified. The evaluation and appraisal provides the necessary feedback on compliance with individual and organisational objectives and achievement, enabling the

organisation to identify and reward good performance and develop remedial solutions where necessary;

6. Organisation and Culture: this involves clarification of role relationships and communications, support, reward and motivational aspects for competency development including requisite resources and learning processes for attaining the policy objectives. This is intended to develop and foster a caring and sensitive approach/culture nurturing talents and paving the way towards an innovating organisation.
7. Continual Development and Progression: this comprises identifying the synergistic aspects which may serve as a complementary and rewarding extension to individuals'/teams' specific roles. Development may involve managerial, technical, support functions or an appropriate blend of duties at the whole life-cycle level or extensions to the role specific activities and vision/ career paths above an existing role into other parts of an organisation and even beyond. The review and assessment of success in all the principles inherent in the framework also fall within the Continual Development principle.

The seven focal areas/principles constitute a systematic competency management framework. It is worth noting however that employment and project/product life-cycles are orthogonal in that securing the requisite human resource and competence for any phase of an engineering production activity would potentially involve all the seven phases of the competence management.

The systematic framework for management of competence is depicted in the WeFA schema of Figure 2. Note that the two frameworks for assessment and management of competence are inter-related and complementary. Whilst assessment focuses on the individual and/or the team in terms of performance, the management framework addresses broader issues relating to the corporate's policy and a nurturing environment to foster talent and innovation as an embedded culture thus creating a sustainable business/service provision.



**Figure 2:** The systemic competence management framework

A case study of an industry process for competence assessment and management is presented in section 5 to illustrate current practice and highlight the necessity and potency of systemic frameworks for effective realisation, development and appreciation of this invaluable human attribute.

## **5. Case study: Competence assessment & management in industry**

### **5.1 Making time for the assessment of competence and knowledge**

One of the problems with getting commitment to a scheme that assesses knowledge and competence is to convince both the candidate and their line manager that the time spent is worthwhile and that there should be sufficient resources allocated to the process. In addition to the benefits of a quantifiable system for developing skills, there will be the need for an auditable record which shows that work has been carried out by those who have met the required occupational standard as part of a quality management process. Persuading people can be difficult particularly when individuals think they have been carrying out an activity satisfactorily for some considerable time. It is preferable to use the term "confirming competence" to define the assessment scheme, rather than the need to "demonstrate competence" which implies that, prior to the assessment, the candidate may be "not yet competent".

For tasks with a high practical element such as manufacturing, installing or maintaining, the most accurate assessment method is usually by observation of the candidate carrying out the task with an examination of their completed work. Any knowledge that could not be inferred from the observation but is required to meet the occupational standard would be covered in questioning or tests. The candidate is assessed in the work environment carrying out the activity they would normally be doing. The non-productive time for the candidate would then be limited to answering any questions raised by the assessor.

It is different however for many engineering and managerial roles including project engineers and designers whose work is usually more desk based. The activities tend to be spread over a longer time span covering discussions and analysis which are difficult to observe in action and the candidate may need to gather information, arrange meetings etc before an outcome can be demonstrated. In these instances the conventional way of assessing managers and engineers has been for them to write a personal report stating how they carry out their work and assemble a portfolio of documentary evidence cross-referencing to the occupational standard.

There tends to be some reticence against this additional work to "demonstrate I am doing my job properly" particularly in the climate where there is little "free" time for personal development unless there is some financial inducement or it is necessary to meet contractual or regulatory requirements. There is also the assessor's time that needs to be considered and the probable lack of assessors at a senior level. The assessor should be occupationally competent at the level of the candidate as well as being a qualified assessor. Many organisations may feel that engineers and managers at this level are more productive carrying out engineering or managerial duties than assessments. Not having sufficient assessors available also has a negative effect, since if a candidate has put in considerable work to assemble a portfolio and then has to wait a long time for the assessment; the news soon gets around and has a detrimental effect by deterring other candidates from starting.

Therefore in order to gain acceptance of a scheme to assess competence and knowledge, it is necessary that the process does not become a burden on both the candidate's and assessor's time.

