Christian M. Stracke

How Innovations and Competence Development support Quality in Lifelong Learning

www.opening-up.education

How Innovations and Competence Development support Quality in Lifelong Learning

by Christian M. Stracke (2014)

Citation:

Stracke, C. M. (2014). How Innovations and Competence Development support Quality in Lifelong Learning. *The International Journal for Innovation and Quality in Learning (INNOQUAL)*, *2*(3), 35-44. [Open Access]
DOI: www.doi.org/10.5281/zenodo.3608669
[also online available at: http://www.opening-up.education/publications]

Contact:

Dr. Christian M. Stracke
ICDE Chair in OER
Associate Professor for Open Education and Innovation
Open University of the Netherlands
Adjunct Professor, Korean National Open University
Advisory Professor, East China Normal University
ORCID: 0000-0001-9656-8298
Christian.Stracke@OU.NL

http://www.opening-up.education
http://www.learning-innovations.eu
http://www.ICORE-online.org

INNOQUAL
The International Journal for Innovation and Quality in Learning
Full Open Access

How Innovations and Competence Development support Quality in Lifelong Learning

Christian M. Stracke
christian.stracke@uni-due.de

eLC / University of Duisburg-Essen, Germany

ABSTRACT

This article discusses how to achieve the best appropriate learning quality as the core objective in learning, education and training by combining the three dimensions learning history, learning innovations and learning standards. Only their combination can ensure that learners' needs are met and that the best, appropriate learning opportunities with high learning quality are provided for. They have to address the societal changes by the Digital Age and to fit to the given situation in lifelong learning enabling long-term and sustainable improvement across education and training. The paradigm shift towards outcome orientation in learning and the introduction of competence development are identified as two main facilitators and supporters for improving the quality in lifelong learning.

KEYWORDS *Learning quality, learning innovations, learning history, learning standards, competence development, education and training, digital age*

INTRODUCTION

Learning innovations and learning quality have been important and reflected topics for a very long time from the beginning of discussions and theories about learning processes. In Europe, Plato's Allegory of the Cave is one of the earliest examples. Their debate continued during the introduction of the first universities in the Middle Ages and of the school systems in the 18th century. During the last years and the upcoming so called "digital age", many discussions have taken place due to the two main changes covering all sectors, branches and levels of society:

1 Globalisation and

2 Establishment of the worldwide internet

These two factors are leading to global markets, worldwide networking, communication and competition, as well as to the digitalisation of services and systems with the introduction of internet-based services, hardware, and software within all parts of our lives. They have and are still changing all societies and in particular lifelong learning, education and training.

EUROPEAN POLICIES FOR THE DIGITAL AGE AND FUTURE LEARNING

The European Union has identified the challenges and opportunities of these global changes and published several communications and framework for future European society and its learning, education and training. Based on the Lisbon Declaration, the former vision of the Information Society called i2020 and the established Bologna Process (European Commission 2005), the European Commission and Council have reviewed and analysed the impact of globalisation, the internet and information technologies in general, leading to current new communications and policies:

EUROPE 2020 promotes a smart, sustainable and inclusive economy as a leading policy and basis for the future of Europe to be achieved until 2020 in five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy (European Commission 2010a).

The Digital Agenda for Europe, as part of EUROPE 2020, is the strategy of the European Union to help digital technologies, including the internet, deliver sustainable economic growth and support the objectives of EUROPE 2020 for a better digital future in Europe (European Commission 2010b).

And finally the communication on Education and Training 2020 reflects these movements in their relations to learning opportunities with special emphasis on the potentials for the European citizens and communities (European Council 2009).

INTERNATIONAL DISCUSSIONS ON FUTURE LEARNING IN THE DIGITAL AGE

In international discussions about the future learning, education and training from theory, research and politics but also from press, individuals and social communities, the main focus is currently on the technological innovations and their opportunities. That is valid for learning opportunities and in particular for learning at work. Theories and experts are claiming brand new and extraordinary chances, sometimes promising new learning eras and paradigms: e. g., the theories of connectivism by Siemens (2005) or of Social Learning by Hart (2011). Even the arrival of fundamental new ways of learning are promised under the label of learning 2.0 / 3.0 in analogy to the terms web 2.0 / 3.0 (Downes 2005, Karrer 2007, and for an overview Redecker 2009). Finally new concepts and descriptions of our world as a 'flat world' are leading to predictions that 'to learn how to learn' will become the most important asset for all workers due to all the changes and faster innovation (Friedman 2006). It is claimed that is this a new movement and progress however it has been clear and evident in pedagogy for several hundreds of years (if not longer) that 'to learn

how to learn' is most important for learning processes and progress and for the development of personality and competences (Dewey 1966, Piaget 1953, Rousseau 1968 [originally published 1762], Vygotsky 1988).

