INTERNATIONAL STANDARD

ISO/IEC 19796-1

First edition
2005-11-01

Information technology — Learning, education and training — Quality management, assurance and metrics —

Part 1: General approach

Technologies de l'information — Apprentissage, éducation et formation — Management, assurance et métrologie de la qualité —

Partie 1: Approche générale

Reference number
ISO/IEC 19796-1:2005(E)

© ISO/IEC 2005

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

Contents

Page

Foreword iv

Introduction v

1 Scope 1

2 Terms and definitions 1

3 Process model 5
3.1 Descriptive model 6
3.2 Reference Framework for Quality Descriptions (RFDQ): process model 7
3.2.1 Process model description 8

4 Conformance 15

Annex A (informative) **Explanation for the use of the model** 16

Annex B (informative) **DIN process model (DIN PAS 1032-1)** 19

Annex C (informative) **French code of practice in E-Learning (AFNOR Z76-001)** 64

Annex D (informative) **Reference Quality Criteria (RQC) DIN PAS 1032-1** 87

Annex E (informative) **Harmonized model for quality management for learning, education, and training: mapping CELTSC and RFDQ** 111

Annex F (informative) **Specific quality objectives** 116

Annex G (informative) **References** 121

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 19796-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training.*

ISO/IEC 19796 consists of the following parts, under the general title *Information technology — Learning, education and training — Quality management, assurance and metrics*:

— *Part 1: General approach*

Three further parts will be developed:

— *Part 2: Harmonized quality model*

— *Part 3: Reference methods and metrics (RMM)*

— *Part 4: Best practice and implementation guide*

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Introduction

The Reference Framework for the Description of Quality Approaches (RFDQ) is a framework to describe, compare, and analyze quality management and quality assurance approaches. These approaches can be mapped to RFDQ. Therefore, the framework is not a quality management or quality assurance model – it is a framework for the description of quality approaches. It will serve to compare different existing standards and to harmonize these towards a common quality model. For a better understanding of the standard, several annexes show samples of the usage of the standard – the annexes are based on the French “Code of Practice" and German DIN PAS 1032-1. Additionally, an annex on Reference Quality Criteria (RQC) is included. These criteria shall serve as reference criteria for the analysis and evaluation of learning resources and scenarios. These criteria are also not a quality assessment approach itself, but a framework to compare different quality assurance and quality assessment approaches.

The following figure shows the levels of quality approaches and the relation of the RFDQ and RQC to existing approaches.

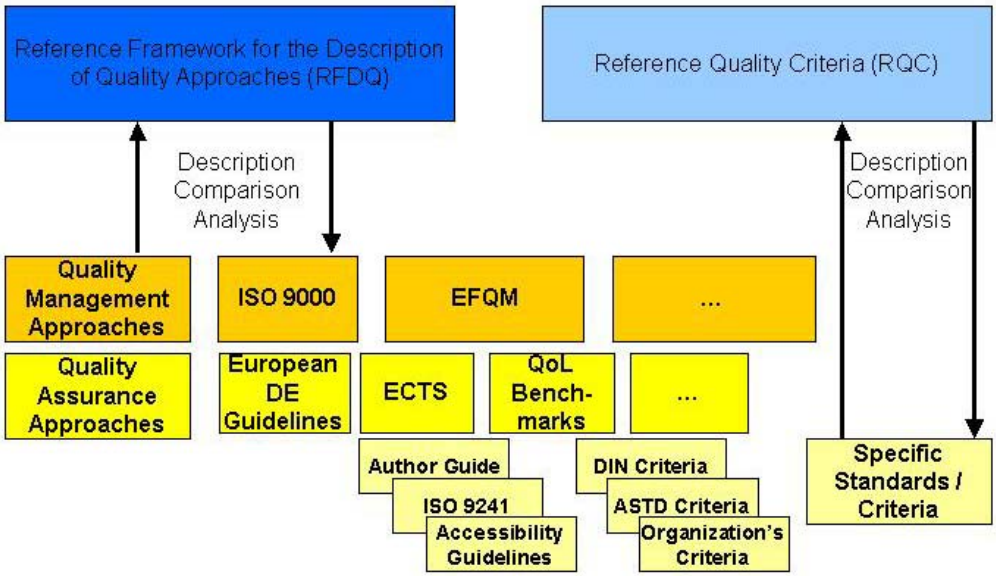

Figure 1: Levels of Quality Approaches

The following figure shows the role of the models within the standardization process.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

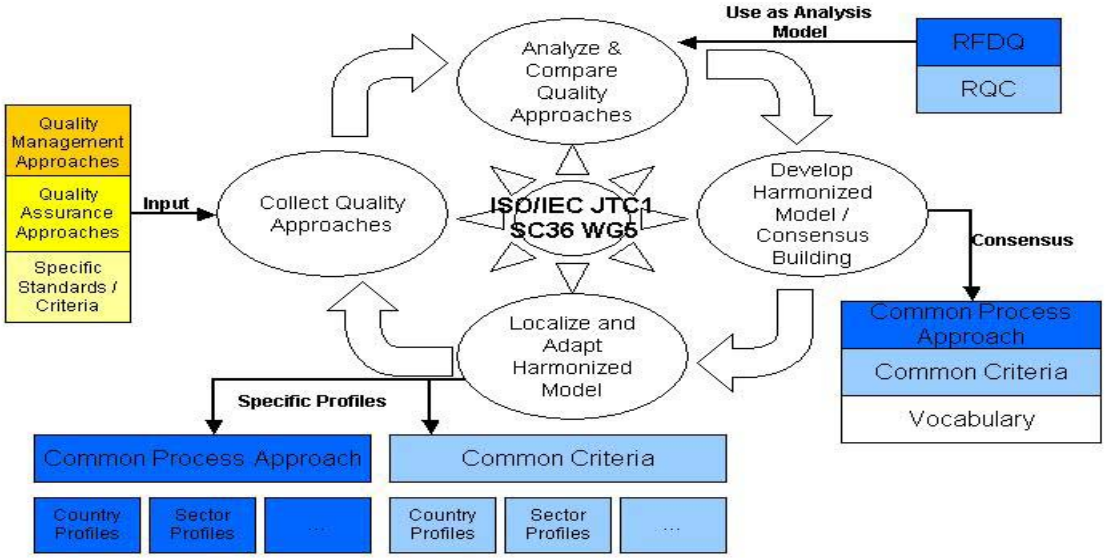

Figure 2: Standardization Process

Chapter 3 describes the process-oriented framework for the description of quality approaches (RFDQ).

Annex A (informative) describes the use of RFDQ and the use of classifications to extend the process model introducing sub-processes.

Annex B (informative) shows the full German process model (DIN PAS 1032-1) as an example how the basic model can be extended.

Annex C (informative) describes the use of the model describing the “French Code of Practice in e-Learning” (AFNOR Z 76-001) as a second sample of the use of the standard.

Annex D (informative) provides a reference list of quality criteria which can be included in RFDQ for assessment and evaluation.

Annex E (informative) describes how other quality approaches can be mapped to RFDQ. Specifically, the Chinese Model CELTSC is used as an example of the mapping procedure.

Annex F (informative) describes the use of the model for specific quality objectives such as metadata quality.

Annex G (informative) lists references to papers used for explanatory purposes.

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Information technology — Learning, education and training — Quality management, assurance and metrics —

Part 1: General approach

1 Scope

This part of ISO/IEC 19796 provides a common framework to describe, specify, and understand critical properties, characteristics, and metrics of quality. The Reference Framework for the Description of Quality Approaches (RFDQ) is an elaborated and extensive process model. This standardization work harmonizes existing concepts, specifications, terms, and definitions for learning, education, and training.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
ASTD
American Society for Training and Development

2.2
CELTSC
Chinese E-Learning Technology Standardization Committee

2.3
CWA
CEN Workshop Agreement

2.4
customer
individual or organization, such as learner, learner's parents, education institutions and potential employer, who consumes the product (studying and training) directly or indirectly

2.5
data quality
set of features such as relevance, accuracy, timeliness, punctuality, accessibility, clarity, comparability, coherence, that concern the collection, analysis, persistence, dissemination, and usage of data

2.6
DIN e.V.
Deutsches Institut für Normung e.V.

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.7
ECTS
European Credit Transfer System

2.8
EFQM
European Foundation for Quality Management

2.9
interested party
person or group (such as employee, provider, partner, investor, owner, society) whose interest is affected by performance or achievements of e-learning

2.10
process
set of interrelated or interacting activities which transforms inputs into outputs

NOTE 1 Inputs to a process are generally outputs of other processes.

NOTE 2 Processes in an organization are generally planned and carried out under controlled conditions to add value.

NOTE 3 A process where the conformity of the resulting product cannot be readily or economically verified is frequently referred to as "special process". (ISO 9000:2000)

2.11
product
result of a process

NOTE 1 There are four generic product categories, as follows:

- services (e. g. transport);
- software (e. g. computer program, dictionary);
- hardware (e. g. engine mechanical part);
- processed materials (e. g. lubricant).

Many products comprise elements belonging to different generic product categories. When the product is then called service, software, hardware or processed material depends on the dominant element. […]

NOTE 2 Service is the result of at least one activity necessarily performed at the interface between the supplier and customer and is generally intangible. Provision of a service can involve, for example, the following:

- an activity performed on a customer-supplied tangible product (e. g. automobile to be repaired);
- an activity performed on a customer-supplied intangible product (e. g. the income statement needed to prepare a tax return);
- the delivery of an intangible product (e. g. the delivery of information in the context of knowledge transmission);
- the creation of ambience for the customer (e. g. in hotels and restaurants).

Software consists of information and is generally intangible and can be in the form of approaches, transactions or procedures.

Hardware is generally tangible and its amount is a countable characteristic. Processed materials are generally tangible and their amount is a continuous characteristic. Hardware and processed materials often are referred to as goods.

NOTE 3 Quality assurance is mainly focused on intended products.

(ISO 9000:2000)

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.12
quality
ability of a set of inherent characteristics of a product, system or process to fulfil requirements of customers and other interested parties. (ISO 9000:2000)

2.13
quality assessment
totality of measures carried out consistently and systematically in order to insure that a product conforms with the requirements of a stated specification (EN 180000:1995)

2.14
quality assurance (QA)
part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000:2000)

2.15
quality control
part of quality management focused on fulfilling quality requirements (ISO 9000:2000)

2.16
quality improvement
part of quality management focused on increasing effectiveness and efficiency (ISO 9000:2000)

2.17
quality management (QM)
coordinated activities to direct and control an organization with regard to quality (ISO 9000:2000)

NOTE Direction and control with regard to quality generally includes establishment of the quality policy and quality objectives, quality planning, quality control, quality assurance and quality improvement.

(ISO 9000:2000)

2.18
quality objective
something sought, or aimed for, related to quality

NOTE Quality objectives should be based on the organization's quality policy. Quality objectives are specified at different levels in the organization.

(ISO 9000:2000)

2.19
QoL
Quality on the line

2.20
quality planning
part of quality management, focused on setting quality objectives and specifying necessary operational process and related resources to fulfil the quality objectives

NOTE Establishing quality plans may be part of quality planning.

(ISO 9000:2000)

2.21
quality policy
overall intentions and direction of an organization related to quality as formally expressed by top management

NOTE The quality policy should be consistent with the overall policy of the organization and should provide a framework for the setting of quality objectives.

(ISO 9000:2000)

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.22
RFDQ
Reference Framework for the Description of Quality Approaches

2.23
RQC
Reference Quality Criteria

2.24
SCORM
Sharable Content Object Reference Model

2.25
service
intangible product that is the result of at least one activity performed at the interface between the supplier and customer

EXAMPLE Knowledge is an intangible product to be delivered.

(ISO 9000:2000)

2.26
service quality (SQ)
overall collection of implicit and explicit characteristics that the service can satisfy the customer

2.27
Total Quality Management (TQM)
management approach of an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society

2.28
W3C
World Wide Web Consortium

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3 Process model

In this section, the reference framework is described and elaborated by referring to its process model.

The process model is a framework for the description, comparison, and analysis of process-oriented quality approaches. The framework can be used as a meta-model for quality management and quality assurance approaches. This means that no assumptions and prescriptive requirements of the quality approaches are made.

The use of the framework can be described as followed:

Scenario 1: Description of a quality approach

Select a quality management or quality assurance approach Q1.

Identify the processes which are covered within Q1.

Describe Q1 according to the framework using the description categories.

Scenario 2: Comparison of quality approaches

Select quality management or quality assurance approaches [Q1..Qn].

Identify the processes which are covered within [Q1..Qn].

Describe [Q1..Qn] according to the framework using the description categories.

Define a metric to compare [Q1..Qn].

Perform analysis and comparison.

Scenario 3: Harmonization of quality approaches

Use Scenario 2.

Combine [Q1..Qn] towards a consensus model.

It is important to mention that the process scheme described in this working paper shall be used as a general, descriptive framework. In a second step, good practice approaches and profiles can be generated – these profiles could contain specific recommendations, guidelines, procedures, or criteria. Secondly, the process scheme can be extended and modified.

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.1 Descriptive model

The descriptive model shows the classification and documentation scheme for quality processes. It bases on the CEN/ISSS CWA 14644[1]. Each process will be described by this scheme:

Attribute	Description	Example
ID	Unique Identifier	ID1234
Category	Main Process	Course Development
Process Name	Process name	Method selection
Description	Description of the process	Within this process the didactic concept and methods are evaluated and selected
Relations	Relation to other processes	Before the method selection a target group analysis must be performed; FA.6
Sub-processes / sub-aspects	Sub-processes / sub-aspects / tasks	Method identification, method alternatives, method priorization
Objective	Objective of a Process	Adequate selection of one or more didactic concepts
Method	Methodology for this process Reference to guideline / documents	Method selection shall be based on the target group. Methods are selected based on the teachers' experience. See Method Guidelines Handbook
Result	Expected result of a process	Method specification Documents
Actors	Responsible / participating actors	Team Didactical Design
Metrics / Criteria	Evaluation and Metrics for this process	Criteria catalogue 3.2.2-3.2.6
Standards	Standards used	DIN EN ISO 9241, IEEE 1484.12.1:2003 Learning Object Metadata
Annotation / Example	Further Information, Examples of usage	

Table 1: Descriptive model for quality approaches

[1] CEN/ISSS CWA 14644 Quality Assurance and Guidelines. Brussels, 2003.

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.2 Reference Framework for Quality Descriptions (RFDQ): process model

In this section the process framework is described in the format explained in 3.1. The process model includes the relevant processes within the life-cycle of information and communication systems for learning, education, and training. The process model is divided in seven parts. Sub-processes are included referencing to a classification of processes – examples of the use of classifications are shown in Annexes B and C.

ID	Category	Sub-Processes
NA	Needs Analysis	Classification
FA	Framework Analysis	Classification
CD	Conception / Design	Classification
DP	Development / Production	Classification
IM	Implementation	Classification
LP	Learning Process	Classification
EO	Evaluation / Optimization	Classification

Table 2: RFDQ process model

In each part, the essential processes are described. For selected processes, examples how the reference model can be used are included; these examples are written in *italics*.

The use of the process model is shown using the classification of processes from DIN PAS 1032-1, listed fully in Annex B.

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

3.2.1 Process model description

In this section, the process model is described including examples for the use of each category of the description scheme.