### **5.2 Targeted questions for continuous assessment**

Some processes for demonstrating competence rely on the candidate "raiding the filing cabinet" searching for historic evidence. However, a more staged approach based on short answers to email questions ensures currency and helps the candidate to compile a portfolio without setting aside large amounts of time and interfering with their day job. There are now many emails sent and received by managers and engineers as routine and the plan builds on their responses to short email questions which have been aligned to the occupational standard. Then over a period of time the candidate will have effectively carried out a self-assessment against the occupational standard for their tasks, and supplied sufficient evidence to the assessor for a decision on their competence to be made.

Each of the performance requirements needs to be converted into a format of a suitable email question, such that the answer is a short statement which, when accompanied by supporting documentary evidence, would be acceptable to the assessor. By asking the question in the form of "Please describe how you did .....", the candidate is encouraged to undertake a reflective review of how they carried out the work in their reply.

The questions are graded such that the first few cover daily or weekly routines for which the candidate will have little trouble in answering and finding the evidence, so giving them confidence to complete the program.

As the candidate progresses, several related performance requirements can be grouped in the email questions. If the candidate has not recently carried out the specific activity but plans to in the near future, then a response indicating a later date is acceptable. Finally, to complete the process a professional discussion between the candidate and the assessor is held to confirm the authenticity of the work submitted and resolve any outstanding issues.

### 5.3 Example from an occupational standard

A number of occupational standards have been used in the process including those from MCI (1997) for management standards and from OSCEng (2006) for engineering standards. As an example, consider the following performance and knowledge requirements taken from the MCI 1997 Management Standards:

Unit D6 "Use information to take critical decisions"

Element D6.1 "Obtain the information needed to take critical decisions"

D6.1e The information you obtain is accurate, relevant, and sufficient to allow you to take decisions

D6.1f Where information is inadequate, contradictory or ambiguous you take prompt and effective action to deal with this

"Associated knowledge"

- How to judge the accuracy, relevance and sufficiency of information to support decision making in different contexts
- How to identify information which may be contradictory, ambiguous or inadequate and how to deal with these problems

5.3.1 The question to the candidate is emailed (for example on a Monday morning) in a format as follows:

Q1 - Please reply to this email by next Monday with a brief statement describing how you have obtained information to take a critical decision. Explain how you ensure that the information obtained was accurate and sufficient; where any information was suspect, describe how this was resolved.

You should attach to the reply some recent supporting documentary evidence such as:

- Examples of accurate information used
- Examples of information that is incorrect
- Correspondence requesting clarification of the information
- Documents you have returned where you have marked ambiguities or errors

Please use a unique file reference for each attached piece of evidence eg XX01 (where XX are your initials).

5.3.2 The short answer may be in the form of:

I obtained performance statistics from the company's information management system and also data directly from my 3 supervisors to help me decide on resource planning for next year. However, the data received from area AAA was inconsistent with that on the system and I requested clarification from a second source. I also visited the site to establish the facts first hand.

*Supporting evidence (attached)*

AB01 Statistics for 3 areas

AB02 Data from AAA

AB03 Clarification request

AB04 Notes of site visit

### 5.4 Flow of information (see figure 3)

After briefing the candidate on the process, the assessor sends out an email in the format as shown in the example in 5.3.1; this should generate a reply similar to that shown in 5.3.2. On receipt, the assessor adds the text and attached files to the candidate's electronic portfolio. Should more information be required or additional documentary evidence needed, then the assessor would reply with a second email request. If the initial reply shows that the candidate has not met the associated knowledge requirements, then the assessor would ask a direct question to cover a specific area of knowledge.

One advantage of the process is that the assessor can provide guidance and feedback whilst carrying out the staged assessments remotely, thus reducing non-productive travelling time to meet the candidate and review the evidence. This can be a significant benefit particularly when there may be a limited number of assessors available locally.