From this perspective, it seems that learning innovations are the only path and road map for a better future education and training. The underlying (and often hidden) argument is that through them we are earning many new chances to learn, and without them we are not matching the changing times of globalisation and worldwide internet as well as the new digital generation, the so labelled "digital natives" (Prensky 2001, cf. for a general criticism of this term Schulmeister 2008). We call this discussion the (learning) innovation strand.

On the other hand, there has been a long-term discussion with a longstanding tradition (since the beginning of our culture) about learning quality covering a broad range of topics, like the quality of learning design, objectives, materials, input as well as learning processes, outcomes and the achieved knowledge, skills and built competences. In the past, many theories were developed dealing directly or implicitly with the question how to ensure or to improve learning quality (cf. for an overview Stracke 2006a). We call this debate the (learning) history strand even if some of the topics like quality management for education and training are less than 100 years old.

Surprisingly, both discussion strands, the new innovation and the old history, are not interconnected and do not reflect each other. It seems that the supporters of learning innovations do not want to refer to theories of the past and that vice versa the authors of learning history do not want to recognise global changes. That leads us to an important question that requires urgent attention and an answer in our changing times: What is the relation between learning innovations and learning quality?

Our answer is based on three hypotheses of the current learning situation:

1. Learning history should not and cannot be ignored.
2. Learning innovations are mainly technology-driven.
3. Learning is not completely changing.

First of all, it has to be stated clearly that the worldwide changes by globalisation and internet for all through World Wide Web, social media and communities do not justify withdrawing or ignoring all theories from the past. They result from many discussions across societies, cultures and centuries leading to learning experiments, evaluations, failures as well as successes and finally to the improvement of both the learning opportunities as well as the learning theories themselves. Modern innovation theories ignoring this treasure of expertise from history are losing a well-proven foundation for basing their argumentation (even if contradictory) that is providing a huge variety of different concepts (e.g. cf. for extremes the theories of cognitive development by Piaget 1953 and the systems theories by Luhmann 1995 and 1998 and Maturana/Varela 1992). Moreover their ignorance is not convincing because without defining their relation to the historical strand they claim to originate from nothing (see figure 2 below) and start from the scratch (which is evidently not the case).

Second, the currently claimed learning innovations based on the effects of new internet opportunities, services and social media not only deal with technological changes and opportunities. Of course we can realize diverse learning scenarios and (digital) communities, services and systems today that were not available several years ago like social communities, MOOCs, blogging (Redecker 2009, Hart 2011, Daniel 2012). But these technological inventions and changes only offer new options and pre-conditions. They cannot be successful by themselves, they still require an appropriate learning design and setting with an attractive and motivating learning environment: For those (and other) reasons Daniel (2012) calls “MOOC” the 'educational buzzword of 2012'.

Finally, learning is not becoming completely different and changing only due to globalisation, new technologies and network opportunities. The new technologies and global changes are providing challenges and chances to establish new ways to base,

present and integrate learning processes within education and training and learning groups including new options for self-regulated learning. But these new modes and types of access and interactions in learning processes do not change completely the way how people learn. The style how to use, consume and reflect learning opportunities and materials may change through increasing speed and multi-tasking and lower attention, but that is only increasing the requirements for learning designers, educators and teachers.

