

# **GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor**

First Edition, Version 2

English Version

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**Global Forum**  
On Maintenance & Asset Management

## About this Document

The ISO standard 'ISO 55000 Asset Management' was published in January 2014.

This new standard provides a fresh focus upon the purpose and application of asset management within organisations. The significant interest in the standard shown by asset owners, regulators and certification bodies reflects a universal business desire to improve the value returned to organisations, through the effective management of physical assets.

To realise that benefit, organizations require knowledgeable people capable of applying an asset management certification process who, at the same time, can use that process to provide the value that business desires.

As a non-commercial, worldwide association of professional asset management bodies, the GFMAM has published a document that specifies the appropriate asset management knowledge for personnel who apply an audit or assessment process against the requirements of 'ISO 55000 Asset Management'.

The aim of that specification the 'GFMAM ISO55001 Auditor Assessor Specification' is to help asset owners identify people who are able to provide that value to businesses.

Certification bodies likewise will benefit from the use of the Specification to select people with the GFMAM recognised asset management knowledge, providing surety that the added value that organisations seek can be realised.

The Auditor Assessor Specification is provided free by the GFMAM.

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## The Global Forum on Maintenance and Asset Management

The Global Forum on Maintenance and Asset Management (GFMAM) has been established with the aim of sharing collaboratively advancements, knowledge and standards in maintenance and asset management.

The members of GFMAM (at the time of issue of this document) are:

- Asset Management Council (AMCouncil), Australia;
- Associação Brasileira de Manutenção e Gestão de Ativos (ABRAMAN), Brazil;
- European Federation of National Maintenance Societies (EFNMS), Europe;
- French Institut of Asset Management and Infrastructures (IFRAMI), France;
- Gulf Society of Maintenance Professionals (GSMP), Arabian Gulf Region;
- Iberoamerican Federation on Maintenance (FIM), South America;
- Institute of Asset Management (IAM), UK
- Plant Engineering and Maintenance Association of Canada (PEMAC), Canada
- The Society for Maintenance and Reliability Professionals (SMRP), USA.
- The Southern African Asset Management Association (SAAMA), South Africa

The enduring objectives of the GFMAM are:

- 1) To bring together, promote and strengthen the maintenance and asset management community worldwide
- 2) To support the establishment and development of associations or institutions whose aims are maintenance and asset management focused
- 3) To facilitate the exchange and alignment of maintenance and asset management knowledge and practices
- 4) To raise the credibility of member organizations by raising the profile of the Global Forum

This document describes the **GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor, First Edition, English Version** that supports the first and third of these enduring objectives.

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## 1 Background

There have been major global advances in Asset Management standards, models and principles over the last two decades. The Global Forum on Maintenance and Asset Management determined that there is benefit in aligning these various advances and collaborating to develop a collective view, in particular for organizations that operate asset management systems in many countries. In March 2014, the **GFMAM Asset Management Landscape, Second Edition, English Version**, was published<sup>1</sup>.

The International Standard Organization, ISO, published a suite of 3 standards on asset management in January 2014. The ISO 5500X Suite of Standards describes a management system for asset management. This is abbreviated to asset management system within the standard.

The three standards in the ISO 55000X suite are:

- ISO 55000 - Overview, principles and terminology;
- ISO 55001 - Asset management — Management systems — Requirements; and
- ISO 55002 - Management systems — Guidelines for the Application of 55001.

After consultation with stakeholders<sup>2</sup>, it was clear that members and stakeholders of the GFMAM member organisations sought assistance in achieving results from the 5500x standards. In particular, organisations require competent and capable people, who may be employed as staff or brought in from external organisations to assess against, or comply with ISO 55001.

This document sets out the *minimum* knowledge and comprehension specification for personnel to audit or assess to ISO 55001.

Each GFMAM member incorporates this Specification as part of their asset management framework.