The emailed questions could be sent out in conjunction with a “real-time” plan, i.e. questions that match dates when certain regular activities take place and actions are due. For example within operational management, decisions may be based on a 13 week cycle (roster planning meetings, ordering of materials etc); or tie in with know seasonal or climatic changes, then the email questions could coincide with these activities prompting responses from the candidates concurrently as they carry out the work.

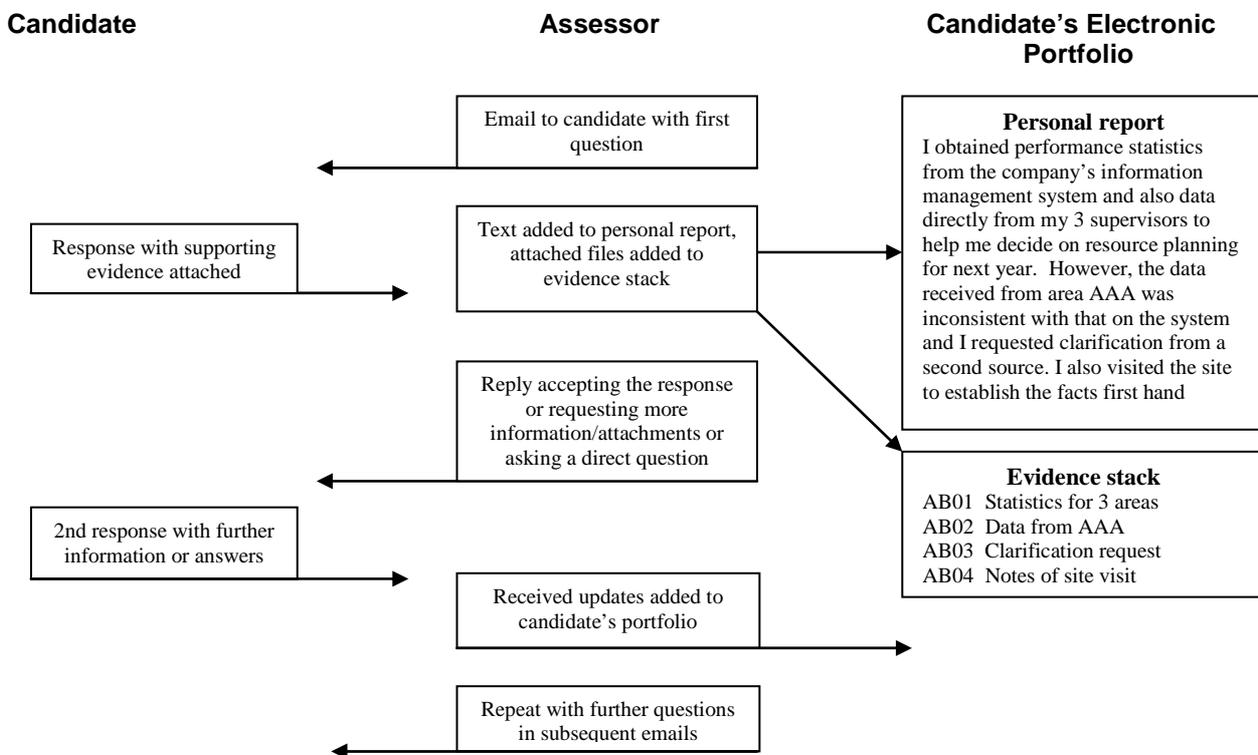


Figure 3: Flow of information

### 5.5 The candidate's electronic portfolio

Microsoft Access is used to create an electronic portfolio, which permits documentary evidence to be embedded as electronic files and therefore the creation of a separate paper portfolio is not required. Each electronic portfolio consists of a set of performance requirements, which define the standard that needs to be achieved with guidance and a list of suggested types of evidence that could be used to demonstrate competence. Where the candidate is completing the portfolio themselves, they will enter short statements describing how they meet the performance requirements as they carry out their engineering or management duties. Each statement can be supported with a range of electronic evidence, such as reports, spreadsheets, emails, witness testimonies, digital pictures, short videos etc. The assessor reviews the statements for each of the performance requirements and can view the supporting documents by clicking on the embedded evidence in the list (see Figure 4).