What is most important for the success of learning processes is learning quality. Learning opportunities have to meet the needs of the learners and to provide the appropriate quality to fulfill their requirements. That can sometimes mean a simple learning course with teacher-centered education and sometimes a complex sophisticated learning environment with learner-oriented group work, enriched and facilitated by an educator as moderator, tutor or enabler, as well as with new learning technologies and innovations including social media and communities. That means that learning quality cannot be pre-defined but has to be adapted to the given situation and learners. In this sense, learning history and learning innovations are two different approaches and points of view that are interdependent and cannot be reflected upon alone but have to be analysed in conjunction for achieving the best and appropriate learning opportunity and success. Next to them, standards build the third source for planning and designing the best learning opportunity and quality (see figure 1), which will be explained more in detail below.

HOW TO ACHIEVE LEARNING QUALITY?

This overall objective for the continuous improvement of learning quality can be called quality development. Quality development has to combine the relevant and appropriate approaches, concepts and elements from all three dimensions upon which learning quality is based: history (by learning theories and traditions), innovation (by new learning options) and standards (by consensus building on learning).

As shown in figure 2, there could be three alternatives and options in theory: to focus only on the learning innovations only (1.), to focus only on the history of learning traditions and theory (2.) or to arrange the mix between both approaches (3.). As already explained above, it is not possible to argue that the only focus on learning innovations can succeed by

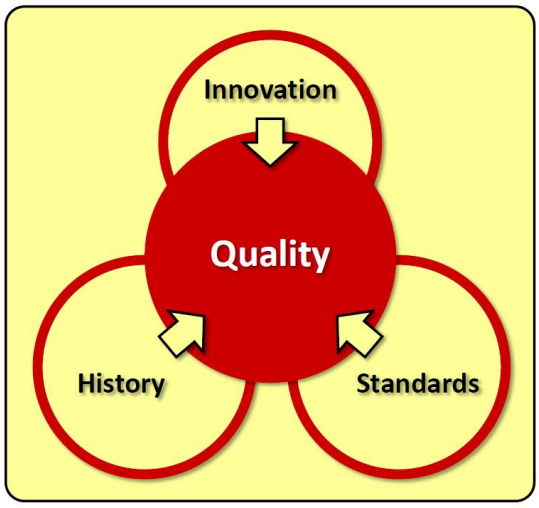

Figure 1 The three dimensions of learning quality

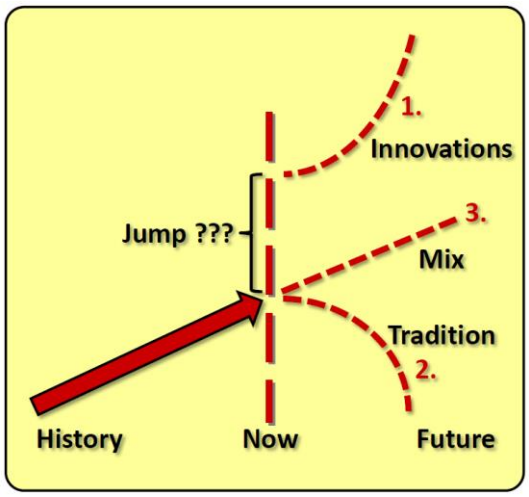

Figure 2 The potential three options for future learning quality

jumping out of nothing as it cannot be argued and proven how such a jump can take place by ignoring the learning experiences and theories. On the other hand, future learning opportunities have to reflect the changes in society and opportunities through innovations and would also fail by ignoring them. Therefore only the mix of learning innovations and history based on learning experiences and theories from the past is promising and convincing as shown in figure 2.

Thus, we can say: quality development is the crucial task for learning, education and training.

In the past, a long-term debate has focussed on quality development in general regarding the different quality issues, aspects and approaches (cf. Deming 1982; Juran 1951 and 1992; and for an overview Stracke 2006a). Quality development in its broad sense can be defined as follows (cf. Stracke 2006b):

Quality development covers every kind of strategy, analysis, design, realisation, evaluation, and continuous improvement of the quality within given systems.

Quality development can be described formally by the chosen scope. Quality is not a fixed characteristic belonging to subjects or systems but depends amongst others on the point of view and scope. The following differentiation of the scope into three quality dimensions has become widely accepted:

- Potential dimension: What are the potentials for the quality development in the future?
- Process dimension: How can the processes be described and optimized for the purpose of quality development?
- Result dimension: How can the quality development be supported regarding given results and systems[2]?