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<sup>1</sup> ISBN 978-0-9871799-2-0, [www.gfmam.org](http://www.gfmam.org)

<sup>2</sup> Stakeholder Feedback Report on assessing and auditing to ISO55001, The Asset Journal, Issue 2 Volume 7, 2013

## 2 Purpose

These competency requirements have been created to form the basis to assure the competence of people who audit or assess organisations to ISO55001. These competency requirements conform to at least, the requirements and recommendations in ISO17021- 5 and ISO 19011:2011.

Purposes include

1. To establish the minimum knowledge and comprehension of asset management to perform duties as an assessor for ISO 550001
2. To provide guidance for organisations providing training in preparing for ISO5001 adoption and evaluation.
3. To provide the basis for certification of ISO 55001 assessor/auditor personnel
4. To support the introduction of ISO5500x, and ensure that organisations derive benefit from the use of these standards.

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## 3 Asset Management Competency Context

### 3.1 Roles and Responsibilities

An auditor/assessor will undertake activities as a member of a team of auditors/assessors.

The role of an asset management system auditor/assessor is to:

- Provide strategic knowledge from multiple disciplines and organizations to interpret integrated and diverse processes and systems;
- Evaluate technical and non-technical aspects of organisations' asset management system; and
- Interrogate and interpret a wide range of documents, systems and personnel.

### 3.2 Competency requirements

A competent auditor/assessor will be able to demonstrate that they possess:

**General.** The minimum asset management knowledge and comprehension established by the Global Forum on Maintenance and Asset Management (see annex A).

This means that they can:

- Identify the symptoms and understand the benefits of integrated asset management processes and systems.
- Understand how organisational elements relate to the requirements of an asset management system;
- Demonstrate a comprehension of asset management as a set of integrated technical and financial risk based processes; and
- Communicate with managers and resources.

A competency statement generally takes a form like this: "Assessors should be able to (requirement statement)" In this document the verbs that fill these blanks are carefully chosen to represent the degree of applied skill required using Bloom's taxonomy as a reference, attached as Appendix I. To 'know and comprehend', for example, represent the lower levels on Bloom's taxonomy whereas the ability to 'evaluate and synthesize' are at the highest. Effective assessment methods should be designed with this taxonomy in mind.

**Asset Management System.** The asset management specific knowledge and skills required of an auditor/assessor for the requirements as defined within the 'ISO 55001 Requirements for an asset management system' standard, including the components of an asset management system, and a holistic comprehension of elements of policy, objectives, plans, processes, resources and related artefacts that comprise the asset management system;

This means that they have sufficient knowledge and experience of the asset management domain to:

- Provide knowledge from multiple disciplines and organizations to interpret integrated and diverse processes and systems;
- Evaluate technical and non-technical aspects of organisations' asset management system; and
- Interrogate and interpret a wide range of documents, systems and personnel.

It is assumed that:

1. A demonstrated knowledge and comprehension of asset management processes and systems does not imply proficiency in execution;
2. No individual has a detailed knowledge and comprehension of all processes and systems of asset management (given broad coverage, life cycle opportunity and interdisciplinary nature);
3. There are some processes and systems in asset management that serve as an exemplar for other processes and systems (e.g. project management and shutdown management have similar characteristics); and
4. There are some processes and systems specifically mentioned as part of ISO55001 – e.g. Asset Management Policy, Asset Management Strategy, Strategic Planning, Asset Management Plan, Asset Data and Knowledge, Asset Management Leadership, Organisational Structure & Culture, Competence & Behaviour, Management Review, Audit & Assurance, Stakeholder Relations.

### 3.3 Background Prerequisites

Qualifications with in-depth knowledge across the disciplines of asset management plus general business experience of at least 5 years, will apply.

### 3.4 Competencies

The competencies that meet the above requirements include:

#### *General*

- Demonstrate a comprehension of asset management as a set of integrated technical and financial risk based processes.

Refer to Section 4 for details.