3.2.1.1 Needs analysis

ID	Category	Process	Description	Relation
NA		Needs Analysis	Identification and description of requirements, demands, and constraints of an educational project	

Sub-processes / Sub-aspects	NA.1 Initiation NA.2 Stakeholder identification NA.3 Definition of objectives NA.4 Demand analysis
Objective	To describe the needs and demands leading to an educational project
Method	*Quality Function Deployment*
Result	Documentation of goals, objectives, needs, and requirements of an educational project
Actors	*Project manager; specialists, learners, sponsors*
Metrics / Criteria	*Indicators*
Standards	*ISO 9000:2000*
Annotation / Example	

Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2005 – All rights reserved

Not for Resale

3.2.1.2 Framework analysis

ID	Category	Process	Description	Relation
FA		Framework Analysis	Identification of the framework and the context of an educational process	*NA, CD*
Sub-processes / Sub-aspects		FA.1 Analysis of the external context FA.2 Analysis of staff resources FA.3 Analysis of target groups FA.4 Analysis of the institutional and organizational context FA.5 Time and budget planning FA.6 Environment analysis		
Objective		To describe relevant factors for an educational project		
Method		*Methods of empirical social research; methods in legal and economic research and analysis*		
Result		Documentation and validation of relevant parameters		
Actors		*Project manager; specialists*		
Metrics / Criteria		*Check for plausibility; consultation of additional experts*		
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

3.2.1.3 Conception / Design

ID	Category	Process Name	Description	Relations
CD		Conception / Design	Conception and Design of an educational process	
Sub-processes / Sub-aspects		CD.1 Learning objectives CD.2 Concept for contents CD.3 Didactical concept / methods CD.4 Roles and activities CD.5 Organizational concept CD.6 Technical concept CD.7 Concept for media and interaction design CD.8 Media concept CD.9 Communication concept CD.10 Concept for tests and evaluation CD.11 Concept for maintenance		
Objective		To plan and design the concepts for an educational process		
Method		*Use of Design Guidelines*		
Result		To provide a conception and design for educational processes		
Actors		*Consultant, Media Designers*		
Metrics / Criteria				
Standards				
Annotation / Example				

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2005 – All rights reserved

Not for Resale

3.2.1.4 Development / Production

ID	Category	Process	Description	Relation
DP		Development / Production	Realization of concepts	*CD*
Sub-processes / Sub-aspects		DP.1 Content realization DP.2 Design realization DP.3 Media realization DP.4 Technical realization DP.5 Maintenance		
Objective		To realize the conceptions		
Method		*Implementation manual*		
Result		Educational products and services		
Actor		*IT-specialists, authors, developers*		
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

3.2.1.5 Implementation

ID	Category	Process	Description	Relation
IM		Implementation	Description of the implementation of technological components	
Sub-processes / Sub-aspects		IM.1 Testing of learning resources IM.2 Adaptation of learning resources IM.3 Activation of learning resources IM.4 Organization of use IM.5 Technical infrastructure		
Objective		To implement appropriate technological components being used in the educational process		
Method		*Change / configuration / content management*		
Result		Learning environment including all learning resources		
Actor		*Project manager, IT-manager*		
Metrics / Criteria		*Testing beta versions and system*		
Standards		*Software validation, e. g. following IEEE; ISO 9000:2000*		
Annotation / Example				

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2005 – All rights reserved

Not for Resale

3.2.1.6 Learning process

ID	Category	Process	Description	Relation
LP		Learning Process	Realization and use of the learning process	
Sub-processes / Sub-aspects		LP.1 Administration LP.2 Activities LP.3 Review of competency levels		
Objective		To perform the learning process		
Method		According to the chosen didactical concepts and methods		
Result		Completed process of learning, education and training.		
Actor		*Learners, trainers, tutors*		
Metrics / Criteria		*User performance, user satisfaction*		
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

3.2.1.7 Evaluation / Optimization

ID	Category	Process	Description	Relation
EO		Evaluation / Optimization	Description of the evaluation methods, principles, and procedures	
Sub-processes / Sub-aspects		EO.1 Planning EO.2 Realization EO.3 Analysis EO.4 Optimization / Improvement		
Objective		To describe the evaluation of the educational process		
Method		Evaluation methods *(Questionnaires, User tracking, user feedback report)*		
Result		To perform an evaluation of the educational process; to optimize and improve the educational process		
Actor		*Evaluators, learners, teachers*		
Metrics / Criteria				
Standards		*ISO 9000:2000*		
Annotation / Example				

Not for Resale

© ISO/IEC 2005 – All rights reserved

4 Conformance

A quality description conforms to this standard if each process included in a RFDQ instance corresponds to the appropriate specification in this standard and includes all sub-processes. A conforming description may contain descriptions of processes not included in this standard. The description may contain additional data elements.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Annex A
(informative)

Explanation for the use of the model

In this section, the use of the model is clarified. Several sample questions are answered in order to provide a clearer understanding of the concept and its use.

Is RFDQ customer oriented / does it take individualization into account?

In general, RFDQ is a framework to describe and compare quality approaches. Therefore, it does not take any position of how “good” quality is achieved. However, it is designed that guidelines, procedures, requirements are included and clearly specified.

Example of quality guidelines and methods for content selection / design:

ID	Category	Process Name	Description	Relations
CD.2	Conception / Design	Concept of the contents	Concept of learning and teaching contents	*NA.4 Demand analysis* *FA.2 Qualifications*
Sub-processes / Sub-aspects	Content selection Content Design			
Objective	1. Learner Demand: The goal is to provide content adapted to the needs and demand of the learner. 2. Adaptation: Each course shall provide different content presentation formats and entry points based on the user experience.			
Method	A prototype of the content shall be provided to a group of learners’ representatives. In a consensus process, the contents shall be prioritized and agreed on. For each course, classify groups of learners according to their learning type. Adapt presentation format and methods according to these learning types.			

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

---,,,,,,,,,,-,,,,,,,,,,

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

	experience lead to acquire knowledge and skills required by the qualification
Result	- Description of roles / functions of staff - Description of competencies / formal qualifications / qualifications through experimental learning - Description of availability of staff
Actors	Project manager; experts *(-> jury),* learners
Metrics / Criteria	
Standards	Project management and documentation guidelines; standards for social research; Law : "Loi sur la Validation des Acquis de l'Expérience"
Annotation / Example	

Note: In order to include the processes of negotiations and individualization, a separate process has been included in the model.

The model can be adapted (e.g., including a more detailed process model) using classifications of sub-processes. An example for the use of sub-processes is given in Annexes B and D.

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Annex B
(informative)

DIN process model (DIN PAS 1032-1)

In this section, we show a sample use of RFDQ. The German DIN process model (DIN PAS 1032-1) including sub-processes is described using RFDQ.

Needs Analysis (NA)

ID	Category	Process	Description	Relation
NA		Needs Analysis	Identification and description of requirements, demands, and constraints of an educational project	

Sub-processes / Sub-aspects	NA.1 Initiation NA.2 Stakeholder Identification NA.3 Definition of objectives NA.4 Demand Analysis
Objective	To describe the needs and demand leading to an educational project
Method	*Quality Function Deployment*
Result	Documentation of goals, objectives, needs, and requirements of an educational project
Actors	*Project manager; specialists, learners, sponsors*
Metrics / Criteria	*Indicators*
Standards	*ISO 9000:2000*
Annotation / Example	

ID	Category	Process	Description	Relation
NA.1	Needs Analysis	Initiation	Initiation of an educational project; description of necessity or demand for learning/education/training	*FA.4*
Sub-process(es) / Sub-aspects			• Identification of demands and requirements • Identification of necessities	
Objective			Description and indication of the processes goals and aims *Needs for teaching*	
Method			*Methods of marketing research and market analysis, trend analysis, need analysis, interviews, balanced scorecard, skill gap analysis; Assessments, work place analysis, Auditing*	
Result			Definition and documentation of the needs, necessities, and demands (for learning / education / training)	
Actors			*End user* *Education and training manager* *Experts in education and training*	
Metrics / Criteria			*Review of description validity*	
Standards			*ISO 900x:2000, ANSI/PMI 99-001-2000 5.1 Initiation*	
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
NA.2	Needs Analysis	Stakeholder Identification	Identification, description and evaluation of the stakeholders groups	
Sub-processes / Sub-aspects			• Identification of actors • Identification of interested parties • Identification of users	
Objective			Description of all potential stakeholders. Influence and cooperation within the education and training processes. Importance for and on the development, acceptance and market capabilities of the finished products	
Method			*Literature analysis, Staff sheets, Curricula, Workshops* *Examination regulations, business-plans* *Interviews, Guidelines*	
Result			Description of all interested parties, their focused objectives, documentation of objectives.	
Actors			*Managers* *Initiator*	
Metrics / Criteria			*Measurements of acceptance, contracts and applications*	
Standards			*ANSI 10.1 und 10.2*	
Annotation / Example			Who are the respective actors and interested parties? (students, teachers, Trainer, Tutors, managers, enterprises, organizations, examination boards, regulative bodies in education,. Universities, sponsors, cooperating institutions, clients, relevant social groups))..	

ID	Category	Process	Description	Relation
NA.3	Needs Analysis	Definition of Objectives	Description and evaluation of the objectives of relevant stakeholders	*CD. x, IM.5, IM.6., LP.1., LP.2., LP.3, LP.4.*
Sub-processes / Sub-aspects	• Strategic goals • Tactical goals • Operative goals			
Objective	Identification, description, and evaluation of goals of the stakeholders *Transition to a quality system in accordance with ISO 9000*.			
Method	*Questionnaire, Interview, Polls, Workshop*.			
Result	Documentation of goals and objectives *operational, consistent goal-systems for quality-measurements in accordance with DIN/ISO 9000*			
Actors	*project or consortia leadership, user, client*			
Metrics / Criteria	*Achievement of objectives*			
Standards	*ISO 9000:2000, ISO 14800*			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
NA.4	Needs Analysis	Demand Analysis	Specification, description, and evaluation of the demand for qualification	

Sub-processes / Sub-aspects	• Description of the qualification demand • Justification of demand • Kind of the qualification demand (formal, informal, prescriptive, taxonomy)
Objective	Specification, description and validation of demand and objectives in an educational project and their operational description
Method	*Document analysis, Interview, Workshop, systematic and methodical formulations*
Result	Requirement specification for project
Actors	*Project manager, user, supplier, sponsor*
Metrics / Criteria	*Evaluation by experts, Certification through DIN/ISO 9000*
Standards	*ISO 9000:2000, ANSI PMI 99-001-2000a*
Annotation / Example	

Framework analysis

ID	Category	Process	Description	Relation
FA		Framework Analysis	Identification of the framework and the context of an educational process	*NA, CD*
Sub-processes / Sub-aspects		FA.1 Analysis of the external context FA.2 Analysis of staff resources FA.3 Analysis of target groups FA.4 Analysis of the institutional and organizational context FA.5 Time and budget planning FA.6 Environment analysis		
Objective		To describe relevant factors for an educational project		
Method		*Methods of empirical social research; methods in legal and economic research and analysis*		
Result		Documentation and validation of relevant parameters		
Actors		*Project manager; specialists*		
Metrics / Criteria		*Check for plausibility; consultation of additional experts*;		
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
FA.1	Framework Analysis	Analysis of the external context	Identification, description and evaluation of the external context / framework of the educational process	

Sub-processes / Sub-aspects	• Legal context / conditions • Economic context / conditions • Educational context / conditions • Social context / conditions • Political context / conditions
Objective	Identification, description and validation of the external context / framework of the educational process
Method	*Methods of empirical social-/educational research; consultation of specialists; market analysis;*
Result	Identification and documentation of relevant aspects of the external context *Legal provisions concerning training intervals in security relevant areas* *Development of the e-learning market* *Structures and processes of the organization within which an educational process is located; organizational culture of learning;* *Structures and constraints due to established curricula etc.* Planning for updates of context analysis
Actors	*Project manager; experts (e.g. market researchers, lawyers)*
Metrics / Criteria	*Check on plausibility of results; additional expertise*
Standards	*Project management and documentation guidelines; standards for social research;*
Annotation / Example	

ID	Category	Process	Description	Relation
FA.2	Framework Analysis	Analysis of staff resources	Identification and description of actors, their qualifications and competencies, and availability	

Sub-processes / Sub-aspects	• Roles / functions • Competencies / formal qualifications • Availability of actors
Objective	Identification of the roles / functions, competencies / qualifications and availability of actors and users
Method	*Methods of empirical social-/educational research (e.g. document analysis); consultation of specialists; staff profile analysis*
Result	- Description of roles / functions of staff - Description of competencies / formal qualifications of staff - Description of availability of staff
Actors	*Project manager; Human Resource experts, learners*
Metrics / Criteria	*Categories 2, 3, 4 of RQC*
Standards	*Project management and documentation guidelines; standards for social research;*
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relations
FA.3	Framework Analysis	Analysis of target group	Identification and description of the target group	*NA.x, CD.x, LP.x, EO.x*
Sub-processes / Sub-aspects	• Socio-cultural and social factors • Individual attribute (age, gender, preferences, etc) • Motivation • Skills, qualification, competencies • Roles and functions			
Objective	Definition of the target group and learner profiles			
Method	*Quantitative or qualitative methods of empirical research; Analysis of CVs, certificates, etc*			
Result	Documentation of target group and learner profiles			
Actors	*Project manager, Human Resource manager, learners, teachers*			
Criteria / Metrics				
Standards	*PAPI; LIP*			
Annotation / Example				

ID	Category	Process	Description	Relation
FA.4	Framework Analysis	Analysis of organizational and institutional context	Identification and description of the organizational and institutional context	

Sub-processes / Sub-aspects	• Business Model • Organizational structure • Internal context • Learning culture
Objective	Description of the organizational and institutional context relevant for the educational process
Method	*Document analysis; interviews;*
Result	Documentation of the organizational and institutional context
Actors	*Project manager; educational staff*
Metrics / Criteria	
Standards	
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
FA.5	Framework Analysis	Time and budget planning	Identification and description of financial, contractual, and temporal constraints	*NA.4*
Sub-processes / Sub-aspects			• Time • Budget / financial resources • Contractual constraints	
Objective			Description of temporal, budgetary, and contractual constraints	
Method			*Models for calculating costs; project planning methods;*	
Result			• Detailed financial plan • Detailed project schedule • Documentation of contractual requirements	
Actors			*Project sponsor; project manager, controller, finance officer*	
Metrics / Criteria			*Periodical checks and updates, Categories 3 and 4 of RQC*	
Standards			*Project management and documentation guidelines; principles of budgeting;*	
Annotation / Example			*First Prototype: 31.3.2003; Version 1.0 by 31.12.2003; Usage 2 times per quarter* *Design of the web site: 20000 Euro; Cost-Benefit-Analysis*	

ID	Category	Process	Description	Relation
FA.6	Framework Analysis	Environment analysis	Identification and description of the environment of and physical resources for an educational process	
Sub-processes / Sub-aspects			• Buildings, rooms and furniture • Technical environment (Hardware, Software, Network)	
Objective			Description of the environment relevant for educational purposes	
Method			*Document analysis (room plans); inspection;*	
Result			• Detailed description of physical resources *(number and size of rooms)* • Detailed description of technical environment *(number and specs of PCs; specs of LAN)*	
Actors			*Project manager; educational staff, facility manager*	
Metrics / Criteria				
Standards			*Product information; standards relating to products (e.g. LAN-components)*	
Annotation / Example			*Training room 10-20 Desktop PCs (Model XYZ), Learning spaces 2-6 people;* *Network Ethernet 100MBit,; Netmeeting 100 Licenses; PC Model XYZ: Pentium IV, Hard disk 8BG, CD-ROM; WLAN-; internal Web-Cam* *Training budget: 1000 Euro p.a. per employee*	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Conception / Design

ID	Category	Process Name	Description	Relations
CD		Conception / Design	Design and Conception of an educational process	
Sub-processes / Sub-aspects		CD.1 Learning objectives CD.2 Concept for contents CD.3 Didactical concept / methods CD.4 Roles and activities CD.5 Organizational concept CD.6 Technical concept CD.7 Concept for media- and interaction design CD.8 Media concept CD.9 Communication concept CD.10 Concept for tests and evaluation CD.11 Concept for maintenance		
Objective		To plan and design the concepts for an educational process		
Method		*Use of Design Guidelines*		
Result		To provide a conception and design for educational processes		
Actors		*Consultant, Media Designers*		
Metrics / Criteria				
Standards				
Annotation / Example				

ID	Category	Process Name	Description	Relations
CD.1	Conception / Design	Learning objectives	Definition and commitment of learning objectives	*NA.1, NA.2, FA.x, LP.x*
Sub-processes / Sub-aspects			• Objectives • Competency model	
Objective			Description of learning objectives in relation to target groups resp. sub groups embedded in a model of competencies	
Method			*Use of the context analysis; discussion and formalization of competency model and objectives*	
Result			Documentation and validation of learning objectives and competency model	
Actors			*Curricula designer, subject experts, teacher*	
Metrics / Criteria			*Analysis of experiences, comparison with needs in real practice*	
Standards			*Reference taxonomies, ontologies*	
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
CD.2	Conception / Design	Concept for contents	Concept of learning and teaching contents	*NA.3, NA.4, FA3.-FA.6, CD.1, CD.3, LP.x*
Sub-processes / Sub-aspects		• Topics / subjects • Volume		
Objective		Representation of the learning and instructional contents		
Method		*Describing subjects using semantic networks*		
Result		Documentation of planned contents		
Actors		*Curricula designer, Subject experts, teacher*		
Metrics / Criteria		*Expert interviews, Categories 5-8 of RQC*		
Standards		*National Curriculum Standards*		
Annotation / Example				

ID	Category	Process	Description	Relation
CD.3	Conception / Design	Didactical concept / methods	Conception of Didactic models, concepts, principles of using methods	*NA.3; NA.4; NA.5; NA.6* *FA; CD.1*
Sub-processes / Sub-aspects	• Learning and pedagogical theories • Didactic models • Curriculum • Learning Scenarios • Methodical concepts • Activities			
Objective	Development of didactic models based on learning and pedagogical theories; selection of adequate methods, activities, settings of work and technologies; designation of objectives and contents relevant for test creation			
Method	*Use of instructional design guidelines*			
Result	• Documentation of the overall concept of didactics • Selection procedure for didactic models • Description of the selection procedure for methodical concepts • Description of the controlling • Activity schemes			
Actors	*Didactic experts, teacher*			
Metrics / Criteria	*Formatively by permanent experience feedback by teacher and learner* *Summatively by success control at the end of learning process (Which increase of competencies has been achieved?)*			
Standards	*IMS Learning Design, DIN PAS 1032-2*			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
CD.4	Conception / Design	Roles and activities	Description of roles and their functions in the educational process	*NA.2; FA.2; FA.3, FA.4; FA.6; CD.2*

Sub-processes / Sub-aspects	Relevant roles in learning scenarios *Curricula responsible, Experts for media didactics, Didactic experts, Content writer, Screenplay writer, Teacher, Learner, Tutor / learning advisor / moderator, Support, Test expert*
Objective	Definition of roles, tasks, responsibilities and rights between the actors
Method	*Actor and workflow modelling*
Result	Documentation and justification of roles and functions
Actors	*Project manager*
Metrics / Criteria	*Analysis of experiences*
Standards	*IMS Learning Design*
Annotation / Example	

ID	Category	Process	Description	Relation
CD.5	Conception / Design	Organizational Concept	Concept of general conditions of the organizational concept	
Sub-processes / Sub-aspects			• Location • Duration, Learning time • Segmentation of learning time	
Objective			*Representation of general conditions relevant for the learning process*	
Method			Description and justification of the general conditions *Data of requirements of areas and technical equipment, data of planned average time, data of planned fixed or freely selectable times, Expert interviews*	
Result			Documentation of general conditions	
Actors			*Curricula responsible, experts media didactics, Didactic experts*	
Metrics / Criteria			*Category 2 of RQC*	
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