Quality development requires a long process to be established and integrated throughout a whole organisation and in particular, society. Once started, it has to become a continuous improvement circle to be finally successful (Crosby 1980; Deming 1986). Quality cannot be described and fixed by a simple definition, because in itself quality is too abstract to have any impact. Therefore, quality has to be defined and specified according to the given context and situation considering the perspectives of stakeholders involved (Donabedian 1980). It is important to identify the relevant aspects and to specify the suitable criteria. It is necessary to find a consensus amongst the different views and perspectives to gain a common understanding of quality for the given context and situation due to different and sometimes contradictory needs and definitions of quality by all stakeholders (for detailed explanations on context determinations cf. Crosby 1980; Deming 1986; Donabedian 1980).

In this way quality awareness is the basic requirement for the adoption of quality development by all stakeholders from any organisation. But on the other hand quality awareness will also be raised by the implementation of quality development. To come to a sustainable integration of quality development within the whole organisation and to ensure the involvement of all stakeholders it is crucial to build a quality strategy and to integrate the quality objectives into the educational and business processes. Also the stakeholders' needs and responsibilities need to be integrated into the overall quality development.

The process of the adoption, implementation and adaptation of quality development can roughly be divided into three steps based on three different levels that need to be covered and addressed for a sustainable and long-term quality development, according to the concept of the introduction of quality development within organisations (see figure 4, for the three level concept of the introduction of quality development cf. Stracke 2006b and 2009a):

1. Level of the individual persons
2. Level of the organisations, communities, education and training systems and societies
3. Integration of quality development involving all stakeholders

[2] Cf. Donabedian 1980, for the whole long-term debate on the quality issues, aspects and approaches cf. Deming (1982 and 1986) and Juran (1951 and 1992).

Figure 3 The dimensions for defining quality in general

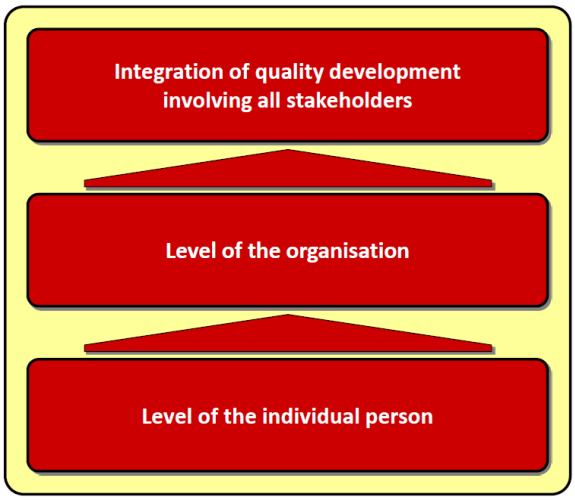

Figure 4 The three levels of quality in general

These explanations are valid for the quality development of learning, education and training in general. The question in the following will be as to how quality and lifelong learning are interlinked and can be combined and addressed by a common approach and instruments, in short: How to improve quality in lifelong learning?

THE PARADIGM SHIFT FROM INPUT TO OUTCOME ORIENTATION IN EDUCATION AND TRAINING

The answer to the key question "How to improve the quality in lifelong learning?" is many-fold and not simple in our days of the digital age with all the aforementioned changes. The paradigm shift plays one major role in the evolution from input to outcome orientation in learning that has been introduced and is taking place in more and more enterprises and organizations to address and fit the current challenges. Today we have to learn during our entire lifetimes to fulfil lifelong learning in order to be prepared for future jobs and tasks that do not yet exist, which are still unknown and cannot even be thought about (Davenport 2005, Friedman 2006, Keeley 2007). This paradigm shift from input to outcome orientation in learning is moving the focus from knowledge (as learning input), which can more and more quickly become outdated, to competences (as learning outcomes), including abilities to transfer and act successfully in an unknown situation.