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## 4 GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor

Landscape Second Edition Subjects	In ISO	Competence Requirements from GFMAM Specification <i>Knowledge and comprehension of</i>
<b>Asset Management Policy</b>	☑	<ul style="list-style-type: none"> <li>• Typical contents of an Asset Management Policy</li> <li>• Appropriate levels of authorisation and control for an Asset management Policy</li> <li>• Consistency of asset management policy with the organizational strategic plans and other policies of the organization</li> <li>• Requirements for communication of the asset management policy with stakeholders</li> <li>• The role of the asset management policy in the achievement of the organisational requirements for asset management, including the asset management system.</li> <li>• Relevant legal, social, environmental and economic factors and trends.</li> </ul>
<b>Asset Management Strategy &amp; Objectives</b>	☑	<ul style="list-style-type: none"> <li>• Typical contents of a Strategic Asset Management Plan</li> <li>• Use of processes to determine the scope of, and requirements for, the asset management system</li> <li>• The relationship between asset management objectives asset management policy, organizational policy and other policies of the organisation.</li> <li>• How the delivery of asset management outputs links the asset management objectives and the processes, plans, organizational structure and support resources required of the asset management system.</li> <li>• The role of processes that integrate the asset management system with other relevant organisational functions</li> <li>• Determining requirements and constraints for asset management objectives..</li> </ul>
<b>Demand Analysis</b>		

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<b>Strategic Planning</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• The strategic planning process</li> <li>• The strategic planning cycle</li> <li>• The application of stakeholder requirements to the strategic planning process</li> <li>• The application of constraints to the strategic planning process</li> <li>• The development and evaluation of scenarios in the development of future plans</li> <li>• The application of decision making process and criteria in strategic planning</li> <li>• How strategic planning outcomes impact on the Strategic Asset management Plan.</li> <li>• The use of processes for the planning, the design, implementation, operation, support and improvement of the asset management system.</li> <li>• The processes used for the preparation of relevant financial projections.</li> </ul>
<b>Asset Management Planning</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Typical contents of an Asset Management Plan, within the context of a documented Strategic Asset Management Plan and Asset Management Policy.</li> <li>• The use of risk based methodologies applied by organizations in the development of asset management plans.</li> <li>• The use of approved criteria for asset management decision making within the application of a risk based methodology.</li> <li>• The consideration and use of, external and internal issues relevant to the organisation's purpose that affects its ability to achieve the intended outcomes.</li> <li>• The consideration and use of, stakeholder's requirements and expectations with respect to asset management.</li> <li>• Preparation of relevant financial projections.</li> </ul>
<b>Capital Investment Decision-Making</b>		<ul style="list-style-type: none"> <li>• The process for planning capital expenditure including the development of financial justifications</li> <li>• The processes of how costs, risks and benefits of investment options are analysed</li> <li>• How different capital investments are compared and prioritised.</li> <li>• Identification of interventions for assets approaching end of economic life.</li> </ul>

<b>Operations &amp; Maintenance Decision-Making</b>	<ul style="list-style-type: none"> <li>• The processes used to seek and gain approval for Operations and Maintenance plans in terms of             <ul style="list-style-type: none"> <li>○ Required supporting Operations and maintenance Budgets; and</li> <li>○ Resultant risk profiles; and</li> <li>○ Asset performance requirements to be achieved by those plans.</li> </ul> </li> <li>• The processes for identifying and managing human factors issues in maintenance and operations decision making.</li> <li>• Identification and definition of maintenance activities to assure delivery of the asset management objectives.</li> <li>• Packaging of all maintenance activities to produce efficient and effective maintenance plans.</li> <li>• Development of operations plans.</li> <li>• How maintenance decisions achieve organisationally required return on investment guidelines</li> </ul>
<b>Lifecycle Value Realisation</b>	
<b>Resourcing Strategy</b>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• How resource requirements are identified, secured and managed to assure delivery of the required the asset management plan and AM objectives</li> <li>• Outsourcing plans</li> <li>• The processes used to seek and gain approval for changes to Resource plans that result in changes to:             <ul style="list-style-type: none"> <li>○ Operations and maintenance Budgets</li> <li>○ Resultant risk profiles</li> <li>○ Asset performance</li> </ul> </li> </ul>
<b>Shutdowns &amp; Outage Strategy</b>	
<b>Technical Standards &amp; Legislation</b>	
<b>Asset Creation &amp; Acquisition</b>	<ul style="list-style-type: none"> <li>• The processes used for asset capability acquisition including development and approval of client requirements; functional performance specifications, acquisition, installation, commissioning and handover.</li> </ul>
<b>Systems Engineering</b>	<ul style="list-style-type: none"> <li>• The processes used to identify the technical and financial processes relevant to the business/project in terms of:             <ul style="list-style-type: none"> <li>○ Agreement processes;</li> <li>○ Project enabling process</li> <li>○ Technical management process, and</li> <li>○ Technical processes</li> </ul> </li> </ul>