ID	Category	Process	Description	Relation
CD.6	Conception / Design	Technical Concept	Concept of the technological realisation	

Sub-processes / Sub-aspects	• Mandatory technical requirements • Optional technical requirements
Objective	Representation of the technical concept
Method	*Data of software requirements, definition of interfaces, integration into existing structures*
Result	Documentation of the technical base *Functional specifications*
Actors	*Technical group, network experts , teacher, support staff*
Metrics / Criteria	*Failor Mode and Effects Analysis FMEA*
Standards	*Category 1 of RQC, ISO 9241*
Annotation / Example	

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
CD.7	Conception / Design	Concept of media- and interaction design	Definition of media- and interaction design	*NA.3; NA.4; FA,; CD.1; CD.2; CD.4; CD.6*
Sub-processes / Sub-aspects		• Media design • Interaction design		
Objective		Representation of the design concept concerning all relevant fields in consideration of existing templates / guide lines		
Method		*Development of screen design and interaction design based on specifications of software ergonomics, Human-Computer Interaction design /usability and if so of the corporate design of the organisation*		
Result		Documentation of design principles (*design concept, style guide*) *Design prototype*		
Actors		*Design experts, Experts media didactics*		
Metrics / Criteria		*Usability test on the basis of the design prototype* *Heuristic evaluation* *Conformity examination respecting existing specifications, ISO 9241, ISO*		
Standards		*ISO 9241, ISO 13407, ISO 14915, W3C-Accessibility-Guidelines, US Section 508*		
Annotation / Example				

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

© ISO/IEC 2005 – All rights reserved

ID	Category	Process	Description	Relation
CD.8	Conception / Design	Media concept	Selection of media usage	*NA.3; NA.4; NA.5; NA.6; FA.4; FA.5; CD.1; CD.2, CD.5;CD.6*
Sub-processes / Sub-aspects			Selection and use (by media functions) • *Presentation and Distribution of Information* • *Collecting and filtering of information* • *Information editing, interaction* • *Constructive representation of own learning results* • *Performance support tools, Communication*	
Objective			• Specification of required media functions • Selection and design of media usage adequate to target group, learning objectives, learning contents and general conditions	
Method				
Result			Documentation media selection procedure and media usage	
Actors			*Expert media didactics, media designer*	
Metrics / Criteria			*Examination for didactics and methods adequacy and for technical feasibility of selected media usage before implementation process*	
Standards				
Annotation / Example				

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
CD.9	Conception / Design	Communication concept	Selection and description of planned communication media	*NA.3; NA.4; NA.5, NA.6; FA.5; FA.6; CD.1; CD.2*
Sub-processes / Sub-aspects			• Aspects of communication media: o *Actors* o *Medium* o *Communication objectives* o *Tools* • Tutor / moderator / trainer instruction	
Objective			Integration and description of relevant communication and interaction media	
Method				
Result			Documentation of communication and interaction media according to the relevant aspects *Documentation/ guideline for tutor/ trainer/ moderator*	
Actors			*Curricula responsible, expert media didactics, teacher*	
Metrics / Criteria			Examination for didactics and methods adequacy and for technical feasibility of selected communication media before implementation process, *Categories 2 and 5 of RQC*	
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
CD.10	Conception / Design	Concepts for tests / evaluation	Specification of evaluation concept and test procedures	*EO.x*

Sub-processes / Sub-aspects	• Test development • Test validation • Test scoring
Objective	Identification of test procedures for competency / skill levels
Method	*Proving with suitable comparison groups* *Statistical validation*
Result	Documentation and justification of test procedures for classification, diagnostics, learning success and proficiency / competence level
Actors	*Didactical experts, test expert, teacher*
Metrics / Criteria	*Correlation of different test procedures* *Expert discourse* *Categories 2, 6, 8 of RQC*
Standards	o *National and international professional associations' standards* o *State/ school performance standard*
Annotation / Example	

ID	Category	Process	Description	Relation
CD.11	Conception / Design	Concepts for maintenance	Conception for maintenance and updates of learning scenarios	*LP.5*

Sub-processes / Sub-aspects	• Didactical / methodological updates *(adaptation of learning methods)* • Content updates • Technical maintenance
Objective	To ensure the appropriateness of the concepts
Method	*Maintenance plans, interviews, trend analysis*
Result	Documentation and justification of maintenance and update concepts
Actors	*Didactical experts, test expert, teacher*
Metrics / Criteria	*Correlation of different test procedures* *Expert discourse* *Categories 2, 6, 8 of RQC*
Standards	*ISO 9001:2000*
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Development / Production

ID	Category	Process	Description	Relation
DP		Development / production	Realization of concepts	*CD*
Sub-processes / Sub-aspects		DP.1 Content realization DP.2 Design realization DP.3 Media realization DP.4 Technical realization DP.5 Maintenance		
Objective		To realize the conceptions		
Method		*Implementation manual*		
Result		Educational products and services		
Actor		*IT-specialists, authors, developers*		
Metrics / Criteria				
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
DP.1	Development / Production	Content realization	Realization of teaching / learning contents	*CD.2*

Sub-processes / Sub-aspects	Topics/Subjects
Objective	Representation of teaching/learning contents
Method	*Expert / learner interview, desktop research*
Result	Representation of planned contents *Process plan, Curriculum* *Production of script / realization*
Actor	*Teacher, expert, scriptwriter, programmer*
Metrics / Criteria	*Prototype evaluation, peer-review*
Standards	*Guideline for scriptwriters* *General education theories / taxonomies*
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
DP.2	Development / Production	Design realization	Realization of screen- and interaction design	*CD.7*
Sub-processes / Sub-aspects	• Media design • Interaction design			
Objective	Realization of design concept for all relevant fields in consideration of existing patterns/guidelines			
Method				
Result	Templates for media / interaction design			
Actor	*Designer, illustrator*			
Metrics / Criteria	*Verification of conformity with regards to existing patters, acceptance of screen design by client* *Category 7 of RQC*			
Standards	*Principles of interface design and usability, standards for software ergonomics (DIN EN ISO 9241)*			
Annotation / Example	The realization of the interaction design implies design of control interaction, e.g. functions, navigation, menus, buttons, but also of didactical interactions, e.g. exercises, talks, opportunities of exploration Existing conditions could be, for example, a style guide or corporate identity or corporate design conditions and have to be taken into consideration accordingly.			

ID	Category	Process	Description	Relation
DP.3	Development / Production	Media realization	Production of the relevant and chosen Media / media resources	*CD.8*
Sub-processes / Sub-aspects		*Audio, video, graphics, animations, photos*		
Objective		Production of required media		
Method		Production of media on the basis of defined criteria *Guidelines for appropriate/available formats and available software* *Data security*		
Result		Completed media products		
Actor		*Designers, illustrators, film-maker, photographers, speakers*		
Metrics / Criteria		*Screenplay conformity test, correctness test*		
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

ID	Category	Process	Description	Relation
DP.4	Development / Production	Technical realization	Realization of technical concept	*CD.6*

Sub-processes / Sub-aspects	
Objective	Realization of technical concept
Method	*Java / Flash programming using programming / documentation guidelines*
Result	• *Documented development of application / coding* • *Code review*
Actor	*Designer, Programmer*
Metrics / Criteria	
Standards	*General software-engineering standards, SCORM, XML*
Annotation / Example	

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relations
DP.5	Development / Production	Maintenance	Maintenance of learning scenarios	*E0.x*
Sub-processes / Sub-aspects		• Content maintenance • Technical maintenance		
Objective		Provision of recent solutions, realization of maintenance concepts		
Method		*Interviews, trend analysis*		
Result		*Up-to-date learning scenarios*		
Actors		*Programmer, content experts, evaluators*		
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Implementation

ID	Category	Process	Description	Relation
IM		Implementation	Description of the implementation of technological components	
Sub-processes / Sub-aspects		IM.1 Testing of learning resources IM.2 Adaptation of learning resources IM.3 Activation of learning resources IM.4 Organization of use IM.5 Technical infrastructure		
Objective		To implement appropriate technological components being used in the educational process		
Method		*Change / configuration / content management*		
Result				
Actor		*Project manager, IT-manager*		
Metrics / Criteria				
Standards				
Annotation / Example				

ID	Category	Process Name	Description	Relations
IM.1	Implementation	Testing of learning resources	Testing and validation of technical components of the educational process	*DP.2, DP.3*
Sub-processes / Sub-aspects	• Testing in development environment • Delivery • Testing in productive environment			
Objective	Achievement of a system status, which is qualified for final release by correct function and high usability.			
Method	*Module Design Test, Functional Test, Challenge Test, Module Integration Test (alpha test), Installation Test, User Acceptance Test (beta test), Test Implementation, pre-production environment, Performance Test (Pilot phase)*			
Result	Documented test results and change requests A qualified software and documentation with correct function and high usability.			
Actors	*Developers of e-Learning systems, Project Manager, Documentation Specialists, IT technicians, test persons of the target group, where applicable independent test institutions*			
Metrics / Criteria	*Test results are reviewed by a Change Control Board, which sets priorities for changes. Usually at least the Chief Developer and the Project Manager are members of the CCB (see DP.2) and where applicable a user representative.*			
Standards	*IEEE Software Validation*			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
IM.2	Implementation	Adaptation of learning resources	Description of configuration management, adaptation, and documentation control	*DP.x, LP.1*
Sub-processes / Sub-aspects			• Configuration Management • Adaptation and change of resources • Documentation	
Objective			Securing that all change requests (see DP.1) for a defined system are done in an effective and controlled manner	
Method			*Configuration Management consists of documented program version control of freezed code, hardware and network configuration, document version control and authorized personnel.* *Changes in program code, graphical design, in the system design or the didactical approach is done in a controlled manner.* *All quality documents like requirements, specifications, test plans and results and the project documentation are created, reviewed, approved, changed, archived and changed in a controlled manner.* *A Design Review Summary Report gives an overview of processed changes.* *For an increased efficiency a Documentation Management database should be used.*	
Result			• Configuration Management Plan, Change Control Plan, Documentation Control Plan and processed Change Request Forms and a Design Review Summary Report. • All change requests are either processed or on hold resp. omitted, in agreement with the customer. • Updated system version	
Actors			*Developer, screen designer, project manager, customer*	
Metrics / Criteria			*Evaluation of Configuration and Change Control System by the Change Control Board (see DP.1)*	
Standards			*IEEE Software Validation*	
Annotation / Example			*XML based DMS, Visual SourceSafe, CC database*	

ID	Category	Process Name	Description	Relations
IM.3	Implementation	Activation of learning resources	Learning products have to be approved by the customer/provider before they can go into operation. This process describes the staging and deployment of the product.	DP.6
Sub-processes / Sub-aspects	• Provision • Registration • Release • Activation			
Objective	• Supply of customers/providers with the necessary technical equipment and learning material • Authorized Access to the learning platform (test modus) and transition of the product into the production environment			
Method	*Staging: Deployment, System Administration, Installation, configuration and test of base components of the production environment* *Registration : licenses, users, courses, etc.* *Release: user acceptance test, handout of product documentation, formal sign-off*			
Result	Learning environment and learning materials are supplied to the customer, access to the learning platform is granted			
Actors	*Supplier, provider, third party vendors, learner, system administrator, user*			
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
IM.4	Implementation	Organization of Use	Providing the organizational requirements for the operation of the learning scenario	*FA.2, FA.4*
Sub-processes / Sub-aspects	• Organizational structure • Qualification of the administration personal • Technical competence and pre-knowledge of users • Support			
Objective	Providing the operational requirements			
Method				
Result	Implementation of the organizational framework			
Actors	*Project Manager, IT Manager, representative of the legal and finance department*			
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
IM.5	Implementation	Technical Infrastructure	Providing the organizational requirements for the operation of the learning scenario	*NA.4, FA.1, FA.5, DP.3, DP.4, IM.1*
Sub-processes / Sub-aspects	• Infrastructure components • Data security • Documentation • Support			
Objective	Providing the organizational requirements for the operation of the learning scenario			
Method	• *Challenge testing, disaster simulation* • *Troubleshooting guidelines for technical problem solution and workarounds*			
Result	Providing tested infrastructure • *Technical configuration summary report* • *Technical training records* • *Disaster recovery plan* • *Completed technical checklists* • *Vendor audits, Summary Report reviewed by the Change Control Board*			
Actors	*Supplier, third party vendors, onsite system administrators*			
Metrics / Criteria				
Standards	*ISO 9241*			
Annotation / Example				

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Learning Process / Realization

ID	Category	Process	Description	Relation
LP		Learning Process	Realization and use of the learning process	
Sub-processes / Sub-aspects		LP.1 Administration LP.2 Activities LP.3 Review of competency levels		
Objective		To perform the learning process		
Method				
Result		Completed process of learning, education and training.		
Actor		*Learners, trainers, tutors*		
Metrics / Criteria		*User performance, user satisfaction*		
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
LP.1	Learning Process	Administration	Description of the administrative requirements and conditions of the learning process	*FA; CD; IM*
Sub-processes / Sub-aspects			• Information • Consultation of learners • Educational Planning/ qualification requirement analysis • Technical support • Registration • Billing / Accounting • Complaint management • Contract • Certification • Transparency • Organizational context, situative context, social context	
Objective			To specify and provide administrative functions according to the needs of the stakeholder of the learning process	
Method			Using the organizational, economical and technological operational concepts	
Result			Realization and documentation of administrative processes	
Actor			*Administrator, project management*	
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
LP.2	Learning Process	Activities	Description of the learning, support, and transfer activities	*CD, LP.1, LP.3*
Sub-processes / Sub-aspects		• Learning activities • Support activities • Transfer activities		
Objective		Initiation of individual learning processes through learning/support/transfer activities		
Method		Using the learning scenario conception		
Result		Documentation of the observable learning progression and learning activities		
Actor				
Metrics / Criteria		*Category 6 of RQC*		
Standards		*DIN PAS 1032-2, IMS Learning Design*		
Annotation / Example				

ID	Category	Process	Description	Relations
LP.3	Learning Process	Review of Competency Level	Activities to determine the competency level	*CD.9*

Sub-processes / Sub-aspects	• Procedures • Performance / Phases • Certificate / Degrees / Reports
Objective	Measurement and Appraisal of Learning progression/ Increase in Competence/ Knowledge acquisition
Method	*Pretest, Performance monitoring, final exam, transfer review*
Result	Documentation of learning performance
Actor	*HR responsible, teacher*
Metrics / Criteria	
Standards	
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Evaluation

ID	Category	Process	Description	Relation
EO		Evaluation / Optimization	Description of the evaluation methods, principles, and procedures	
Sub-processes / Sub-aspects		EO.1 Planning EO.2 Realization EO.3 Analysis EO.4 Optimization / Improvement		
Objective		To describe the evaluation of the educational process		
Method		Evaluation methods *(Questionnaires, User tracking, user feedback report)*		
Result		To perform an evaluation of the educational process; to optimize and improve the educational process		
Actor		*Evaluators, learners, teachers*		
Metrics / Criteria				
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
EO.1	Evaluation / Optimization	Evaluation planning	Description of evaluation planning	*all categories*
Sub-processes / Sub-aspects	• Goals of an evaluation • Approach to evaluation • Time frame • Selection of & number of evaluators involved • Definition of parameters & criteria • Selection of methods & instruments			
Objective	Development of a plan for evaluating results both in terms of didactic and economic criteria;			
Methods				
Result	Detailed plan of the evaluation			
Actor	*Internal / External evaluators, project manager;*			
Metrics / Criteria				
Standards				
Annotation / Example	*Evaluation activities are possible on different levels (cf. Kirkpatrick, Schenkel, Phillips):* *Product – reaction – learning (individual and organizational) – behavior & processes – business results – ROI / ROE*			

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

ID	Category	Process	Description	Relation
EO.2	Evaluation / Optimization	Realization	Realization of the evaluation	*all categories*
Sub-processes / Sub-aspects		• Organization of evaluation activities • Sampling and sample		
Objective		To obtain data in order to pass judgment on the results achieved and the relationship of results to resources that were required		
Methods		Using the evaluation plan		
Result		• Documentation of the realization of evaluation activities • Documentation of the data obtained		
Actor				
Metrics / Criteria				
Standards				
Annotation / Example				

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
EO.3	Evaluation / Optimization	Data Analysis	Description of the data analysis	*all categories*
Sub-processes / Sub-aspects	• Summary • Analysis • Interpretation • Recommendation			
Objective	To obtain insights / understanding as to the methods, tools and resources applied with respect to costs, results, usability;			
Methods	*Statistical analysis*			
Result	Description and justification of • analysis of results and interpretation • summary of analysis & interpretation • recommendations			
Actor	*Project manager, evaluator, external consultants*			
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
EO.4	Evaluation / Optimization	Optimization / Improvement	Description of the adaptation and optimization of products and processes	*all categories*
Sub-processes / Sub-aspects	• Preventive measures • Corrective measures			
Goal	Maintaining / increasing the efficiency and effectiveness of products and processes on the basis of experiences and recommendations			
Methods				
Results	Documentation and justification of measures for improvement taken • *maintenance / improvement of the efficiency and effectiveness of products and processes* • *preventive measures: adaptation to changed circumstances* • *corrective measures: implementation of recommendations based on evaluation*			
Actors	*Project manager, evaluators, designer, teacher, programmer*			
Metrics / Criteria				
Standards				
Annotation / Example	• *The work group is discussing a differentiation of two processes: preventive and corrective measures; these will be different with respect to input and methods;* • *Taking into account circumstances, for example with respect to the organization, staff, (technical) resources etc.;* • *The results of evaluation activities serve as input for improvement of planning and implementation in future projects („lessons learned“)*			