The importance and impact of competences and of competence development has constantly been increasing since the beginning of the digital age (see above). This is not only true for the (new) media competence (also often called media literacy) but for the business sector and the society itself as a whole. In the Digital Agenda 2020, the European Commission underlines the growing weight and significance of competences for

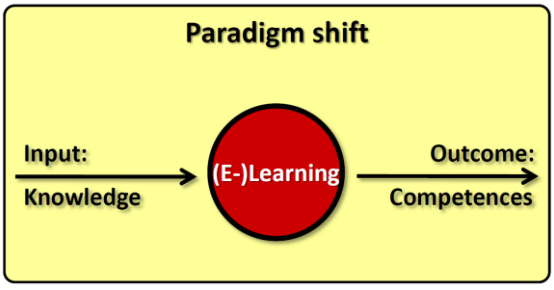

Figure 5 The paradigm shift to learning outcome orientation

the future of Europe and the whole world community and for the international mobility (EC 2010). This has been confirmed by experts from human resources and vocational education and training (VET) as well. The term "competence" is currently on top of the agenda for several reasons: competences as well as the building and the measurement thereof are becoming more crucial for business success in our times of increasing flexibility, speed and globalisation within the economy. Organisations, and in particular enterprises, have to face more complex and unpredictable challenges in markets and societies due to globalisation and stronger competition - together with growing requirements and cost pressures (especially in the economic crisis). At the European level, the concept of key competences (European Parliament/European Council 2006) and the EQF, the European Qualification Framework (European Parliament/European Council 2008), has been developed and approved to face these challenges in lifelong learning. The concept of competence (which is traditionally combined with successful acting in unknown situations in the Central European tradition) offers a theoretical basis for the development of strategies, methods and means for solving the current tasks (Weinert 2001). Enterprises have to make good use of their employees by efficiently and effectively supporting and managing them to survive in the market through success and innovation. In addition, the needs for personal and organizational development have to be identified, and vocational training and change management methods have to be introduced and evaluated, as also mentioned by the OECD (Keeley 2007).

However the term "competence" is defined in many different ways, in particular in business practice. Thus, strong initiatives are taking place in human resource development and in vocational education and training to harmonize the whole competence field on the basis of the requirements from all stakeholders of businesses, political systems and societies (ISO 20006, 2012). The aim is to develop valuable and adaptable instruments for the building, measurement, and modelling of competences.

For this ambitious and long-term objective, the term "competence" and its historical development and definition have to be established. The historical development lines of the term "competence" in different science disciplines verify the variety and complexity of meanings and views on the term. In psychology, White has used the term "competence" very early to designate skills developed by self-organization and required for performance (1959). In semantics and only a few years later, Chomsky (1962) defined competence as the self-organized ability to construct and understand a potentially unlimited amount of sentences using a limited set of vocabulary and thus, to manage speech acts as a competent speaker. And based on these concepts, two different schools of thought were developed in different directions: the first line continued the Chomsky's ideas by broadening them to a human being's acting in general; the second line used the term for societal criticism and combined it along with "coping", in particular with the generation of social situations.

This short overview demonstrates the increasing relevance and importance of the concept of competence, independent from the variety of different traditions and understandings. In the following we use the term "competence" according to its general meaning defined by Stracke (2011) as:

> Competence is the ability (that cannot be observed directly but only by activities) to adequately and successfully combine and perform necessary activities in any contexts to achieve specific tasks or objectives.

Using this definition as the basis, the potential (non-observable) competences and the (observable) activities performing the competence can be distinguished. This is most important and can be expressed by using the following simplified representation:

- Competence = Knowledge + Skills (+ individual ability)
- Activities = Performance of Knowledge + Skills + Competences (+ individual ability)

Competences can be built and exist without being demonstrated and performed. Most important is the fact that they are non-observable; they are only shown and observable through acting, i.e. through performance and activities. Only activities can be observed and measured.

To summarize, the general answer to the key question regarding how to improve quality in lifelong learning is given by the paradigm shift from input to outcome orientation in learning, and by the introduction of competences as the main basis and core concept for this shift.

Further key questions are how competences and their development contribute to the improvement of lifelong learning and its quality and what are their use cases and benefits. A framework for competence modelling and related instruments was developed in several research projects and tested in pilot implementations (cf. Stracke 2011 and 2009b for more details). In a very brief summary, it can be stated that competence models are required and used for describing and measuring competences. Thus, competence models are the core instruments for competence modelling and its implementation and therefore for competence development in general. Competence models contribute and support the improvement of learning quality and build the basis for lifelong learning.