In the process described in this paper, the electronic portfolio is used by the assessor who enters the email responses and the attached supporting evidence on behalf of the candidate. The assessor then carries out an immediate assessment of the evidence submitted and provides feedback to the candidate.

### 5.6 Adding the personal statements and evidence

An extract of the “Assessor's Page” of an electronic portfolio is shown in Figure 4; across the top are the unit and element titles followed by a brief summary of what needs to be provided to demonstrate competence. The email response from the candidate has been entered under “Candidate's personal report” together with the supporting evidence. The assessor then adds their judgement including any questions to ask the candidate and responds back accordingly. The program has the facility to export a report which includes the assessor's feedback and lists those requirements which have yet to be met. The result is that over a period of between 3 to 6 months depending on the complexity of the standard, either the candidate is confirmed as

competent, or a training and development need is identified. In the latter case, action can be taken immediately rather than waiting for the final assessment. The exercise should take no more than 15-30 minutes a week for both the candidate and the assessor. The final report includes an overall summary and any independent assessment or verification of the portfolio that may be required prior to submitting for an award.

Unit D6 Use information to take critical decisions - D6.1 Obtain information needed to take critical decisions																	
Your evidence should include a personal account of how you obtain the information needed to take critical decisions and a sample of relevant reports and records you have produced. Documents and records of communication between you and others, including witness testimonies, may also provide evidence with regard to steps you have taken to meet the performance requirements																	
Performance and Knowledge Requirements	Candidate's personal report & supporting evidence																
<p><b>D6.1e The information you obtain is accurate, relevant, and sufficient to allow you to take decisions</b></p> <p><b>D6.1f Where information is inadequate, contradictory or ambiguous you take prompt and effective action to deal with this</b></p> <p>Explain how you ensure that the information you obtain is accurate and sufficient, also what actions you took to resolve any information you found to be inaccurate</p> <p>KNOWLEDGE REQUIREMENTS</p> <ul style="list-style-type: none"> <li>How to judge the accuracy, relevance and sufficiency of information to support decision making in different contexts</li> <li>How to identify information which may be contradictory, ambiguous or inadequate and how to deal with these problems</li> </ul> <p><b>Suggested Evidence</b></p> <ul style="list-style-type: none"> <li>Example of accurate information used</li> <li>Examples of information that is incorrect</li> <li>Correspondence requesting clarification of the information</li> <li>Documents you have returned where you have marked ambiguities or errors</li> </ul>	<p>I obtained performance statistics from the company's information management system and also data directly from my 3 supervisors to help me decide on resource planning for next year. However, the data received from area AAA was inconsistent with that on the system and I requested clarification from a second source, I also visited the site to establish the facts first hand</p> <table border="1"> <thead> <tr> <th>Ref</th> <th>Title</th> <th>File Type</th> </tr> </thead> <tbody> <tr> <td>AB01</td> <td>Statistics for 3 areas</td> <td>Microsoft Word Document</td> </tr> <tr> <td>AB02</td> <td>Data from AAA</td> <td>Microsoft Excel Worksheet</td> </tr> <tr> <td>AB03</td> <td>Clarification request</td> <td>Microsoft Word Document</td> </tr> <tr> <td>AB04</td> <td>Notes of site visit</td> <td>Microsoft Word Document</td> </tr> </tbody> </table> <p><b>Assessors comments/questions</b></p> <p>Evidence shows sufficient and accurate information obtained from reliable sources (company information system) and querying where there is ambiguity (area AAA)</p> <p>Q – What steps have you taken to ensure correct information is provided by AAA in the future?</p> <p><input checked="" type="checkbox"/> Response requested from candidate</p>		Ref	Title	File Type	AB01	Statistics for 3 areas	Microsoft Word Document	AB02	Data from AAA	Microsoft Excel Worksheet	AB03	Clarification request	Microsoft Word Document	AB04	Notes of site visit	Microsoft Word Document
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Figure 4: Extract of the “Assessors Page” in the electronic portfolio

### 5.7 Maintaining and updating competence

Having achieved the target of confirming competence at the end of the exercise the process can be adapted to monitor and reassess the candidate to ensure that they maintain the level of skill, experience and knowledge required for satisfactory performance. For example a review could be planned after 12 months as part of the candidate's development. This can be initiated by an email from the assessor, but this time looking only at areas where an improvement is expected, perhaps in response to a development objective set by the candidate's line manager as a result of a performance review.