Annex C
(informative)

French code of practice in E-Learning (AFNOR Z76-001)

The French code of practice in E-Learning shows how the model can be used with different process models. The processes from the French model can be mapped to RFDQ:

ID	Process	Sub-process(es)	RFDQ ID	RFDQ Process
AN	Analysis	AN1: Strategic analysis / context of demand AN2: Needs and resources analysis / feasibility of demand	NA FA	Needs Analysis Framework Analysis
DC	Design / Construction	DC1: Design of learning system and its environment DC2: Design of learning resources and material	CD	Conception / Design
IN	Instrumentation	IN1: Choice of material and of technologies IN2: Implementation of material and technologies IN3: Definition of maintenance strategies IN4: Definition of updating strategies	DP IM	Development / Production Implementation
RE	Realization	RE1: Negotiation / prescription RE2: Coaching / Tutoring RE3: Learning RE4: Collaboration RE5: Assessment	LP	Learning Process
EV	Evaluation	EV1: Planning who, what, when, how EV2: Data collection and analysis EV3: Recommendations for improvement	EO	Evaluation / Optimization

Table 3: List of the processes and sub-processes / mapping of RFDQ

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

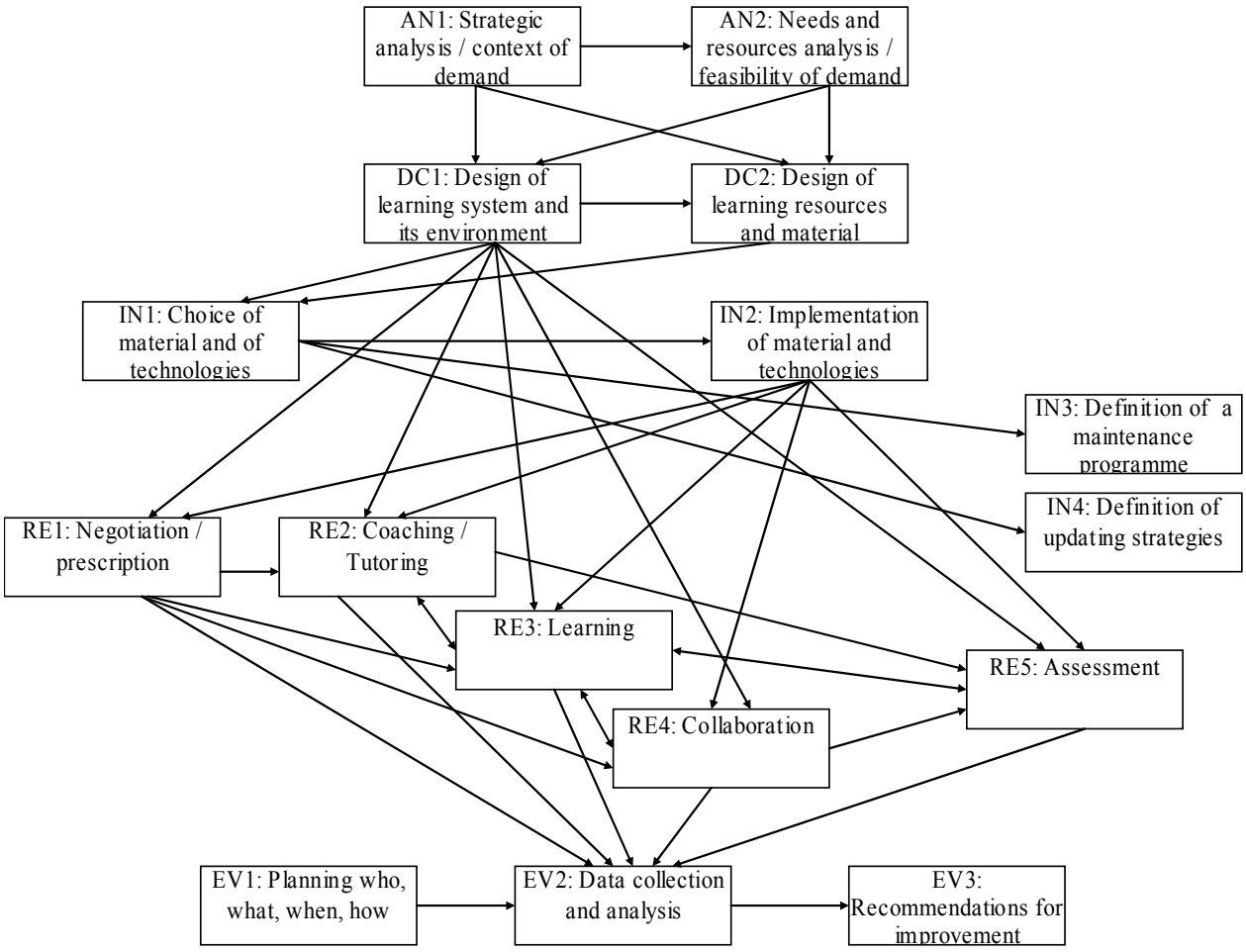

Figure 3: Links between sub-processes

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Analysis

ID	Category	Process	Description	Relation
AN		Analysis	In the analysis phase, the context, the needs, requirements, demands, and constraints for the development of an e-learning system are identified and defined.	

Sub-processes / Sub-aspects	AN1: Strategic analysis / context of demand AN2: Needs and resources analysis / feasibility of demand
Objective	To describe the context and the reasons (the needs and demand) for the development of an e-learning system; the resources available and the constraints for its implementation
Method	*Methods for field research in social and economical sciences, Strategic Analysis, Needs Analysis*
Result	Description of the context, the added value produced and the needs and demand which are met by the development of an e-learning system
Actors	*Project manager; specialists*
Metrics / Criteria	
Standards	*Project Management Standards, National Standards AFNOR X50 - 749, 750, 756 and 760*
Annotation / Example	

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
AN1	Analysis	Strategic Analysis / Context of demand	Identification and description of stakeholders and competitors, elicitation of the added value for e-learning, identification of potential partnerships	*AN2, DC1, DC2*
Sub-processes / Sub-aspects	Identification and description of actors Identification and description of stakes and interests Elicitation of the added value Identification and description of Interested parties			
Objective	To have a clear vision of all stakeholders and of their interests, of the potential market, of the potential partners			
Method	*Methods of market research and market analysis, trend analysis, need analysis, interviews, literature review, balanced scorecard…*			
Result	Description of interested parties and competitors, justification of the added value for e-learning			
Actors	*Project manager, user groups, education and training managers, experts in education and trainings*			
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
AN2	Analysis	Needs and resources analysis	Identification and description of needs, resources and constraints; evaluation of the feasibility of an e-learning solution to meet the demand	*AN1, DC1, DC2*
Sub-processes / Sub-aspects	Definition of the scope of the project Identification and description of the educational / training needs Plan of the project taking into account resources, constraints, potential partnerships Cost / benefits analysis Preparation of decision making			
Objective	To prepare the decision by identifying the demand, the training needs, the resources available and required, the constraints, the costs and timeframe of the project, the benefits of the project			
Method	*Needs analysis, project planning methodologies, cost-analysis methodologies, cost-benefit analysis…*			
Result	Definition of the project and its objectives, feasibility study, provisional budget and schedule,			
Actors	*Project manager and experts in needs analysis, costing and cost benefit analysis*			
Metrics / Criteria				
Standards				
Annotation / Example				

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Design / Construction

ID	Category	Process Name	Description	Relations
DC		Design / Construction	In the Design and Construction phase, the e-learning system and its environment including the learning resources (material, support and tutoring…) are defined and designed	
Sub-processes / Sub-aspects	DC1: Design of the learning system and of its environment DC2: Design of the learning resources and material			
Objective	To define and design the e-learning system, its human and technical environment, including technologies and the learning resources (material and human resources)			
Method	*Use of Design Guidelines*			
Result	The architecture of the e-learning system, its environment and the resources needed			
Actors	*Project manager, consultant or e-learning specialists, subject matter experts*			
Metrics / Criteria				
Standards	This Code of practice (AFNOR Z 76-001)			
Annotation / Example				

ID	Category	Process Name	Description	Relations
DC1	Design / Construction	Design of the learning system and of its environment	Definition of the architecture of the learning system and of the learning environment in order to meet the identified needs	AN1, AN2, DC2, IN1, RE1, RE2, RE3, RE4, RE5

Sub-processes / Sub-aspects	Choosing the type of architecture according to a preferred typology Overall specifications of the system and its environment according to needs and constraints Design of the system in terms of learning activities, organization, roles of actors, support facilities, assessments, registration, tracking… Planning quality assurance
Objective	To define the learning situations in order to meet the learning needs; to specify how they are organised, when and where they take place; how they are supported, how they are administrated…
Method	*Learning design methodologies, Educational modelling languages…*
Result	The detailed organization of the learning system, of the learning environment and of support facilities
Actors	*E-learning course designers, specialists in distance education*
Metrics / Criteria	
Standards	*Reference taxonomies or typologies, Instruction Design Methodologies (ex: MISA, IMS-LD…)*
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
DC2	Design / Construction	Design of the learning resources and material	Specification and design of learning resources needed to meet the needs within the specified architecture	AN1, AN2, DC1, IN1
Sub-processes / Sub-aspects	Organizing resources according to training paths Design and specification of learning resources and support, including use of existing resources… Design of specific material after having checked material available “off-the-shelf” Preparing delivery of newly created material			
Objective	To specify and design resources required by the learning system, taking into account the type of support required and material existing on the market			
Method	*Learning resources design methodologies, learning material evaluation methodologies, usability heuristics…*			
Result	Specification of a consistent set of learning resources, including existing evaluated material			
Actors	*Learning resource designers, subject matter experts, teachers, usability specialists, media specialists*			
Metrics / Criteria				
Standards	Usability standards			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Instrumentation

ID	Category	Process	Description	Relation
IN		Instrumentation	In the instrumentation phase, material, tools and technologies are chosen and implemented, and the maintenance and updating strategies are defined	
Sub-processes / Sub-aspects	IN1: Choice of material and technologies IN2: Implementation of material and technologies IN3: Definition of a maintenance programme IN4: Definition of updating strategies			
Objective	To chose and implement appropriate technological components being used in the educational system, and to define strategies for maintenance and updating of these components			
Method				
Result				
Actors	*Project manager, implementers, IT-specialists*			
Metrics / Criteria				
Standards				
Annotation/ Example				

Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
IN1	Instrumentation	Choice of material and technologies	Preparation of decisions concerning the technical components of the learning system: off-the-shelf learning material, tools and technologies.	*DC1, DC2, IN2, IN3, IN4*
Sub-processes / Sub-aspects	Definition of a set of criteria to select material, tools, technologies… Collection of information about uses from other users, internet forums, … Preparing the decision about the dilemma: make or buy?			
Objective	To prepare the decisions about technological choices for decision makers			
Method				
Result	Information about advantages and disadvantages of various solutions, a set of criteria and arguments to support the decisions			
Actor	*Project manager, consultants, other users*			
Metrics / Criteria				
Standards				
Annotation/ Example				

ID	Category	Process Name	Description	Relations
IN2	Instrumentation	Implementation of material and technologies	According to the chosen alternative (make or buy), sub-processes are different: buying and installing equipment, software or material in one case; deciding to use or not Open Source software, developing and testing software tools and material before installing it in the other.	*IN1, RE1, RE2, RE3, RE4, RE5*

Sub-processes / Sub-aspects	Buying equipments, software and learning material Use of Open Source software Developing and testing tailor-made material and software tools Installing the equipment, software, material
Objective	To buy or develop the technical components of the system, and to install them
Method	*In case of tailor-made software, use of Software development methodologies is highly recommended*
Result	Operational technological components of the learning system
Actors	*Project Manager, Software Developers, Documentation Specialists, IT technicians, Media specialist, test persons of the target group…*
Metrics / Criteria	
Standards	*W3C recommendations, AICC, SCORM, Metadata models (IEEE 1484.12.1:2003 Learning Object Metadata)*
Annotation / Example	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

ID	Category	Process Name	Description	Relations
IN3	Instrumentation	Definition of a maintenance programme	The definition of a maintenance programme is part of the implementation process	*IN1*
Sub-processes / Sub-aspects		Choosing between prevention and repair Definition of a maintenance programme		
Objective		To define a maintenance programme		
Method				
Result		A Maintenance programme		
Actors		*Project manager, IT specialists*		
Metrics / Criteria				
Standards				
Annotation / Example				

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process Name	Description	Relations
IN4	Instrumentation	Definition of updating strategies	Definition of updating strategies is also part of the implementation process	IN1
Sub-processes / Sub-aspects	Monitor technological changes and evolution of uses or changes in users practices Organising technological watch			
Objective	To be able to anticipate technological obsolescence by watching the evolutions and planning systematic updating			
Method				
Result	An updating plan for technological components			
Actors	*Project manager, IT specialists*			
Metrics / Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Realization

ID	Category	Process	Description	Relation
RE		Realization	In the realization phase, the learning system and its environment are in use; and a set of activities are performed by various actors in order to achieve the expected result: learning.	
Sub-processes / Sub-aspects	RE1: Negotiation / prescription RE2: Coaching / tutoring RE3: Learning RE4: Collaboration RE5: Assessment			
Objective	To describe the activities performed by various actors contributing to the success of the learning process			
Method				
Result	Learning			
Actor	*Learners, trainer or teachers, tutors or coaches, administrative staff, counsellors*			
Metrics / Criteria	User performance, user satisfaction			
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
RE1	Realization	Negotiation / prescription	The learner is informed, an individual training path is prescribed, and a contract confirms the agreement	*DC1, IN2, RE2, RE3, RE4, EV2*
Sub-processes / Sub-aspects	Information of the learner Prescription of an individual learning path (eventually taking into account prior learning assessment) Proposal of a contract presenting the conditions proposed for learning, the objectives, the support available, etc.			
Objective	To evaluate and propose the conditions for successful learning			
Method				
Result	A contract and the administrative data about the learner			
Actor	*Administrative staff, trainers or teachers, learners*			
Metrics / Criteria				
Standards	Standards for learner information (AFNOR X50-760), Quality standards (ISO 9000:2000)…			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
RE2	Realization	Coaching / tutoring	The type of support and the way it is provided are described here	*DC1, IN2, RE1, RE3, RE5, EV2*
Sub-processes / Sub-aspects		Implementing a given combination of support types (pedagogical, didactical, methodological, technical, administrative…) Implementing the support tools		
Objective		To support the learner and the learning process		
Method				
Result		Implementation of support in order to facilitate the learning process		
Actor		*Learners, tutor or coach*		
Metrics / Criteria				
Standards				
Annotation / Example				

---,,,

ID	Category	Process	Description	Relations
RE4	Realization	Collaboration	Relations with other learners and collaborative work facilities are described here	*DC1, IN2, RE1, RE3, RE5, EV2*
Sub-processes / Sub-aspects			Encouraging and monitoring collaborative activities Use of collaborative technologies	
Objective			To develop collaborative learning situation in order to enhance the learning process	
Method				
Result			Collaborative activities	
Actor			*Learners, tutor or coach, teacher or trainer…*	
Metrics /Criteria				
Standards				
Annotation / Example				

© ISO/IEC 2005 All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	category	Name of process	Description of process	Relation
RE5	Realization	Assessment	Description of activities to promote the transfer of lessons learned into a professional/everyday context	*DC1, IN2,RE2, RE3, RE4, EV2*
Sub-processes / Sub-aspects	Definition of indicators and value scales for marks and appreciations Self evaluation Production expected from the learner in assessments External Evaluation			
Objective	To validate acquired knowledge and skills			
Methods				
Result	Marks, appreciations, and eventually at the end, certification or diploma			
Actor	*Learners, teachers or trainers*			
Metrics /Criteria				
Standards	Standards for certification, diplomas…			
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Evaluation

ID	Category	Process	Description	Relation
EV		Evaluation	The evaluation methods, principles and procedures are defined here	
Sub-processes / Sub-aspects	EV1: Planning who, what, when, how EV2: Data collection and analysis EV3: Recommendations for improvement			
Objective	To define the evaluation process of the learning system			
Method	*Questionnaire, User tracking, Interviews…*			
Result	An evaluation of the learning system			
Actor	*Evaluators, learners, tutors or coachs, teachers or trainers*			
Metrics / Criteria				
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
EV1	Evaluation	Planning who, what, when, how	Who evaluates, what to evaluate, when and how evaluate are described here	*EV2 and all categories for other processes*
Sub-processes / Sub-aspects	Defining who, what, when, how to evaluate Tracking learner's activities and automation of the evaluation of certain parameters Measurement of ROI			
Objective	To plan the evaluation of the learning system			
Methods	*Documents analysis, interviews, questionnaires, measurement of satisfaction, testing, statistical analysis…*			
Result	Detailed plan on how to proceed with the evaluation			
Actor	*Evaluators*			
Metrics /Criteria	According to the process evaluated: Operational partnerships, improvement of cost / benefit ratio, acceptance by the actors, efficiency (of the learning system, of technologies, of collaboration tools…)			
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ID	Category	Process	Description	Relation
EV2	Evaluation	Data collection and analysis	Description of the main focus for evaluating each processes	*EV1, RE1, RE2, RE3, RE4, RE5 and all categories for other processes*
Sub-processes / Sub-aspects	Analysis of strategic results Analysis of the construction process Analysis of the instrumentation process Analysis of the realization process Cost analysis			
Objective	To get the relevant data for each process, and to analyse them			
Methods	*Documents analysis, interviews, questionnaires, measurement of satisfaction, testing, statistical analysis…*			
Result	Evaluation reports for each process			
Actor	*Evaluators*			
Metrics / Criteria	According to the process evaluated: Operational partnerships, improvement of cost / benefit ratio, acceptance by the actors, efficiency (of the learning system, of technologies, of collaboration tools…)			
Standards				
Annotation / Example				

ID	Category	Process	Description	Relation
EV3	Evaluation	Recommendations for improvement	At the final stage, the strengths and weaknesses of the learning system and of its environment are identified and recommendations for improvement made	*EV2, and all categories for other processes*
Sub-processes / Sub-aspects		Providing recommendations Disseminating the results and the recommendations Setting an action plan for improvement		
Objective		To improve the learning system		
Methods				
Result		Recommendations, action plan for improving the learning system		
Actor		*Evaluators, all actors involved*		
Metrics /Criteria				
Standards				
Annotation / Example				

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO/IEC 2005 – All rights reserved

Annex D
(informative)

Reference Quality Criteria (RQC) DIN PAS 1032-1

A comprehensive list of reference criteria for the assurance of quality of learning products is provided in the criteria catalogue. The catalogue contains as well functional as media and learning psychology related reference criteria. Furthermore, it includes criteria related to data security and (special marked) criteria related to national laws in the area of distance learning.