CONCLUSIONS

This article has analysed how to achieve the best appropriate quality in lifelong learning through the introduction and support of innovation and competence development. The changes through the digital age require new approaches to fulfil future jobs and tasks that are still unknown today. Therefore it is a core objective for learners, learning providers and the whole society to focus on the quality of lifelong learning and to improve it by learning outcome orientation and competence development. This can be addressed by combining the three dimensions learning history, learning innovations and learning standards. Only their combination can ensure that learners' needs are met and that the best, appropriate learning opportunities with high learning quality are provided for. They have to address the societal changes by the Digital Age and to fit to the given situation in lifelong learning enabling long-term and sustainable improvement across education and training. The paradigm shift towards outcome orientation in learning together with the introduction of competence development could be identified as two main facilitators and supporters of improving quality in lifelong learning. It has to be stated that current research and development is still in its initial stages but the future roadmap is becoming clear: development towards learning and personal and societal life, not separated and isolated, but instead combined and interlinked in all learning modes (formal, non-formal and informal) through learning outcome orientation, competence development and technology-enhanced learning. Learning innovations will be the facilitator and learning design and pedagogy will remain most important aspects for learning quality and success.

REFERENCES

Chomsky, N. (1962): Current Issues in Linguistic Theory. The Hague: Mouton.

Crosby, P. B. (1980): Quality is Free. The art of making quality certain. McGraw-Hill, New York.

Cross, J. (2010): Working smarter fieldbook, Internet Time Alliance, Berkeley, CA.

Daniel, J. (2012): "Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility", online available at: http://sirjohn.ca/wordpress/wp-content/uploads/2012/08/120925MOOCspaper2.pdf, retrieved 2012-11-02.

Davenport, T. (2005): Thinking for a Living: How to Get Better Performances and Results from Knowledge Workers, Harvard Business Review Press, Boston.

Deming, W. E. (1986): Out of the Crisis. MIT, Cambridge, MA.

Deming, W. E. (1982): Quality, productivity and competitive position. MIT, Cambridge MA.

Dewey, J. (1966): Democracy and Education: An Introduction to the Philosophy of Education, The Free Press, New York.

Donabedian, A. (1980): The Definition of Quality and Approaches to Its Assessment [= Explorations in Quality Assessment and Monitoring, vol. 1]. Health Administration Press, Ann Arbor.

Downes, St. (2005): E-Learning 2.0, in: eLearn Magazine (October 2005), http://elearnmag.acm.org/featured.cfm?aid=1104968.

European Commission (2010a): EUROPE 2020 - A strategy for smart, sustainable and inclusive growth [COM/2010/2020 final]; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC2020:EN:NOT.

European Commission (2010b): A Digital Agenda for Europe [COM/2010/0245 final]; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0245:EN:NOT.

European Commission (2005): i2010 – A European Information Society for growth and employment {SEC(2005) 717} [COM/2005/0229 final]; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52005DC0229:EN:NOT.

European Council (2009): Education and Training 2020 (ET 2020); http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009XG0528%2801%29:EN:NOT.

European Parliament/ European Council (2008): Recommendation of the European Parliament and of the Council on the Establishment of the European Qualifications Framework for Lifelong Learning (EQF). [online available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:111:0001:0007:EN:PDF]

European Parliament/ European Council (2006): Recommendation of the European Parliament and of the Council on Key Competences for Lifelong Learning. [online available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:EN:PDF]

Friedman, T. (2006): The World is Flat. Penguin Books, London.

Hart, J. (2011): Social Learning Handbook, Centre for Learning & Performance Technologies, Wiltshire.

ISO/IEC 19796-1:2005: Information Technology - Learning, Education, and Training — Quality Management, Assurance and Metrics — Part 1: General Approach. International Organization for Standardization (ISO), Geneva (2005).

ISO/IEC 19788-1:2010 (2010): Information Technology - Learning, Education, and Training — Metadata for Learning Resources — Part 1: Framework. International Organization for Standardization (ISO), Geneva.

ISO/IEC 20006-1 (2012): Information Technology for Learning, Education and Training — Information Model for Competency — Part 1: Competency General Framework and Information Model (CD), ISO, Geneva.

Juran, J. M. (1992): Juran on quality by design. The new steps for planning quality into goods and services. Free Press, New York.