<b>Configuration Management</b>	<ul style="list-style-type: none"> <li>• The processes used for the effective management of asset related data (Functional, Physical and Derived) including: <ul style="list-style-type: none"> <li>○ Configuration management and control;</li> <li>○ Configuration Identification;</li> <li>○ Configuration Control;</li> <li>○ Configuration Status Accounting; and</li> <li>○ Configuration verification and auditing.</li> </ul> </li> </ul>
<b>Maintenance Delivery</b>	<ul style="list-style-type: none"> <li>• The processes used for the integration of Operations and Maintenance activities, including work and resource planning</li> <li>• The processes used for the communication of : <ul style="list-style-type: none"> <li>○ Proposed Changes to existing Operations and Maintenance plans; and</li> <li>○ Approved changes to Operations and Maintenance plans</li> </ul> </li> <li>• The processes used to seek and gain approval for changes to Operations and Maintenance plans that result in changes to: <ul style="list-style-type: none"> <li>○ Operations and maintenance Budgets</li> <li>○ Resultant risk profiles</li> <li>○ Asset performance</li> </ul> </li> </ul>
<b>Reliability Engineering</b>	
<b>Asset Operations</b>	
<b>Resource Management</b>	
<b>Shutdown &amp; Outage Management</b>	
<b>Fault &amp; Incident Response</b>	<ul style="list-style-type: none"> <li>• The processes of planning for and dealing with emergencies and incidents and resulting disruptions to normal operations in terms of an appropriate balance between: <ul style="list-style-type: none"> <li>○ The expected costs/budget;</li> <li>○ The expected resultant risks; and</li> <li>○ The expected resultant asset performance.</li> </ul> </li> </ul>
<b>Asset Decommissioning and Disposal</b>	

<b>Asset Information Strategy</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• The process for determining the asset information requirements necessary to support decision-making and operational activities</li> <li>• How asset information systems are specified.</li> <li>• How record-keeping and other documentation requirements are specified.</li> <li>• The processes for identifying and responding to human factor issues relating to asset management information and knowledge.</li> </ul>
<b>Asset Information Standards</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Specifying asset information requirements to assure the attribute requirements of asset data are collected and recorded in a consistent way.</li> <li>• Specifying how and when information is to be collected, analysed and evaluated.</li> <li>• Specifying data quality requirements</li> <li>• Defining requirements for alignment of financial and non-financial terminology</li> </ul>
<b>Asset Information Systems</b>		<ul style="list-style-type: none"> <li>• The processes used to determine the requirements for asset management information systems</li> </ul>
<b>Data &amp; Information Management</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Data management processes to assure asset management information systems provide data in accordance with the asset information requirements and standards</li> <li>• Data governance processes to determine the appropriate data assurance activities are undertaken to determine the data accuracy and quality.</li> <li>• Processes to assure consistency and traceability between financial and technical data and other relevant non-financial data.</li> </ul>
<b>Procurement &amp; Supply Chain Management</b>		
<b>Asset Management Leadership</b>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Determining the visible commitment of management to the leadership required for Asset Management and the Asset Management System</li> <li>• Determining the communications strategy for Asset Management and the Asset Management System.</li> <li>• The processes used to determine the leadership selection, training and assessment, based on the values, shared beliefs and behaviour role models.</li> </ul>