These criteria can be used for assessment and evaluation within the process model, described in 3.2. Only criteria which are suitable for a certain context should be used. Hence, the criteria just provide a comprehensive list – when implementing a quality management or quality assurance system, adequate criteria can be chosen from this list.

The reference catalogue shall provide a common basis to build country and domain specific catalogue profiles. These profiles contain a relevant selection of criteria and can specify priorities e.g. by marking criteria as “must-criteria”. Such a criteria profile based on the reference catalogue is deployed in the evaluation of processes based on the process reference model. For this purpose each process specification in the process reference model contains a reference to the relevant section of the reference criteria catalogue. Furthermore the reference catalogue can be applied to create criteria profiles

- which allow comparisons of learning products,
- which support certification of learning products (according to quality standards).

When learning products are software products, ISO 9241 applies to the learning product. For that reason the 213 criteria of ISO 9241are building the first section of the reference catalogue. Additionally, 480 criteria were collected, which are specific to learning products.

The list of reference criteria is structured into catalogue sections, to allow easier access to certain criteria. Each criterion appears only once in the catalogue. A criteria profile however may use another structure.

Criteria of ISO 9241 are evaluative. The reference criteria of the other sections are however evaluative and descriptive (see table below).

SectionNo.	Section/Category	No of criteria	No of descriptive criteria
2	General Conditions	101	32
3	Technical Aspects	103	23
4	Data storage and Data processing	37	14
5	Functionalities	69	29
6	Theoretical Aspects	80	17
7	Encoding of Information	59	3
8	Special modes of presentation	31	0
	Total	480	118

Table 4 — Criteria specific to learning products

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

For example screen design criteria of ISO 9241 are evaluative. Red typing on a blue screen is a mistake in screen design (color criteria) after ISO 9241. In contrast a criteria such as “Availability of tutors” cannot be evaluated out of context of the whole learning product. Nevertheless the description concerning this criterion provided to the potential user is important for the evaluation of a product. Information provided to a descriptive criteria can be evaluated e.g. if a provider claims that a tutor ia available daily between 9am-5pm.

The reference criteria are neutral concerning didactical and media and learning psychology related models and theories. The catalogue rather provides a set of criteria which have to be fulfilled, when a provider claims that a learning product follows the approach of e.g. explorative learning.

The structure of the catalogue is shown by example of the criteria 5.4.2.4 (Section 5 - Functionalities, Subsection 4 - Communication, Subsubsection 2 - asynchronous communication):

No	Criterion	Description/ Operationalization	Value space	Comments, Explanations
5.4.2.4	Support of asynchronous communication by enabling learners to share/publish data	*Which type of data can be published/shared by learners?* *For which type of data are publication/ authoring tools offered for learners?*	a) selection (none, plain text, formatted text, images, audio, video, other) b) selection (none, for plain text, for formatted text, for Web-pages, image editing, audio editing, video editing, other)	The possibility to share different kind of data among learners supports the communication and learning process, especially for group and project oriented learning styles. For example learner web-pages or shared file directories facilitate the exchange of data. A basic form of data exchange would be the exchange of ascii-text through Email. Standard Authoring and publication tools facilitate the exchange of data among learners. For example conflicts of data formats are avoided, when learners use the tools offered by the learning product instead of using a variety of tools.

The full list is provided in the following table.

ID	Bezeichnung	Description	descriptive (d) evaluative (e)
1.	**Bestehende Normen – Software-Ergonomie**	**existing norms – software ergonomics**	
1.1	**Visuelle Anzeige (29 241-3)**	**visual visualisation (9241-3)**	**e**
1.2	**Farbdarstellung (9241-8)**	**colour illustration (9241-8)**	**e**
1.3	**Dialoggestaltung (9241-10)**	**dialog design (9241-10)**	**e**
1.4	**Ergonomische Anforderungen (9241-12)**	**ergonomic requirements (9241-12)**	**e**

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

1.5	**Benutzerführung / Fehlermanagement / Hilfefunktionen (9241-13)**	**user guidance / fault management / help function (9241-13)**	**e**
1.6	**Dialogführung: direkte Manipulation (9241-16)**	**dialogue guidance: direct manipulation (9241-16)**	**e**
1.7	**Dialogführung: Bildschirmformularen (9241-17)**	**dialogue guidance: on screen form (9241-17)**	**e**
2	**Rahmenbedingungen**	**framework**	
2.1	**Organisatorische Aspekte**	**organisational aspects**	
2.1.1	**Zeitliche Aspekte des Lernens**	**temporal aspects of learning**	
2.1.1.1	Voraussichtliche Lernzeit insgesamt	overall estimated learning time	
2.1.1.1.1	Benennung	description	e
2.1.1.1.2	Gültigkeit	validity	e
2.1.1.2	Lernetappen	learning units	
2.1.1.2.1	Benennung	description	d
2.1.1.2.2	Gültigkeit	validity	e
2.1.1.3	Quereinstieg	non-linear entry	
2.1.1.3.1	Benennung	description	d
2.1.1.3.2	Gültigkeit	validity	e
2.1.1.4	Zeitliche Verfügbarkeit vom Produkt	temporal availability of the product	
2.1.1.4.1	Angabe	specification	e
2.1.1.4.2	Gültigkeit	validity	e
2.1.1.5	Zeitliche Verfügbarkeit von Tutoren	temporal availability of tutors	
2.1.1.5.1	Benennung	description	d
2.1.1.5.2	Gültigkeit	validity	e
2.1.1.6	Zeitliche Verfügbarkeit von Lehrern	temporal availability of teachers	
2.1.1.6.1	Benennung	description	d
2.1.1.6.2	Gültigkeit	validity	e
2.1.1.7	Laufzeit des Produkts	duration	
2.1.1.7.1	Benennung	specification	e
2.1.1.7.2	Gültigkeit	validity	e
2.1.2	**Situative Aspekte**	**situational aspects**	
2.1.2.1	Institutionelle Anbindung	connection with institution	
2.1.2.1.1	Benennung	description	d
2.1.2.1.2	Gültigkeit	validity	e
2.1.2.2	Präsenzphasen	presence courses	

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.1.2.2.1	Benennung	description	d
2.1.2.2.2	Gültigkeit	validity	e
2.1.2.3	Lernsituation	setting of learning	
2.1.2.3.1	Benennung	description	e
2.1.2.3.2	Gültigkeit	validity	e
2.1.2.4	Arbeitsplatz	working environment	d
2.1.3	**Betreuungskonzept**	**support concept**	
2.1.3.1	Tutoren	tutors	
2.1.3.1.1	Benennung	description	d
2.1.3.1.2	Gültigkeit	validity	e
2.1.3.1.3	Qualifikation	qualification	e
2.1.3.2	Lehrer	teachers	
2.1.3.2.1	Benennung	description	d
2.1.3.2.2	Gültigkeit	validity	e
2.1.3.2.3	Qualifikation	qualification	d
2.1.3.3	Technischer Support	technical support	d
2.1.3.4	Internet-Adresse	web-address	
2.1.3.4.1	Öffentlicher Zugang	public access	d
2.1.3.4.2	Information und Funktionsfähigkeit	Information & accessibility	e
2.1.3.4.3	Nicht öffentlicher Zugang	non-public access	d
2.1.3.4.4	Funktionsfähigkeit	Operativeness & accessibility	e
2.2	**Zielsetzung**	**purpose**	
2.2.1	**Beschreibung**	**description**	
2.2.1.1	Existenz	existence	e
2.2.2	**Fertigkeiten und Fähigkeiten**	**skills and abilities**	
2.2.2.1	Benennung	specification	e
2.2.2.2	Gültigkeit	validity	e
2.2.3	**Formale Abschlüsse / Zertifikate**	**formal graduations / certificates**	
2.2.3.1	Benennung	description	d
2.2.3.2	Gültigkeit	validity	e
2.2.3.3			
2.2.3.3.1	Anbieterzertifikat	provider certificate	d
2.2.3.3.2	Selbsterstelltes Zertifikat	Self-created certificate	d
2.2.3.3.3	Gültigkeit	validity	e
2.3	**Zielgruppe**	**target group**	
2.3.1	**Alter**	**age**	
2.3.1.1	Altersangabe	age specification	

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.3.1.1.1	Benennung	description	d
2.3.1.1.2	Gültigkeit	validity	e
2.3.1.2	Jugendschutzbestimmungen	protection of minors by law	
2.3.1.2.1	Benennung	description	e
2.3.1.2.2	Gültigkeit	validity	e
2.3.2	**Formale Vorkenntnisse/Abschlüsse**	**formal knowledge / graduations**	
2.3.2.1	Benennung	description	e
2.3.2.2	Gültigkeit	validity	e
2.3.3	**Fachliche Vorkenntnisse**	**professional knowledge**	
2.3.3.1	Benennung	description	
2.3.3.1.1	Grundsätzliche Angabe	basic information	e
2.3.3.1.2	Infogehalt der Angabe	information content	e
2.3.3.2	Überprüfungsmöglichkeit	verification possibility	d
2.3.3.3	Gültigkeit	validity	e
2.3.4	**Allgemeine Vorkenntnisse**	**common knowledge**	
2.3.4.1	Überfachlich	multidisciplinary	
2.3.4.1.1	Benennung	description	d
2.3.4.1.2	Erforderlichkeit	requirement	e
2.3.4.2	Computerspezifisch	computer specific	
2.3.4.2.1	Benennung	description	d
2.3.4.2.2	Erforderlichkeit	requirement	e
2.3.4.3	Andere Wissensgebiete	other fields of knowledge	
2.3.4.3.1	Benennung	description	d
2.3.4.3.2	Erforderlichkeit	requirement	e
2.3.5	**Kompensation von Behinderung / Barrierefreies Lernen**	**Compensation of disabilities/Learning without barriers**	
2.3.5.1	Maßnahmen	arrangements	e
2.3.5.2	Erklärung BITV-Konformität	statement of conformance to legal requirements	e
2.3.5.3	Tatsächliche BITV-Konformität	Validity of statement	e
2.3.5.4	Eignung	suitability	e
2.3.6	**Sprachen**	**languages**	
2.3.6.1	Benennung	description	d
2.3.6.2	Gültigkeit	validity	e
2.3.7	**Berufsgruppen**	**occupational groups**	
2.3.7.1	Benennung	description	d
2.4	**Qualitätssicherung**	**quality assurance**	

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.4.1	**Fachliche Richtlinien**	**professional guidelines**	
2.4.1.1	Benennung	description	d
2.4.2	**Aktualität des Produkts, ggf. Aktualisierungsdienst**	**topicality of the product, update service**	
2.4.2.1	Umsetzung	implementation	e
2.4.2.2	Version	version	d
2.4.2.3	Erscheinungsjahr/-datum	year of publication/date	d
2.4.3	**Autoren**	**authors**	
2.4.3.1	Benennung	description	d
2.4.3.2	Kompetenz	expertise	d
2.4.3.3	Formale Kompetenz	formal expertise	d
2.4.4	**Implementierung**	**Implementation**	
2.4.4.1	Benennung	description	d
2.4.4.2	Kompetenz	expertise	d
2.4.5	**Evaluationsbemühungen**	**evaluation efforts**	
2.4.5.1	Benennung	description	e
2.4.5.2	Bewertung der Bemühungen	validation of the efforts	e
2.4.6	**Zitierform / Rechte**	**quotations / rights**	
2.4.6.1	APA-Standards o. ä.	APA-standards or similar	e
2.4.6.2	Vorhandensein – Literaturverzeichnis	existence of bibliography	e
2.4.6.3	Fachtermini	technical terms	e
2.4.6.4	Abkürzungen	abbreviation	e
2.4.6.5	Urheberrechte	copyright	e
2.4.7	**Sprachliche Korrektheit**	**linguistic correctness**	
2.4.7.1	Rechtschreibung	orthographiy	e
2.4.7.2	Grammatik	grammar	e
2.4.7.3	Interpunktion	punctuation	e
2.4.7.4	Gender	gender	e
2.4.7.5	Sachlichkeit	objectiveness	e
2.4.8	**Sonstiges**	**miscellaneous**	
2.4.8.1	Keine Diskriminierungen	no discrimination	e
2.4.8.2	Keine Darstellung von Gewalt	no illustration of violence	e
2.4.9	**Qualitätsstandards des Produkts**	**quality standards of the product**	
2.4.9.1	Produktrelevante Standards	standards relevant for the product	d
2.4.9.2	Testierungen / Zertifizierungen Produkt	certification of the product	d
2.4.9.3	Verliehene Auszeichnungen, Preise usw.	given awards etc.	d

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

2.4.9.4	Testierungen / Zertifizierungen Anbieter	certification of the provider	d
2.4.9.5	Erforderlichkeit	requirement	e
2.5	**Weitere Teilnahmebedingungen**	**additional participation requirements**	
2.5.1	**Kosten**	**costs**	
2.5.1.1	Produktkosten	product costs	e
2.5.1.2	Telekommunikationskosten	telecommunication costs	
2.5.1.2.1	Benennung	description	e
2.5.1.2.2	Gültigkeit	validity	e
2.5.2	**Fernunterricht**	**distance learning**	
2.5.2.1	Relevanz von nationalen und ggf. internationalen rechtlichen Festlegungen	Relevance of national and international legal determinations	d
2.5.2.2	Gültigkeit	validity	e
2.5.2.3	Erfüllen der Bestimmungen	conformity to the determinations	e
2.5.3	**Einverständniserklärung mit Speicherung von Daten**	**declaration of consent with storage of data**	
2.5.3.1	Vordruck	pre-printed form	d
2.5.3.2	Gespeicherte Merkmale	saved criteria	e
2.5.3.3	Verwendungszweck	purpose	e
2.5.3.4	Speicherdauer	saving period	e
2.5.3.5	Widerrufbarkeit	possibility of revocation	e
2.5.4	**Verwertung**	**utilisation**	
2.5.4.1	Verwertungsrechte	utilisation rights	e
2.5.4.2	Lizenzierung	licensing	e
2.5.5	**Vertragsbedingungen**	**contract conditions**	
2.5.5.1	Außerordentliche Kündigungen	extraordinary notice of cancellation	d
2.5.5.2	Weitere Vertragsbedingungen	additional contract conditions	d

3	**Technische Aspekte**	**technical aspects**	
3.1	**Nutzer**	**user**	
3.1.1	**Ausstattung**	**requirements**	
3.1.1.1	Rechnerkonfiguration	system requirements	
3.1.1.1.1	Benennung: Minimumkonfiguration	description: minimum requirements	e
3.1.1.1.2	Benennung: komfortable Konfiguration	description: comfortable requirements	d
3.1.1.1.3	Gültigkeit	validity	e
3.1.1.1.4	Speicherplatz für Installation	disk space requirement for installation	e

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.1.1.1.5	Speicherplatz für Nutzung	disk space requirement for use	e
3.1.1.1.6	Zeitpunkt	time	e
3.1.1.2	Betriebssystem	operating system	
3.1.1.2.1	Benennung Minimum Version OS	description: minimum operating system	e
3.1.1.2.2	Benennung Komfortable OS	description: comfortable operating system	d
3.1.1.2.3	Gültigkeit	validity	e
3.1.1.3	Netzzugang	access	
3.1.1.3.1	Erfordernis Internetzugang	internet access required	e
3.1.1.3.2	Internetzugang wünschenswert	internet access desirable	e
3.1.1.3.3	Tauglichkeit ohne Netzzugang	suitability without internet access	e
3.1.1.3.4	Geschwindigkeit für Netzzugang	bandwidth of internet access	e
3.1.1.3.5	Gültigkeit	validity	e
3.1.1.4	Zusatzgeräte	additional equipment	
3.1.1.4.1	Benennung der benötigten Geräte	description of required equipment	e
3.1.1.4.2	Funktionsabhängigkeit von den Geräten	dependency on required equipment	e
3.1.1.4.3	Hinweis	information	e
3.1.1.5	Performance	performance	e
3.1.2	**Installation / Deinstallation**	**Installation / Un-Installation**	
3.1.2.1	Vorhandensein aller Bestandteile	existence of all components	e
3.1.2.2	URLs	URLs	e
3.1.2.3	Installationserfolg	successful installation	e
3.1.2.4	Nebenwirkungen – Installation	side effects of the installation	e
3.1.2.5	Deinstallationsroutine	uninstallation routine	e
3.1.2.6	Deinstallationserfolg	successful uninstallation	e
3.1.2.7	Nebenwirkungen – Deinstallation	side effects of the uninstallation	e
3.1.2.8	Archivierung	storage	
3.1.2.8.1	Nutzerdaten	user data	d
3.1.2.8.2	Hinweis	information	e
3.1.2.9	Installationsanweisungen	installation instructions	
3.1.2.9.1	Vorhandensein – Installationsanweisung	existence – installation instructions	e
3.1.2.9.2	Vorhandensein – Deinstallationsanweisung	existence – uninstallation instructions	e
3.1.2.9.3	Verständlichkeit/Korrektheit: Installationsanweisung	intelligibility/correctness: installation instructions	e
3.1.2.9.4	Verständlichkeit/Korrektheit: Deinstallationsanweisung	intelligibility/correctness: uninstallation instructions	e