The focus and frequency of monitoring would depend on a number of factors taking into account development plans, the introduction of new processes or equipment, dealing with infrequent events and any risk associated with poor performance. A plan could be devised showing target levels to be achieved by certain dates following the completion of any training and development courses. The email questions could be triggered to request evidence of the newly developed skills.

#### 5.7.1 Certification schemes

Many competence certification systems such as those accredited to the European Standard BS EN ISO/IEC 17024 (BSI 2003) will have an expiry date on the “certificate of competence”. In addition they require that those assessed as competent need to demonstrate that they maintain their competences and continuously carry out tasks to the required standard. ISO17024 clause 6.4 “Surveillance” requires a “pro-active surveillance process to monitor certificants’ compliance with the relevant provisions of the certification scheme” and that there is “impartial evaluation to confirm the continuous competence of the certified person”. Regular email questions can be sent requesting a current “Reflective review” with supporting evidence that demonstrates continuous competence.

The IRSE (2007) Licensing Scheme, as part of its compliance with ISO17024, requires that a Licence Holder consistently works to the standard defined in the licence. Evidence of this should be by verified entries in their logbook which is then reviewed on an annual basis. An email by the assessor could request a copy of

this review, and if there was insufficient evidence of continuous competence then corrective action can be taken.

### **5.7.2 Competence below the expected level**

The Office of Rail Regulator (ORR 2007) in their publication Railway Safety Publication No 1 "Developing and maintaining staff competence", discusses situations where competence may start to fall below what is expected. This may be due to the lack of opportunity to practice skills because of their low level of occurrence (infrequent event), but at the other extreme due to over familiarity, when people "reach a level of almost automatic performance" and "regress into bad habits and lapses". A program of email questions with a number of case studies would assist in dealing with the lack of practice of those skills that are rarely used, whilst a program which focuses email questions on those areas where lapses are most likely to occur should pick up the possible onset of bad habits before they take hold.

## **5.8 Quantifying levels of competence**

The process described is to confirm and maintain competence and knowledge at a specific level, but it can also be used to motivate the candidate's career development. For competence based qualifications such as NVQs (QCA 2007) the candidate is either "competent" or "not yet competent". However there may be different levels of competence within an occupational area and a measure of competence could be incorporated within the program. A rating between 1 to 5 such as proposed by the IET in their "Competence Framework – Assessing Competence" (IET 2007) could be used. Since each of the performance requirements may also have a different weight in relation to its importance to the job role, the program could compute a score based on the weighting factor and a judgment of the level by the assessor. Indeed the candidate's job role may not require the same level throughout the related occupational standard, for example, they may need to be at level 4 for some performance requirements but at level 2 for others. The evidence supplied by the candidate would be judged against the target levels for their job.

## **5.9 Enhancements**

The process could be enhanced with the use of a central server, to which the candidate and assessor have access, enabling the candidate to view their progress on line. In addition, auto reminders could be used in order to reduce the build up of any backlog if replies were not received by the due dates.

It may also be possible to set up simple rules within the email programs such that when the candidate uses selected words or phrases in their emails as part of their normal work, then a copy of the email with attachments is automatically sent to the assessor or routed directly to the candidate's electronic portfolio.

## **6. Conclusions**

With competence gaining pervasive prominence in preference to mere focus on knowledge, the adoption, deployment and continual enhancement of competency frameworks founded on systemic principles and a systematic approach provide an advanced basis for management of this strategic capability. We have illustrated a candidate architecture for an advanced and systemic competence assessment and management framework which can fulfil the requirements and meet the challenges of this complex domain whilst illustrating the current practice.

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