<b>Organisational Structure</b>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• Defining the positions within the organisation that have the right level of authority and decision rights for Asset Management and the Asset Management system.</li> <li>• The process used to identify which positions within the organisational structure are the most appropriate to give the right level of authority and decision rights needed for the implementation and ongoing support for Asset Management and the Asset Management System</li> </ul>
<b>Organisational Culture</b>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• How to determine the sustainability of the approach of leadership and organisational structure to embed Asset Management into the organisation</li> <li>• The processes used to determine the reward and penalty (consequences) system applicable to enhance/reinforce the desirable behaviour and also avoid/prevent undesirable one.</li> <li>• The processes used to determine the values, shared beliefs and behaviour role models for the organisation and how they are communicated for the applicable stakeholders.</li> <li>• The processes used to determine symbols (written and unwritten ones) that reinforce and are in accordance with values, shared beliefs, behaviours and consequence systems.</li> </ul>
<b>Competence Management</b>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The processes used to:             <ul style="list-style-type: none"> <li>○ Identify needed competencies to support (decision making) within the asset management system</li> <li>○ Develop and implement individual training plans to close any identified competency gap</li> <li>○ Authorise people within the AMS to make decisions, as part of either a specific project or a program of work</li> <li>○ Identify and manage a technical and/or financial regulatory system.</li> </ul> </li> </ul>
<b>Risk Assessment and Management</b>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The processes used for:             <ul style="list-style-type: none"> <li>○ Identifying and assessing risks, associated with the use of assets.</li> <li>○ Selecting mitigation tasks for the management of the risks including relevant legal, regulatory, ethical and social requirements.</li> </ul> </li> <li>• The processes used to identify, analyse and mitigate the cumulative risks associated with the use of assets.</li> </ul>
<b>Contingency Planning &amp; Resilience Analysis</b>	
<b>Sustainable Development</b>	

<p><b>Management of Change</b></p>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>• The process that support change management associated with management activities, from the effect of:             <ul style="list-style-type: none"> <li>○ Organisation change;</li> <li>○ Asset Management System process change;</li> <li>○ Changes in relevant Laws, regulatory requirements etc;</li> <li>○ Changes to the organisation's approved Decision Making Criteria</li> <li>○ Changes to the organisation's Risk Management Framework.</li> </ul> </li> </ul>
<p><b>Assets Performance &amp; Health Monitoring</b></p>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>• The processes used to:             <ul style="list-style-type: none"> <li>○ Monitor and review asset performance, against the approved functional performance specification requirements</li> <li>○ Monitor and review asset failure mode data against the baseline analysis</li> <li>○ Monitor and review asset condition monitoring data against the baseline analysis</li> <li>○ Monitor and review asset maintenance and operating costs data against the baseline analysis</li> <li>○ Monitor and review asset risk data against the baseline analysis</li> </ul> </li> </ul>
<p><b>Asset Management System Monitoring</b></p>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>• The processes used to:             <ul style="list-style-type: none"> <li>○ Monitor the AMS performance, against the approved functional performance specification requirements</li> <li>○ Monitor AMS failure data against the baseline analysis</li> <li>○ Monitor AMS maintenance and operating costs data against the baseline analysis</li> </ul> </li> </ul>
<p><b>Management Review, Audit &amp; Assurance</b></p>	<p><input checked="" type="checkbox"/></p> <p>The processes used to:</p> <ul style="list-style-type: none"> <li>• Measure, analyse and evaluate the AMS</li> <li>• Measure, analyse and evaluate the performance of assets</li> <li>• Develop and conduct internal audits of the AMS</li> <li>• Develop and conduct management reviews of the AMS</li> <li>• Identify and review asset failure, together with development of corrective actions</li> <li>• Conduct the continual improvement of:             <ul style="list-style-type: none"> <li>○ The Asset Management System; and</li> <li>○ The assets of the organisation.</li> </ul> </li> </ul>
<p><b>Asset Costing &amp; Valuation</b></p>	