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale
© ISO 2005 – All rights reserved

3.2	**Betreiber**	**provider**	
3.2.1	**Transportweg zum Server**	**route of tranport to the server**	
3.2.1.1	Verschlüsselung zum Server	encryption to the server	e
3.2.1.2	Sicherheit der Verschlüsselung	security level of the encryption	e
3.2.1.3	Verschlüsselung für Email	encryption for e-mail	e
3.2.1.4	Keine Standard-Verschlüsselung	non standard encryption	e
3.2.1.5	Information für Nutzer	user information	e
3.2.2	**Serversicherheit (von außen und innen)**	**security of the server (from outside and inside)**	
3.2.2.1	Server-Zugriffsberechtigung	server access right	e
3.2.2.2	Firewall-Zugriffsberechtigung	firewall access right	e
3.2.2.3	Maßnahmen zur Serversicherheit	server security measures	e
3.2.2.4	Anwendungen auf Server	applications on the server	e
3.2.2.5	Sichtbarkeit für Lernenden	visibility for learners	e
3.2.2.6	Sichtbarkeit für Lehrenden	visibility for teachers	e
3.2.2.7	Sichtbarkeit für Administrator	visibility for administrators	e
3.2.3	**Verfügbarkeit / Performance**	**availability / performance**	
3.2.3.1	Server-Verfügbarkeit	availability of server	e
3.2.3.2	Zugriffs-/Antwortzeiten	access-/answer time	e
3.2.3.3	Kompensation von geringer Bandbreite beim Nutzer	Compensation efforts for low bandwidth users	d
3.2.3.4	Zugriffs-/Antwortzeiten – for low bandwidth users	access-/answer time – for low bandwidths users	e
3.2.3.5	IT-Probleme	it-problems	e
3.2.4	**Benennung der technisch Verantwortlichen / Zertifizierung / Testierung**	**designation of the technical person in charge / certification**	
3.2.4.1	Version	version	e
3.2.4.2	Webmaster	webmaster	e
3.2.4.3	Verantwortlicher	person in charge	e
3.2.4.4	Zertifikate	certificates	e
3.2.4.5	Provider	provider	e
3.2.5	**Technischer Support**	**technical support**	
3.2.5.1	Informationen über Produktupdates	information on product updates	
3.2.5.1.1	Benennung auf Homepage	designation on the homepage	d
3.2.5.1.2	Update-Informationen	update information	d
3.2.5.1.3	Automatische Aktualisierung	self-updating	d
3.2.5.2	Technische Hilfe	technical help	

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.2.5.2.1	Angabe einer Email-Adresse	designation of an e-mail address	d
3.2.5.2.2	Korrektheit der Email-Adresse	correctness of the e-mail address	e
3.2.5.2.3	Online-Hilfe	Online help	d
3.2.5.2.4	Hilfetelefonnummer	hotline phone number	d
3.2.5.2.5	Hilfetelefonnummer Korrektheit	correctness of hotline phone number	e
3.2.5.2.6	Reaktionszeiten	response time	
3.2.5.2.6.1	Angaben	descriptions	d
3.2.5.2.6.2	Gültigkeit	validity	e
3.2.5.2.7	Reaktionsqualität	quality of response	e
3.2.5.2.8	Umgang mit Software-Bugs	dealing with software bugs	d
3.2.6	**Nutzer-Log-In**	**user log-in**	
3.2.6.1	Authentifizierungsmechanismus	authentification mechanism	d
3.2.6.2	Funktionsweise der Identitätsprüfung	functionality of the identity-check	d
3.2.6.3	Passwort	password	e
3.2.6.4	Passwort vergessen	forgot password	d
3.2.6.5	Passwortspeicherung	password storage	e
3.2.6.6	Passwort wiedererlangen	retrieve password	e
3.2.6.7	Mandantenfähigkeit des Systems	Ability to generate clients	d
3.2.7	**Nutzerdaten**	**user data**	
3.2.7.1	Speicherung	storage	
3.2.7.1.1	Speicherdauer	storage time	d
3.2.7.1.2	Temporäre Speicherung	temporal storage	d
3.2.7.1.3	Mitteilung über Speicherung	information about storage	e
3.2.7.2	Speicherort	storage location	
3.2.7.2.1	Speicherort: eigener PC	storage location: own pc	e
3.2.7.2.2	Mitteilung über den Speicherort	information about storage location	e
3.2.7.3	Schutzbedarf	protection needs	
3.2.7.3.1	Angaben	specification	e
3.2.7.3.2	Kategorie: gering	category: low	d
3.2.7.3.3	Kategorie: mittel	category: medium	d
3.2.7.3.4	Kategorie: hoch	category: high	d
3.2.7.3.5	Kategorie: sehr hoch	category: very high	d
3.2.7.4	Speicherdauer	storage duration	e
3.2.7.5	Information über Löschen	Information about deletion	e
3.2.7.6	Nutzerzugriff vor Löschen	user access before deletion	
3.2.7.6.1	Nachfrage	with confirmation	d
3.2.7.6.2	Ohne Nachfrage	without confirmation	d

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.2.7.7	Vertraulichkeit	confidentiality	e
3.2.7.8	Gültigkeit	validity	e
3.2.7.9	Funktionsfähigkeit ohne Speicherung	operativeness without storage	e
3.2.8	**Zugriff auf die Nutzerdaten**	**access to user data**	
3.2.8.1	Zugriffsberechtigte	authorised persons	
3.2.8.1.1	Nutzer	user	d
3.2.8.1.2	Sonstige	other	d
3.2.8.1.3	Angemessenheit der Zugriffsregelungen	suitability of access-control	e
3.2.8.1.4	Kopieren	copy	d
3.2.8.1.5	Export	export	d
3.2.8.1.6	Import	import	d
3.2.8.2	Sicherung der Nutzerdaten	backup of user data	
3.2.8.2.1	Recovery	recovery	e
3.2.8.2.2	Backups	backups	e
3.2.8.2.3	Sicherheit der Backups	security of backups	e
3.3	**Produkt**	**product**	
3.3.1	**Ressourcentypen**	**types of resources**	
3.3.1.1	Benennung	description	d
3.3.2	**Technisches Konzept**	**technical concept**	
3.3.2.1	Angemessenheit des technischen Konzepts	suitability of technical concept	e

4	**Datenspeicherung und -verarbeitung**	**data storage and processing**	
4.1	**Spezifikation der Daten**	**specification of data**	
4.1.1	**Bereiche**	**categories**	
4.1.1.1	Daten über Bereiche speichern	save categories data	d
4.1.2	**Aufgaben**	**exercises**	
4.1.2.1	Speicherung Einzelaufgabendaten	data storage of each exercise	d
4.1.3	**Leistungen**	**results**	
4.1.3.1	Leistungsdaten speichern	save result data	e
4.1.4	**Lernzeiten**	**learning period**	
4.1.4.1	Lernzeiten speichern	save learning period data	d
4.1.5	**Links**	**links**	
4.1.5.1	Linkdaten speichern	save link data	e
4.1.6	**Nutzungsverlaufsdaten**	**history data**	

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

4.1.6.1	Verlaufsdaten speichern	save history data	d
4.1.7	**Andere Daten**	**other data**	
4.1.7.1	Weitere Daten	additional data	d
4.1.7.2	Notizen speichern	Save notes	e
4.2	**Anzeige-Tools**	**visualisation tools**	
4.2.1	**Verfahren des Zugriffs**	**type of access**	
4.2.1.1	Bearbeitungsstand	Learning progress	e
4.2.1.2	Übungsaufgabenlösung	Progress in exercises	d
4.2.1.3	Testaufgabenlösung	Progress in tests	d
4.2.2	**Standardstatistiken**	**standard statistics**	
4.2.2.1	Verfügbarkeit	availability	e
4.2.3	**Spezielle Auswertungen**	**special analysis**	
4.2.3.1	Anwenderdefinierte Auswertungen	user-defined analysis	d
4.3	**Analyse**	**analysis**	
4.3.1	**Bearbeitungsfortschritt**	**progress**	
4.3.1.1	Annotationen	annotations	e
4.3.1.2	Detailliertheit	level of details	e
4.3.1.3	Aussagekraft der Annotationen	significance of annotations	e
4.3.2	**Vorkenntnisse (Prüfung während des Lernprozesses)**	**previous knowledge (test during the learning process)**	
4.3.2.1	Überprüfung	test	d
4.3.2.2	Zeitpunkt der Überprüfung	time of test	d
4.3.2.3	Konsequenzen	consequences	e
4.3.3	**Vorschlagswesen, Systemsteuerung**	**suggestion-system, system control**	
4.3.3.1	Nutzerprofile	user profiles	
4.3.3.1.1	Erzeugungsmöglichkeit	creation possibility	d
4.3.3.1.2	Datenbasis des Nutzerprofils	data basis of user profile	d
4.3.3.1.2.1	Vortest	pre-test	d
4.3.3.1.2.2	Begleitend	accompanying	d
4.3.3.1.3	Initiator der Nutzerprofilerzeugung	initiator of user profile creation	
4.3.3.1.3.1	System	system	d
4.3.3.1.3.2	Nutzer	user	d
4.3.3.2	Adaptionsmechanismen / Systemsteuerung	adaptation mechanisms / system control	
4.3.3.2.1	Einsatz	Use	d
4.3.3.2.2	Beschreibung	description	e
4.3.3.3	Art der Steuerung	type of control	
4.3.3.3.1	Systemsteuerung	system control	d

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

4.3.3.3.2	Adaptive Systemsteuerung	adaptive system control	d
4.3.3.3.3	Lernersteuerung	controlled by the learner	d
4.3.3.3.5	Angemessenheit	suitability	e
4.3.4	**Lernerfolgskontrolle**	**control of learning results**	
4.3.4.1	Vorhandensein	existence	e
4.3.4.2	Lösbarkeit automatisch generierter Tests	Solvability of automatically generated tests	e
4.3.4.3	Zeitpunkt	time	d
4.3.4.4	Verfügbarkeit	availability	d
4.3.4.5	Abrufbarkeit	access	e
4.3.4.6	Verwendbarkeit zur Nutzersteuerung	use for user-control	e

5	**Funktionalitäten**	**functionalities**	
5.1	**Steuerung**	**control**	
5.1.1	**Lernersteuerungselemente**	**learner control elements**	
5.1.1.1	Lernzeit	learning time	d
5.1.1.2	Reihenfolge	sequence	d
5.1.1.3	Umfang	amount	d
5.1.1.4	Kodierung	encoding	d
5.1.1.5	Modalität	modality	d
5.1.1.6	Komplexität	complexity	
5.1.1.6.1	Wahlmöglichkeit	choice	d
5.1.1.6.2	Definition	definition	d
5.1.2	**Programmsteuerungselemente**	**program control elements**	
5.1.2.1	Verfügbarkeit	availability	e
5.1.3	**Angemessenheit**	**suitability**	
5.1.3.1	Angemessenheit des Steuerungskonzepts	suitability of the control concept	e
5.2	**Steuerungsunterstützung**	**control support**	
5.2.1	**Überblick über Inhalt**	**overview of the content**	
5.2.1.1	Existenz	existence	
5.2.1.1.1	Vorhandensein	existence	e
5.2.1.1.2	Qualität des Produktüberblicks	quality of the product overview	e
5.2.1.2	Inhaltsverzeichnis	table of contents	
5.2.1.2.1	Vorhandensein	existence	d
5.2.1.2.2	Vollständigkeit	completeness	e
5.2.1.2.3	Auffindbarkeit	recognisability	e
5.2.1.3	Sitemap	sitemap	

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

5.2.1.3.1	Vorhandensein	existence	d
5.2.1.3.2	Vollständigkeit	completeness	e
5.2.1.3.3	Auffindbarkeit	recognisability	e
5.2.1.4	Netzstruktur (mind map)	Mind map	
5.2.1.4.1	Vorhandensein	existence	d
5.2.1.4.2	Vollständigkeit	completeness	e
5.2.1.4.3	Auffindbarkeit	recogniseability	e
5.2.1.5	Vorschlagswesen	suggestion system	
5.2.1.5.1	Vorhandensein	existence	d
5.2.1.5.2	Annehmen	accept	d
5.2.1.5.3	Auffindbarkeit	detectability	e
5.2.1.6	Guided Tour	guided tour	
5.2.1.6.1	Vorhandensein	existence	d
5.2.1.6.2	Umfang	amount	
5.2.1.6.2.1	Gesamtprodukt	whole product	d
5.2.1.6.2.2	Exemplarisch	exemplarily	d
5.2.2	**Suchen / Wiederfinden**	**search / retrieve**	
5.2.2.1	Suchfunktion	search function	
5.2.2.1.1	Vorhandensein	existence	d
5.2.2.1.2	Auffindbarkeit	recogniseability	e
5.2.2.1.3	Bewertung Suchfunktion	search function rating	e
5.2.2.2	Stichwortverzeichnis	index	
5.2.2.2.1	Vorhandensein	existence	d
5.2.2.2.2	Auffindbarkeit	recogniseability	e
5.2.2.2.3	Bewertung	rating	e
5.2.2.3	Volltextsuche	full-text search	
5.2.2.3.1	Vorhandensein	existence	d
5.2.2.3.2	Auffindbarkeit	recogniseability	e
5.2.2.3.3	Bewertung	rating	e
5.2.2.4	Bookmarks / Lesezeichen	bookmarks	
5.2.2.4.1	Vorhandensein	existence	d
5.2.2.4.2	Anzeige	display	d
5.2.2.4.3	Bewertung	rating	e
5.2.2.4.4	Auffindbarkeit	recogniseability	e
5.2.3	**Bewegen**	**move**	
5.2.3.1	Angemessenheit der Navigationsmechanismen	suitability of the navigation mechanisms	e
5.2.3.2	Links	hyperlinks	

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

5.2.3.2.1	Erkennung	recognition	e
5.2.3.2.2	Konsistenz des Konzepts	consistency of concept	e
5.2.3.2.3	Sichtbarkeit des Wiederaufrufs	Visibility of recall	e
5.2.3.2.4	Erreichbarkeit Externer Links	Availability of external links	e
5.2.3.2.5	Erkennbarkeit der Sprungziele	visibility of link targets	e
5.2.3.3	Anzeigeelemente	graphics	
5.2.3.3.1	Vorhandensein	existence	e
5.2.3.3.2	Erwartungskonformität	conformity to expectations	e
5.2.3.4	Blättern, usw.	browse	
5.2.3.4.1	Vorwärts	forward	e
5.2.3.4.2	Rückwärts	backward	e
5.2.3.4.3	letzte Situation	undo	e
5.3	**Unterstützungsfeatures**	**supporting features**	
5.3.1	**Drucken**	**print**	
5.3.1.1	Druckversion größerer Textmengen	print version of bigger texts	d
5.3.2	**Notizzettel**	**notes**	
5.3.2.1	Existenz	existence	d
5.3.2.2	Anbringen an Seiten	add to a site	d
5.3.3	**Demo**	**demo**	
5.3.3.1	Existenz	existence	e
5.3.3.2	Umfang	amount	d
5.3.4	**Kontrollleiste – Ton**	**control panel – sound**	
5.3.4.1	Steuerung	control	e
5.3.5	**Kontrollleiste – bewegte Bilder**	**control panel - animations**	
5.3.5.1	Steuerung	control	e
5.3.6	**Beenden**	**exit**	
5.3.6.1	Verlassen des Programms	quit the program	e
5.3.7	**Wiedereinstieg**	**re-entry**	
5.3.7.1	Anknüpfen an letzten Stand	continue	e
5.4	**Kommunikation**	**communication**	
5.4.1	Synchrone Kommunikation	synchronous communication	
5.4.1.1	Ermöglichung synchroner Kommunikation	enabling synchronous communication	d
5.4.1.2	Unterstützung der synchronen Kommunikation durch Zusatztools	support synchronous communication using add-on tools	d
5.4.1.3	Unterstützung der synchronen Kommunikation durch Chat-Tools	support synchronous communication using chat-tools	d
5.4.1.4	Unterstützung der synchronen Kommunikation durch Instant	support synchronous communication using instant messaging	d

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

	Messaging (IM)		
5.4.1.5	Unterstützung der synchronen Kommunikation durch Audio / Videokonferenzen	support synchronous communication using audio-/video-conferencing	d
5.4.1.6	Unterstützung der synchronen Kommunikation durch gemeinsame Nutzung von Anwendungen	support synchronous communication using shared application	d
5.4.2	Asynchrone Kommunikation	asynchronous communication	
5.4.2.1	Ermöglichung asynchroner Kommunikation	enabling asynchronous communication	d
5.4.2.2	Unterstützung der asynchronen Kommunikation durch Annotationstools	support asynchronous communication using annotation tools	d
5.4.2.3	Unterstützung der asynchronen Kommunikation durch Foren	support asynchronous communication using fora	d
5.4.2.4	Unterstützung der asynchronen Kommunikation durch zusätzliche Publikationsmöglichkeiten für Lernende	support asynchronous communication using additional publication possibilities for learners	d
5.4.2.5	Unterstützung der Kommunikation in Gruppenarbeitsprozessen	support communication in team-working processes	d