Juran, J. (Ed.) (1951): Quality Control Handbook. McGraw-Hill, New York.

Karrer, T. (2007): Understanding E-Learning 2.0, in: Learning Circuits (07/2007), http://www.astd.org/Publications/Newsletters/Learning-Circuits/Learning-Circuits-Archives/2007/07/Understanding-E-Learning-20.

Keeley, B. (2007): Human Capital. How what you know shapes your life, OECD, Paris. [also online available at: http://www.oecd.org/insights/humancapital]

Luhmann, N. (1998): The Society of the Society [= Die Gesellschaft der Gesellschaft]. Suhrkamp Frankfurt/ Main.

Luhmann, N. (1995): Social Systems. Stanford University Press, Stanford.

Maturana, H. R./ Varela, Francisco J. (1992): The Tree of Knowledge. The Biological Roots of Understanding. Shambhala, Boston.

Piaget, J. (1953): The origin of intelligence in the child. Routledge; London.

Prensky, M. (2001): "Digital Natives, Digital Immigrants - Part II: Do they really think differently?", in: On the Horizon, 9 (6), 1-9.

Redecker, C. (2009): Review of Learning 2.0 Practices: Study on the Impact of Web 2.0 Innovations on Education and Training in Europe, Joint Research Centre; Luxembourg.

Rousseau, J.-J. (1968): The Social Contract, Penguin, Harmondsworth.

Siemens, G. (2005): "Connectivism: Learning as Network-Creation", online available at: http://elearnspace.org/Articles/networks.doc, retrieved 2012-11-02.

Schulmeister, R. (2008): Gibt es eine "Net Generation"? Version 2.0, http://www.zhw.uni-hamburg.de/uploads/schulmeister-net-generation_v2.pdf.

Stracke, C. M. (2011): "Competence Modelling for Innovations and Quality Development in E-Learning: Towards learning outcome orientation by competence models"; in: Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunication 2011 [= EdMedia 2011] (2011), AACE, Chesapeake, VA, 1885-1894.

Stracke, C. M. (2010a): "Quality development and standards in learning, education, and training: adaptation model and guidelines for implementations". In: Информатизация образования и науки [= Информике (Informika), ISSN 2073-7572]; Vol. 7 (3), 2010. Moscow (Russian Federation), 136-146 [online available at: http://www.qualitydevelopment.eu/docs].

Stracke, C. M. (2010b): Quality and Standards in Learning, Education, and Training: The Adaptation Model IDEA for the Introduction of Quality Development. In: Proceedings of the International Conference on the Past and Future of e-Learning Standards. Toyo, Tokyo. [also online available at: http://www.qualitydevelopment.eu/docs]

Stracke, C. M. (2009a): Quality Development and Standards in e-Learning: Benefits and Guidelines for Implementations. In: Proceedings of the ASEM Lifelong Learning Conference: e-Learning and Workplace Learning. ASEM, Bangkok. [also online available at: http://www.qualitydevelopment.eu/docs]

Stracke, C. M. et. al. (2009b): PAS 1093:2009. Human Resource Development with Special Consideration of Learning, Education and Training – Competence Modelling in Human Resource Development. Berlin: Beuth. [also online available at: http://www.qualitydevelopment.eu/docs]

Stracke, C. M. (2006a): Process-oriented Quality Management. In: Pawlowski J. & Ehlers, U. (Eds.) European Handbook on Quality and Standardisation in E-Learning. Springer, Berlin: 79-96.

Stracke, C. M. (2006b): Interoperability and Quality Development in e-Learning. Overview and Reference Model for e-Learning Standards. In: Proceedings of the Asia-Europe e-Learning Colloquy. e-ASEM, Seoul. [also online available at: http://www.qualitydevelopment.eu/docs]

Vygotsky, L. (1988): Thought and Language. Cambridge, MA: MIT Press.

Weinert, F. E. (2001): "Concept of Competence: A Conceptual Clarification", in: Rychen, D. S. (Ed.): Defining and Selecting Key Competencies, Hogrefe & Huber: Seattle et al., 45-66.

White, R. W. (1959): "Motivation Reconsidered. The Concept of Competence", in: Psychological Review, 66, 297-333.