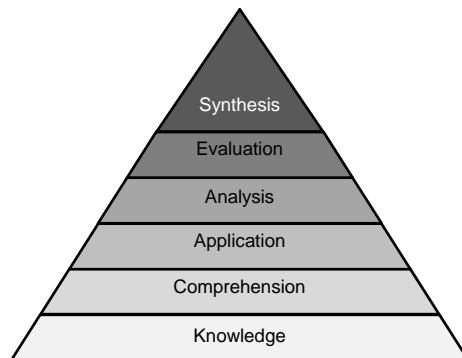
<p><b>Stakeholder Engagement</b></p>	<p>☑</p>	<p>The processes used to:</p> <ul style="list-style-type: none"> <li>• Identify the stakeholders relevant to the asset management system;</li> <li>• Develop and approve the requirements and expectations of those stakeholders</li> <li>• Identify and approve the criteria for asset management decision making;</li> <li>• Identify and approve the stakeholder requirements for recording financial and non-financial information for reporting both internally and externally.</li> </ul>
<p><b>Asset Management System</b></p>	<p>☑</p>	<ul style="list-style-type: none"> <li>• The scope and content of, the asset management system;</li> <li>• The requirements of an asset management system defined by ISO 55001;</li> <li>• The processes used to verify that the requirements of an asset management system are met; and</li> <li>• The ability to conceptualise and discuss alternative strategic approaches and define the risks and benefits of each, using the collective considerations from asset management discipline professionals.</li> </ul>

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## 5 Appendix I: Bloom's Taxonomy of Learning

- A1 Bloom's Taxonomy (in full: *Bloom's Taxonomy of Learning Domains*, or *Bloom's Taxonomy of Educational Objectives*) was first published in 1956 under the leadership of Dr Benjamin Bloom, an American academic and educational expert. 'Bloom's Taxonomy' was originally created with the aim of developing a system of categories of learning behaviour. The intention was to assist in the design and assessment of educational learning. However, Bloom's Taxonomy is now used by corporate trainers and HR professionals, coaches and teachers: the Taxonomy is relevant to all types of learning.
- A2 At the outset, Bloom believed that education should focus on 'mastery' of subjects and the promotion of higher forms of thinking, rather than a utilitarian approach to simply transferring facts. Bloom demonstrated that most teaching tended to be focused on fact-transfer and information recall – the lowest level of training – rather than truly meaningful personal development.
- A3 The Taxonomy – the set of classification principles – has been represented thus:



- A4 The Taxonomy is structured into three domains ('categories'): Cognitive, Affective and Psychomotor. Relating this to the above diagram, these domains can be represented thus:

		Domains		
		Cognitive	Affective	Psychomotor
Increasing degree of difficulty of categories ⇕		Synthesize (create/build)		
		Evaluate (assess, judge in relational terms)	Internalize value system (adopt behaviour)	Naturalization (automate, become expert)
		Analyse (structure/elements)	Organise personal value system	Articulation (combine, integrate related skills)
		Apply (use)	Value (understand and act)	Develop Precision
		Understand	Respond (react)	Manipulation (follow instructions)
		Recall data	Receive (awareness)	Imitation (copy)
	Knowledge	Attitude	Skills	

- A5 In each of the three domains Bloom's Taxonomy is based on the premise that the categories are ordered in degree of difficulty. An important premise of Bloom's Taxonomy is that each category (or 'level') must be mastered before progressing to the next. As such the categories within each domain are levels of learning development, and these levels increase in difficulty.

- A6 This matrix structure enables a checklist or template to be constructed for the design of learning programmes, training courses, qualifications and examinations. It can be argued that effective learning – especially in organisations, where training is to be converted into quantifiable results – should cover all the levels of each of the domains with regard to the situation and the learner.

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