6	**Theoretische Aspekte**	**theoretical aspects**	
6.1	**Psychologische Aspekte**	**psychological aspects**	
6.1.1	**Motivation**	**motivation**	
6.1.1.1	Maßnahmen	measures	d
6.1.2	**Angst vor Misserfolg**	**fear of failure**	
6.1.2.1	Gegenmaßnahmen	countermeasures	d
6.2	**Lernpsychologische Aspekte**	**aspects concerning the learning psychology**	
6.2.1	**Maßnahmen**	**measures**	
6.2.1.1	Existenz	existence	e
6.2.1.2	Angemessenheit des lernpsychologischen Konzepts	suitability of the learning psychology concept	e
6.2.1.3	Motivation zur Lernleistungskontrolle	motivation for learning progress control	
6.2.1.3.1	Explizit	explicit	d
6.2.1.3.2	Implizit	implicit	d
6.2.1.4	Einordnung des Einsatzes	classification of the measures	
6.2.1.4.1	Behavioristisch	behaviouristic	d
6.2.1.4.2	Kognitionspsychologisch	cognitive-psychological	d
6.2.1.5	An Erfahrungen anknüpfend	to tie to existing experiences	d
6.2.2	**Behavioristische Ansätze**	**behavioristic approaches**	

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6.2.2.1	Programmierte Instruktion	programmed instructions	
6.2.2.1.1	Kleinstschrittigkeit	information transfer in smallest information packages	e
6.2.2.1.2	Verstärkungsmechanismen	Reinforcing mechanisms	e
6.2.3	**Kognitionspsychologische Ansätze**	**cognitive psychological approaches**	
6.2.3.1	**Entdeckendes Lernen**	**explorative learning**	
6.2.3.1.1	Reihenfolge der Bearbeitung	processing sequence	e
6.2.3.1.2	Manipulation	manipulation	e
6.2.3.1.3	Recherchen durch Lerner	Investigations by learners	
6.2.3.1.3.1	Anreize durch Darstellung der Inhalte	Stimulation through presentation of the content	e
6.2.3.1.3.2	Technische Unterstützung	technical support	e
6.2.3.2	Lernen durch Einsicht	learning through deeper insight	
6.2.3.2.1	Übungen	exercises	e
6.2.3.2.2	Rückverweise	references	e
6.2.3.2.3	Erklärungen	explanations	e
6.2.3.2.4	Anknüpfen	Continuation	e
6.2.3.3	Handlungsorientiertes Lernen	learning by doing	
6.2.3.3.1	Handlungsabläufe	sequences	e
6.2.3.3.2	Entscheidungsgrundlagen	basis for decisions	e
6.2.3.4	Konflikte erzeugen	initiate conflicts	e
6.2.3.5	Konstruktivistische Ansätze	constructivist approaches	d
6.2.4	**Lernen am Modell**	**learning with an exemplar**	
6.2.4.1	Behavioristische Orientierung	behaviouristic orientation	d
6.2.4.2	Kognitive Orientierung	cognitive orientation	d
6.2.4.3	Eignung des Modells	Suitability of the model	e
6.2.5	**Lernen lernen**	**learn learning**	
6.2.5.1	Reflexion über Lernkontrolle	reflection on learning progress control	d
6.2.5.2	Reflexion über Arbeitsweisen	reflection on working habits	d
6.2.5.3	Reflexion über Zeitmanagement	reflection on time management	d
6.2.5.4	Reflexion über Selbstüberwachung	reflection on self-monitoring	d
6.2.5.5	Hinweise	information	d
6.2.6	**Übungen und Tests**	**exercises and tests**	
6.2.6.1	Umfang	amount	e
6.2.6.2	Zielangemessenheit der Übungen	adequate focus of the exercises	e
6.2.6.3	Zielangemessenheit der Tests	adequate focus of the tests	e
6.2.6.4	Transparenz der Bewertung	Transparency of assessment	e

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6.2.7	**Übungen**	**exercises**	
6.2.7.1	Existenz	existence	e
6.2.7.2	Vielfalt der Übungsformate	variety of different exercise styles	d
6.2.7.3	Lösung	answer	
6.2.7.3.1	Lösbarkeit	solvability	e
6.2.7.3.2	Lösungshilfen	hints	e
6.2.7.3.3	Unterstützung zur Lösung	support	e
6.2.7.3.4	Lösungsabruf	recall possibility of the answers	e
6.2.7.4	Rückmeldung	feedback	
6.2.7.4.1	Richtig-Rückmeldung	positive feedback	e
6.2.7.4.2	Erläuterung der Richtig-Lösung bei Übungen	explanation of the positive feedback for exercises	e
6.2.7.4.3	Differenzierte Rückmeldung	differentiated feedback	e
6.2.7.4.4	Begründungen der Falsch-Lösungen	explanation of the negative feedback	e
6.2.7.4.5	Hilfe nach Falsch-Lösungen	assistance after negative feedback	e
6.2.7.4.6	Übungsergebnismeldung	feedback on the results of the exercises	e
6.2.8	**Tests**	**tests**	
6.2.8.1	Nutzer-Ergebnisinformation	information on test results for users	
6.2.8.1.1	Ergebnisinformation bei Tests (Existenz)	information on test results (existence)	e
6.2.8.1.2	Ergebnisinformation bei Tests (Schnelligkeit)	information on test results (promptness)	e
6.2.8.1.3	Detailinfo bei Tests	detailed information on tests	d
6.2.8.2	Lehrer-Ergebnisinformation	information on test results for teachers	
6.2.8.2.1	Ansicht	view	d
6.2.8.2.2	Weiterverwertung	further utilisation	d
6.3	**Didaktische Aspekte**	**didactical aspects**	
6.3.1	**Darstellungskonzepte**	**concepts for presentation**	
6.3.1.1	Angemessenheit des didaktischen Konzepts	suitability of the didactical concept	e
6.3.1.2	Multiple, redundante Darstellung	multiple, redundant presentation	e
6.3.1.3	Multiple, ergänzende Darstellung	multiple, additional presentation	e
6.3.1.4	Konzept der semantischen Diskrepanz	concept of the semantic discrepancy	e
6.3.2	**Interaktivitätsanforderungen**	**interactivity requirements**	
6.3.2.1	Entscheidungsniveau	decision level	
6.3.2.1.1	Stufe 1	level 1	d
6.3.2.1.2	Stufe 2	level 2	d
6.3.2.1.3	Stufe 3	level 3	d

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6.3.2.1.4	Stufe 4	level 4	d
6.3.2.2	Interaktivitätsniveau	level of interactivity	d
6.3.2.3	Unterstützung von kooperativen Lernen	Support of collaborative Learning	d
6.3.3	**Unterstützungsmaßnahmen**	**supporting measures**	
6.3.3.1	Orientierungsunterstützung	supporting the orientation	
6.3.3.1.1	Visuelle Hervorhebung durch Formatierungen	visual accentuation by text formatting	d
6.3.3.1.2	Visuelle Hervorhebung: Konsistenz	visual accentuation: consistency	e
6.3.3.1.3	Zusammenfassungen	summary	d
6.3.3.1.4	Exkurse	excursus	d
6.3.3.1.5	Differenzierte Darstellung der Inhalte	different ways of content presentation	e
6.3.3.1.6	Hierarchisierung von Inhalten	hierarchical content	e
6.3.3.2	Zielsetzung	purpose	
6.3.3.2.1	Angabe der Ziele	designation of the goals	d
6.3.3.2.2	Vereinbarkeit der Ziele mit dem Vorwissen	compatibility of intended goals with the previous knowledge	e
6.3.3.3	Rückbezüge	references	
6.3.3.3.1	Rückbezüge, sequentiell	sequential references	e
6.3.3.3.2	Rückbezüge, nicht sequentiell	non sequential references	e
6.3.4	**Schwierigkeitsniveau / Komplexität**	**degrees of difficulty / complexity**	
6.3.4.1	Definition der Begriffe	definition of the terms	e
6.3.4.2	Stufenkonzept	graduation concept	
6.3.4.2.1	Nachvollziehbarkeit einer vorhandenen Abstufung	Comprehensibility of an existing graduation	e
6.3.4.2.2	Auswahlunterstützung	support of self-assessment	e
6.3.5	**Weitere Maßnahmen**	**additional measures**	
6.3.5.1	Eselsbrücken	cribs	d
6.3.5.2	Schwierigkeitssteigerung	increase of difficulty	d
6.3.5.3	Abwechslungsreichtum des Produkts insgesamt	variety of the whole product	d
6.3.5.4	Beispiele	examples	d
6.3.5.5	Transfer	transfer	d
6.3.5.6	Varianz der Informationsdichte	Variety of information density	d
6.4	**Nutzungskonzept**	**concept of utilisation**	
6.4.1	**Einbettung in Lernumgebung**	**embedding in the learning environment**	**e**
6.4.2	**Begründung**	**explanation**	**e**

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6.4.3	**Angemessenheit der theoretisch zu begründenden Maßnahmen**	**suitability of the measures to be explained theoretically**	
6.4.3.1	Unterstützung der Lernziele durch das Konzept insgesamt	supporting the learning goals by the whole concept	e
6.4.3.2	Unterstützung der Zielgruppe durch das Konzept insgesamt	supporting the target group by the whole concept	e
6.4.3.3	Umsetzung des genannten Konzepts	implementation of this concept	e

7	**Kodierung der Information**	**coding of the information**	
7.1	**Inhaltsäquivalenter Informationstransport**	**content equivalent information transport**	
7.1.1	**Visuelle Kombinationen**	**visual combination**	
7.1.1.1	visuell-visuell	visual – visual	e
7.1.1.2	auditiv-visuell	aural – visual	e
7.1.1.3	visuell-auditiv	visual – aural	e
7.2	**Bilder**	**images**	
7.2.1	**Bildqualität**	**quality of the images**	
7.2.1.1	Schärfe	sharpness	e
7.2.1.2	Kontrast	contrast	e
7.2.1.3	Helligkeit	brightness	e
7.2.1.4	Tiefe	depth	e
7.2.1.5	Figur-Grund-Trennung	figure-background-differentiation	e
7.2.1.6	Erkennen des Wesentlichen	identification of the essentials	e
7.2.1.7	Farbenblindheit/Fehlsichtigkeit	Colour-blindness/ametropia	e
7.2.2	**Technische Aspekte**	**technical aspects**	
7.2.2.1	Alternative Darstellung	alternative presentation	e
7.2.2.2	Bilddateigröße	size of the image file	e
7.2.3	**Didaktische Aspekte**	**didactical aspects**	
7.2.3.1	Format	format	e
7.2.3.2	Detailliertheit	degree of details	e
7.2.3.3	Darstellungsperspektive	perspective of the presentation	e
7.2.3.4	Gestalttheoretische Prinzipien	design-theoretical aspects	e
7.2.3.5	Überschriften/Unterschriften	headlines/underlines	e
7.2.3.6	Überschriften – Detailliertheit	headlines – degree of details	e
7.2.3.7	Kombinationen	combinations	
7.2.3.7.1	Kombination Bild – geschriebener Text	combination image – written text	e
7.2.3.7.2	Kombination Bild – gesprochener Text	combination image – spoken text	e

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

7.2.4	**Spezialfall: Diagramme**	**special case: diagrams**	
7.2.4.1	Diagrammart	type of diagram	e
7.2.4.2	Legende	legend	e
7.2.4.3	Skalierung	scaling	e
7.2.4.4	Achsenbeschriftung	labelling of the axis	e
7.2.4.5	Interpretationsrichtung	affected interpretation	e
7.2.4.6	Kombination Diagramm – Tabelle	combination diagram - chart	e
7.2.5	**Spezialfall: Realbilder (photorealistische Bilder)**	**special case: photo-realistic images**	
7.2.6	**Spezialfall: Logische Bilder**	**special case: logical figures**	
7.2.7	**Spezialfall: Piktogramme**	**special case: pictogram**	
7.2.8	**Spezialfall: Karikaturen**	**special case: caricature**	
7.3	**Bewegte Bilder**	**animated images**	
7.3.1	**Geschwindigkeit**	**speed**	
7.3.1.1	Veränderungsmöglichkeit für Nutzer	control option for user	e
7.3.2	**Zoom**	**zoom**	
7.3.2.1	Steuerung durch Nutzer	control option for user	e
7.3.2.2	Einfluss auf Bildqualität	Influence on visual quality	e
7.3.3	**Perspektivenwechsel**	**change of perspective**	
7.3.3.1	Veränderung durch den Nutzer	control option for user	d
7.3.4	**Spezialfall: zweidimensional**	**special case: two-dimensional**	
7.3.5	**Spezialfall: dreidimensional**	**special case: three-dimensional**	
7.3.6	**Kombinationen**	**combinations**	
7.3.6.1	Begründung für die gemeinsame Präsentation	explanation of the combined presentation	e
7.3.6.2	Texteinblendungen	text fade-in	
7.3.6.2.1	Dauer der Einblendungen	duration of the fade-in	e
7.3.6.2.2	Umfang der Einblendung	amount of the fade-in	e
7.3.6.3	Sprechtext	spoken text	
7.3.6.3.1	Zusammenhang zwischen Bild und Text	coherence between image and text	e
7.3.6.4	Graphische Einblendungen	graphic fade-in	
7.3.6.4.1	Zusammenhang	coherence	e
7.4	**Texte**	**texts**	
7.4.1	**Begriffliche Konsistenz**	**conceptual consistence**	
7.4.1.1	Konsistente Verwendung der genutzten Begriffe	consistent use of used terms	e
7.4.2	**Fachtermini/Übersetzung**	**technical terms/translation**	
7.4.2.1	Existenz eines Glossars	existence of a glossary	e

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

7.4.2.2	Existenz eines Wörterbuch (Sprachlernprogramme)	existence of a dictionary (language learning)	
7.4.2.2.1	Verfügbarkeit im System	internal availability	e
7.4.2.2.2	Externe Verfügbarkeit	external availability	e
7.4.3	**Spezialfall: Geschriebener Text**	**special case: written text**	
7.4.3.1	Inhalt des Textes	content of the text	
7.4.3.1.1	Kompliziertheit	complexity	e
7.4.3.1.2	Aussprachehilfen	help for pronunciation	e
7.4.3.2	Visuelle Darstellung	visual presentation	
7.4.3.2.1	Zeichen	characters	e
7.4.3.2.2	Formate	formats	e
7.4.3.2.3	Farben	colours	e
7.4.4	**Spezialfall: Gesprochener Text**	**special case: spoken text**	
7.4.4.1	Inhalt des Textes	content of the text	
7.4.4.1.1	Kompliziertheit	complexity	e
7.4.4.1.2	Umfang	amount	e
7.4.4.2	Sprache selber	language itself	
7.4.4.2.1	Aussprache	articulation	e
7.4.4.2.2	Sprechgeschwindigkeit	talking speed	e
7.4.4.2.3	Tonfall	accent	e
7.4.4.2.4	Mehrere Sprecher	multiple speaker	e
7.4.4.2.5	Differenziertheit der Sprache	differentiation of the language	e
7.4.4.3	Organisation	organisation	
7.4.4.3.1	Kontrollleiste	control bar	e
7.4.4.3.2	Ohne Ton	without tone	e
7.4.5	**Spezialfall: Tabellen**	**special case: charts**	
7.4.5.1	Strukturierung	structuring	
7.4.5.1.1	Strukturierungskriterium	structuring criteria	e
7.4.5.1.2	Graphische Unterstützung	graphical support	e
7.4.5.2	Gestaltung	design	
7.4.5.2.1	Spaltenüberschriften	column headlines	e
7.4.5.2.2	Zeilenbenennungen	row description	e
7.4.5.2.3	Manipulationen der Tabelle	chart manipulation	e
7.4.5.2.4	Zoombarkeit	zoom	e
7.4.6	**Spezialfall: Charts**	**special case: charts**	
7.4.6.1	mind map (Vollständigkeit)	mind map (completeness)	e
7.4.6.2	site map (Vollständigkeit)	site map (completeness)	e

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

7.4.7	**Kombinationen**	**combinations**	
7.4.7.1	Schrift-Wort	script-word	e
7.4.7.2	Bild-Text-Kombination	image-text-combination	e

8	**Formate und Gestaltung**	**formats and design**	
8.1	**Animationen**	**animations**	
8.1.1	**Sinn und Zweck**	**spirit and purpose**	
8.1.1.1	Informationsinhalt	information content	e
8.2	**Simulationen**	simulations	
8.2.1	**Sinn und Zweck**	**spirit and purpose**	
8.2.1.1	Informationsinhalt	information content	e
8.2.2	**Regeln / Funktionsgesetze**	**rule / function**	
8.2.2.1	Funktionsregeln	operations rules	e
8.2.3	**Manipulation**	**manipulation**	
8.2.3.1	Konsequenzen	consequences	e
8.2.3.2	Aktueller Zustand	status quo	e
8.2.3.3	Unterbrechung	break points	e
8.3	**Aufgaben**	**exercises**	
8.3.1	**Offene Aufgaben**	**open exercises**	
8.3.1.1	Vorhandensein von Musterlösungen	existence of an example answer	e
8.3.2	**Geschlossene Aufgaben**	**closed exercises**	
8.3.2.1	Entscheidungsgrundlage für Lösung	decision-making-basis for exercises	e
8.3.2.2	Rückgängig-Machen vor Lösungsabruf	undo function	e
8.3.2.3	Lösungen	answers	e
8.3.3	**Spezialfall: Lückentext-Aufgaben**	**special case: cloze exercises**	
8.3.3.1	Erschließbarkeit der fehlenden Fragments	deduction of the missing fragment	e
8.3.3.2	Fehlertoleranz bei Schreibweise	fault tolerance for spelling	e
8.3.4	**Spezialfall: Multiple Choice-Aufgaben (MC-Aufgaben)**	**special case: multiple-choice exercises**	
8.3.4.1	Format	format	e
8.3.5	**Spezialfall: Mehrfach-Multiple Choice-Aufgaben (MMC-Aufgaben)**	**special case: multi-multiple-choice exercises**	
8.3.5.1	Alternativenanzahl	number of alternatives	e

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

8.3.5.2	Anzahl der korrekten Alternativen	number of correct answers	e
8.3.5.3	Auswahl der Alternativen	choice of alternatives	e
8.3.5.4	Falschen Alternativen	wrong alternatives	e
8.3.5.5	Inhalt der Alternativen	content of alternatives	e
8.3.5.5.1	Sinnhaftigkeit	sense	e
8.3.5.5.2	Direkte Negation	direct negation	e
8.3.6	**Spezialfall: Zuordnungsaufgaben**	special case: correlation exercises	
8.3.6.1	Überschuss bei Zuordnungsaufgaben	overplus in correlation exercises	e
8.3.6.2	Eindeutigkeit bei Zuordnungsaufgaben	clearness in correlation exercices	e
8.3.6.3	Textfragmente zu Texten	text-fragments to a complete text	
8.3.6.3.1	Erschließbarkeit der Lösung	deduction of the correct answer	e
8.3.6.3.2	Ratewahrscheinlichkeit	probability to guess right	e
8.3.6.4	Texte zu Bildern	text to image	e
8.3.6.5	Bild zu Text	images to text	e
8.3.6.6	Bilder zu Bilder	image to image	e
8.4	**Spracherfassung**	**voice recording**	
8.4.1	**bei Sprachlernprogrammen**	**in language learning programs**	
8.4.1.1	Vorhandensein der Sprachaufzeichnung	existence of voice recording	e
8.4.1.2	Vorhandensein der Sprachwiedergabe	existence of voice play back	e
8.4.1.3	Aussprachevergleich	pronunciation comparison tool	e
8.4.1.4	Funktionsfähigkeit	operativeness	e
8.5	**Gesamtgestaltung**	**look & feel**	
8.5.1	Roter Faden des Gesamtprodukts	thread through the whole product	e
8.5.2	Produkt: aus einem Guss	monolithic product	e
8.5.3	Ansprechende Gestaltung des Gesamtprodukts	appealing design of the product	e
8.5.4	Ansprechende Bedienung des Gesamtprodukts	appealing handling of the product	e

Table 5: Reference Quality Criteria

© ISO 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Annex E
(informative)

Harmonized model for quality management for learning, education, and training: mapping CELTSC and RFDQ

The Chinese contribution [Zhit2003] presents a Total Quality Management approach applied to the field of Learning, Education, and Training. In this chapter, the CELTSC model is mapped to the RFDQ. By connecting those approaches, we show how the reference framework and a specific approach can be connected and interrelated. Therefore, the Chinese model can be seen as a first step towards a harmonized model, corresponding to steps 2 and 3 of the standardization process (see chapter 3).

Note: This chapter shall describe how a specific country profile can be generated using RFDQ. It only provides a sample how the model can be used. Therefore, only selected processes of CELTSC are mapped in order to show the mapping process.

In the following, the main steps of mapping CELTSC to RFDQ are explained.

Mapping CELTSC framework

The Framework (see below) of CE LTSC is used as objectives of each process.

© ISO 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Example: Mapping the CELTSC category "Responsiveness"

ID	Category	Process	Description	Relation
LP.3	Learning Process	Support of learning activities	Description of the support provided for learning process	*CD. Conception/ Design* *LP.2 Learning activities*
Sub-processes / Sub-aspects	• Communication • Collaboration • Interaction • Supervision and Moderation • Experience Exchange • Qualifying of Tutors • Self-organization and self-direction			
Objective	1. Responsiveness of service request: Education institution can satisfy the learner's service request in time 2. Responsiveness of teacher: Answer learner's questions and review their assignments timely 3. Publishing information in time: e-learning providers should publish information of instruction, management and service timely as notification for class, exam schedule, scores of exam, etc			
Method	The responsiveness shall be tested by periodical tests. A complaint hotline should be installed. In case of complaints by students, a meeting with the responsible support actors will be arranged; corrective actions will be agreed on.			
Result	Support concept. Support hotline. Complaint management.			
Actor	Teacher, support staff, learners			
Metrics /Criteria	Responsiveness will be measured by the average reply time. The complaint rate will be measured by "complaints per student" and "complaints per course"			
Standards				
Annotation / Example				

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

The same mapping procedure can be done for the other categories of the CELTSC framework.

Mapping general requirements

The general requirements (section 5.3.1) can be easily mapped and are partly already included in RFDQ. As an example, in both models processes are defined and clearly specified. Additionally, criteria and metrics are an integral part of both models. The documentation requirements are also part of CELTSC and RFDQ. The documentation within RFDQ is done using the proposed template for processes and their specifications.

Quality Management principles can be mapped to the context of the educational process. The subprocess of the organizational context is the main process for these requirements/principles.

Example:

ID	Category	Process	Description	Relation
FA.1	Framework Analysis	Analysis of the external context	Identification, description and evaluation of the external context / framework of the educational process	NA.2; NA.3; CD; DP
Sub-processes / Sub-aspects			- legal context / conditions - economic context / conditions - **organizational context / conditions** - social context / conditions - educational context / conditions	
Objective			**Customer focus:** The e-learning institution depends on its customer (as learners) for existence. It provides services for their customers and interested parties (such as parents, society etc.) and therefore should understand current and future needs for customer and interested parties (in particular, related to learning, knowledge, experience, and capabilities of individuals), should meet their requirements and strive to exceed their expectations. **Leadership:** The e-learning institution establishes unity of purpose, direction, and the means of their activity. They create the environment in which they can become fully involved in achieving their objectives. **Involvement of people:** people at all levels are the essence of an organization and their full involvement enables their abilities to be	

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

	used for organization's benefit. **Process approach:** a desired result is achieved more efficiently when related resources and activities of e-learning, instruction and management activities are managed by the individual as a process. **System approach to management:** identifying, understanding and managing a system of interrelated processes for achieving a given objective contributes to the effectiveness and efficiency. **Continual improvement:** a permanent objective of the institution is its continual improvement. Continual improvement is continual activity to improve the ability to satisfy its needs. **Factual approach to decision making:** effective decisions of the individual are based on the analysis of the factual data and other relevant information, which is performed according to the logical procedures or personal experience. **Mutually beneficial supplier relationships:** the ability of the e-learning institution and its suppliers (e-learning instruction technology providers, e-learning content providers, etc.) to create a value is enhanced by mutually beneficial relationships.
Method	
Result	
Actors	
Metrics / Criteria	
Standards	
Annotation / Example	

Mapping process elements

The process elements (chapter 6) of the CELTSC model can be mapped to the reference processes of RFDQ. The requirements of CELTSC are then mapped to the objectives of the corresponding process in RFDQ.

CELTSC Process	RFDQ Process
6.1.1 Management Commitment	FA.1 Analysis of external context
6.1.2. Customer Focus	FA.1 Analysis of external context – Specification through process attributes: objectives /

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 – All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

	methods
6.1.3 Quality Policy	FA.1 Analysis of external context
6.1.4 Planning	FA.3 Time and budget planning
6.1.5 Responsibility, authority and communication	FA.2 Analysis of staff resources - Specification through process attributes: actors
6.1.6 Management review	FA.1 Analysis of external context - Specification through process attributes: objectives / methods / metrics/criteria
6.2.1. Resource Management: HR	FA.2 Analysis of staff resources - Specification through process attributes: actors
6.2.2. Resource Management: Infrastructure	FA.6 Environment Analysis; CD.6 Technical Concept; IM.x Implementation
6.2.3. Resource Management: Instruction Resources	CD.x Conception / Design , specifically CD.2 Concept of the contents
6.2.4. Resource Management: Learner Information	LP.1 Administration; LP.3 Activities.Support Activities
6.2.5. Resource Management: Other resources	CD.x Conception / Design Processes; DP.x Development / Production Processes
6.3.1 Service Realization: Planning of realization process	CD.x Conception / Design Processes
6.3.2 Service Realization: Process related to customer	CD.x Conception / Design Processes
6.3.3 Service Realization:: Design &/ Development	CD.x Conception / Design Processes; DP.x Development / Production Processes
6.3.4 Service Realization:: Purchasing	FA.5 Time and budget planning; CD.x Conception / Design Processes
6.3.5 Service Realization: Service Provision	LP.x Learning Processes
6.4.1 Evaluation and Improvement: Measurement and Monitoring	Measurement and monitoring is part of every process (process attributes: method; metrics/criteria)
6.4.2 Evaluation and Improvement: Control of non-conformance	EO.2 Realization, EO.3 Data Analysis
6.4.3 Evaluation and Improvement: Analysis of data	EO.3 Data Analysis
6.4.4 Evaluation and Improvement: Improvement	EO.4: Optimization / Improvement

Table 6: Mapping CELTSC and RFDQ

Therefore, the models can be easily mapped. RFDQ is used in the first phase of standardization, whereas CELTSC is a model for phases 2 and 3 of the standardization process.

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Annex F
(informative)

Specific quality objectives

In this section it is shown, how specific quality objectives and goals can be included in RFDQ. Including a specific goal and corresponding methods (such as guidelines or principles) is the first step of generating an individual profile of RFDQ.

The two examples are based on two expert contributions by Canadian and US experts [KoFr2003, Fara2003].

Metadata Quality

In this chapter it is shown how a specific quality objective, i.e., the quality of metadata, can be included in the model. This section is based on the Canadian contribution [KoFr2003].

"Building on Svenonius's work, Tillett's recommendations to the Joint Steering Committee for the Revision of AACR (http://www.nlc-bnc.ca/jsc/prin2001.pdf) suggest the following Principles of Bibliographic Description and Access:

- **Principle of user convenience**
  Decisions taken in the making of descriptions and controlled forms of names for access should be made with the user in mind. A subprinciple is the

- **Principle of common usage**
  Normalized vocabulary used in descriptions and access should accord with that of the majority of users.

- **Principle of representation**
  Descriptions and controlled forms of names for access should be based on the way an information entity describes itself. A subprinciple is the

Not for Resale
© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

- **Principle of accuracy**
  Descriptions and controlled forms of names for access should faithfully portray the entity described.

- **Principle of sufficiency and necessity**
  Descriptions and controlled forms of names for access should include only those elements that are bibliographically significant.

- **Principle of standardization**
  Descriptions and controlled forms of names for access should be standardized, to the extent and level possible.

- **Principle of integration**
  Descriptions for all types of materials should be based on a common set of rules, to the extent possible. “ [KoFr2003]

Within the process conception and design, a process “Metadata creation” can be introduced. Within this process, guidelines concerning the generation of metadata can be specified as shown in the table below.

ID	Category	Process Name	Description	Relations
CD.2	Conception / Design	Concept for contents	Concept of learning and teaching contents	
Sub-processes / Sub-aspects	Metadata creation			
Objective	Metadata creation: To produce a framework that provides a clear, precisely stated, and commonly shared understanding of what it is that the bibliographic record aims to provide information about, and what it is that we expect the record to achieve in terms of answering user needs			
Method	Use of metadata guidelines: • **Principle of user convenience** Decisions taken in the making of descriptions and controlled forms of names for access should be made with the user in mind. A subprinciple is the • **Principle of common usage**			

Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

	Normalized vocabulary used in descriptions and access should accord with that of the majority of users. • **Principle of representation** Descriptions and controlled forms of names for access should be based on the way an information entity describes itself. A subprinciple is the • **Principle of accuracy** Descriptions and controlled forms of names for access should faithfully portray the entity described. • **Principle of sufficiency and necessity** Descriptions and controlled forms of names for access should include only those elements that are bibliographically significant. • **Principle of standardization** Descriptions and controlled forms of names for access should be standardized, to the extent and level possible. • **Principle of integration** Descriptions for all types of materials should be based on a common set of rules, to the extent possible
Result	Bibliographic record
Actors	Metadata creator, users
Metrics / Criteria	
Standards	IEEE 1484.12.1:2003 Learning Object Metadata, CanCore
Annotation / Example	

Introducing specific sub-processes, specific aspects can be included into RFDQ leading to a specific profile of the generic model.

Data quality

One specific quality goal is to provide quality data within the process. In this section the objectives and criteria by [Fara2003] are mapped to RFDQ to provide another example how specific requirements can be mapped.

“Each facet of data collection and analysis requires a precise understanding of ‘data quality’.

EXAMPLES:

(1) For each subclause 2.3, each ID has its own data quality associated with it.

Not for Resale

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization © ISO/IEC 2005 All rights reserved
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

(2) For an ID, the facets of data quality, i.e., Objective, Method, Result, Actors, Metrics, Criteria, etc., each have their own data quality descriptions (e.g., "Method" would concern various kinds of errors and bias that statisticians would analyze).

For each datum or data set that is collected, the following criteria may be supplied:

- Relevance: An inquiry about data is relevant if it meets users' needs. The identification of users and their expectations is therefore necessary.
- Accuracy: Accuracy is defined as the closeness between the estimated value and the (unknown) true value.
- Timeliness and Punctuality in Disseminating Results: What is the committed publication and dissemination schedule. For example, most users want up-to-date figures which are published frequently and on time at pre-established dates.
- Accessibility and Clarity of the Information: Data have most value when they are easily accessible by users, are available in the forms users desire and are adequately documented. Data should be described by ISO/IEC 11179-3.
- Comparability: Data for a given characteristic have the greatest usefulness when they enable reliable comparisons of values taken by the characteristic across space and time. Note: The comparability component stresses the comparison of the same data among implementations in order to evaluate the meaning of aggregated data.
- Coherence: When originating from a single source, data are coherent in that elementary concepts can be combined reliably in more complex ways. When originating from different sources, and in particular from statistical (data) surveys of different frequencies, statistics are coherent in so far as they are based on common definitions, classifications and methodological standards.
- Completeness: Domains for which data are available should reflect the users' needs." [Fara2003]

These guidelines and criteria can be mapped into the RFDQ introducing a specific objective of providing data quality. Obviously, data quality is part of the evaluation of the processes.

ID	Category	Process	Description	Relation
EO.3	Evaluation / Optimization	Data Analysis	Description of the data analysis	*all categories*
Sub-processes / Sub-aspects	• summary • analysis			

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

	• interpretation • recommendation
Objective	To provide quality data for data collection and analysis.
Methods	Data should be described by ISO/IEC 11179-3
Result	Adequate data during data collection and analysis.
Actor	Evaluator, users, database administrator
Metrics / Criteria	• Relevance: An inquiry about data is relevant if it meets users' needs. The identification of users and their expectations is therefore necessary. • Accuracy: Accuracy is defined as the closeness between the estimated value and the (unknown) true value. • Timeliness and Punctuality in Disseminating Results: What is the committed publication and dissemination schedule. For example, most users want up-to-date figures which are published frequently and on time at pre-established dates. • Accessibility and Clarity of the Information: Data have most value when they are easily accessible by users, are available in the forms users desire and are adequately documented. • Comparability: Data for a given characteristic have the greatest usefulness when they enable reliable comparisons of values taken by the characteristic across space and time. Note: The comparability component stresses the comparison of the same data among implementations in order to evaluate the meaning of aggregated data. • Coherence: When originating from a single source, data are coherent in that elementary concepts can be combined reliably in more complex ways. When originating from different sources, and in particular from statistical (data) surveys of different frequencies, statistics are coherent in so far as they are based on common definitions, classifications and methodological standards. • Completeness: Domains for which data are available should reflect the users' needs
Standards	ISO/IEC 11179-3
Annotation / Example	

Not for Resale
© ISO/IEC 2005 – All rights reserved

Annex G
(informative)

References

The following referenced documents support the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC Guide 2, *Standardization and related activities — General vocabulary*

ISO/IEC 2382, *Information technology — Vocabulary*

ISO 9000:2000, *Quality management systems — Fundamentals and vocabulary*

ISO 9001:2000, *Quality management systems — Requirements*

ISO 9004:2000, *Quality management systems — Guidelines for performance improvements*

ISO 10015:2001, *Quality management — Guidelines for training*

ISO/IEC 11179-3:2003, *Information technology — Data management and interchange — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

DIN PAS 1032-1 *Learning, Education and Training focussing on e-Learning — Part 1: Reference Model for Quality Management and Quality Assurance — Planning, Development, Realisation and Evaluation of Processes and Offers in Learning, Education and Training*

AFNOR Z 76-001 French Code of Practice in e-Learning

[Blan2003] Blandin, Bernard: Some issues in Quality in education and training raised by the French law on Validation of Experiential Learning, 2003.

[KoFr2003] Kosovac, Branca, Friesen, Norm: Report on Metadata Quality Management Practices, 2003.

[Fara2003] Farance, Frank: Data Quality. E-Mail communication. 2003-11-09.

[Trem2000] Tremblay, Ellen: An Evaluation of Online Distance Education Course Databases. March 31, 2000. Available at: <http://telecampus.edu/pubrep.doc>

[Sven2000] Svenonius, Elaine. The Intellectual Foundation of Information Organization. Cambridge, Mass.: MIT Press, 2000.

[Zhit2003] Zhu Zhiting, Zhang Yi, Li Qing, Hu Xiaoyong: CELTSC, Specification for Service Quality Management System of e-Learning, 2003.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ICS 03.100.30; 35.240.99

Price based on 121 pages

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale