

Quality evaluation of education and learning

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Abstract: *Education is considered as the main driver for the development of people, organizations and societies as a whole, and to ensure this quality should be considered as the essential factor in the education and learning. High quality does not take place accidentally but needs a professional approach and coherent quality realization in the processes of teaching and learning and within the educational organizations' management. Quality evaluations are the key managerial activities of the organizations and related to the operations control, performance improvement and quality assurance.*

Today quality concepts that are used in education are ambiguous, and education evaluations at different national and international educational levels are inconsistent and fragmented with regard to their scopes and purposes. However, professional quality and evaluation concepts and practices are well established in many sectors of our societies. Recognized quality concepts and principles are internationally standardized, and metrology is the theoretical basis of measurements and evaluations.

Quality evaluations should not be isolated activities but they should be driven by the clear purpose and lead to appropriate measures for developing learners, teachers, educational organizations and their stakeholders, and the societies at large.

The focus of this article is on the formal and non-formal educational organizations and their learning outputs influencing individuals' lifelong learning. However, a lot of learning takes place through the informal ways even in the context of the organized education.

Keywords education, learning, quality, evaluation

1 Challenges and opportunities

1.1 Combining the four perspectives: Education, learning, quality and evaluation

Quality is the main factor in all forms of education and learning so that education could be considered as the main driver for the development of people, organizations and societies (UNESCO, 2005). UNESCO's new global vision for education towards 2030 (UNESCO, 2015) declares: "Ensure inclusive and equitable *quality education* and promote lifelong learning opportunities for all". This strong commitment to the quality of *education* and improving *learning outputs* also emphasizes the need for the consistent *evaluation and mechanisms to measure* progress. Combining education, learning, quality and evaluation, however, is a multifaceted and difficult theoretical and practical challenge.

Education should always be examined in connection with its main output, learning. However, in addition to the learners, educational organizations have many other interested parties that must be taken into account in the quality considerations. Education takes place in the formal, non-formal and informal

ways (UNESCO, 2010), and learning is related to individuals, organizations, and societies as a whole (Anttila and Jussila, 2015). All this makes the educating and learning phenomena very complicated. The scope of our interest is the comprehensive area of education from the viewpoint of lifelong learning, although the primary focus of this article is the learning of an individual person as the output of formal and non-formal educational organizations.

Globally recognized quality concepts, principles and methodologies have been developed during more than a hundred years by the quality profession, and they also are internationally standardized (ISO, 2015 & 2009) and practiced in the most countries and used in millions of different organizations. The educational sector should not be any exception, but we have discovered that the general professional quality approach is not well-known among education experts and interaction between education and quality experts has been minimal.

Evaluation is conceptually a challenging topic of the general measurement theory and practice. Metrology is the science of measurement and its application, and its vocabulary (OIML, 2010) covers the generally accepted terms and definitions. These basic concepts may and should be used also when evaluating the quality of education and learning.

1.2 Inconsistency of the prevailing evaluation practices

Our societies provide a great variety of formal and non-formal education for lifelong learning through different organizations (Anttila and Jussila, 2015):

- General education from kindergartens and primary schools to universities: Preparing for becoming and growing as a member of society and the citizenship, and contributing to the working life in the society and the world
- Training and education of young people in vocational schools: Preparing for an occupation and profession for the needs and expectations of the society and its organizations, and person's career development
- Training and education in adult education centers: Getting specialized knowledge and skills for citizenship and wellbeing
- Training and education by third sector organizations, e.g. sport clubs, youth centers, associations, etc.: Developing skills and attitudes
- Training and education by educational or consulting enterprises: Getting specialized knowledge and skills and networking

These different learning environments have different influences on how the education is practiced and how the learning takes place. This matter of fact should be taken into account when considering quality and its evaluation practices.

The prevailing evaluation practices are fragmented and inconsistent in the sector of education. Many organizations have developed their own different models for considering the quality of educational organizations and systems and the quality of learning, which are used at different educational levels nationally and internationally (Anttila and Jussila, 2015). Many of these models also refer to quality and consider evaluation aspects:

- UNESCO EFA (Education for all). GEQAF (General education quality/diagnostic framework): The education system and learning environment; targets, structure and functioning of the education. LLECE (Latin American laboratory for the assessment of the quality of education). SACMEQ (The Southern and Eastern Africa consortium for monitoring educational quality)
- OECD PISA (The programme for international student assessment): Assessment of the 15-year-old students' scholastic performance on mathematics, science and reading
- TIMSS (Trends in international mathematics and science study): Assessment of the fourth and eighth grade students' knowledge in mathematics and science, and PIRLS (Progress in international reading literacy study): Assessment of the 4th grade students' reading literacy
- EIU (The Economist intelligence unit) Learning Curve: Analysis of the educational systems in a broad sense

- The American Baldrige excellence framework (Education) and the European EFQM excellence model (EFQM, 2013)
- The Bologna process: Approach to ensure comparability in the standards and quality of higher education qualifications and university quality assurance
- EQAVET (the European quality assurance in vocational education and training)
- ISO standardization: ISO/PC 288 on the educational organizations management systems (ISO 21001) (will supercede ISO 29990:2010, ISO/IEC CD 36001, ISO/WD 18420)
- National standardization, e.g. NP 4512:2012: A Portuguese management system standard fostering quality, innovation and technology in vocational education and training
- PHExcel (PHExcel Consortium, 2014): A European study on quality tools for higher education review and improvement
- Various international and national assessments, classifications, and quality awards, related to universities, polytechnics, colleges, vocational schools, and educational programs

In these approaches education, quality and evaluation are looked through a variety of lenses that causes confusions and raises critical questions:

- What is the purpose of the evaluations?
- What is the scope of the evaluations with regard to educational and quality aspects? The approaches range from very narrow and detailed to comprehensive, and some even are superficial.
- How is the quality concept understood?
- Who does perform the evaluation and whose interest is considered?
- How and for what are the evaluation results used?
- What are the effectiveness and efficiency of the evaluations?
- What are the consequences of wrong, insufficient or incorrectly directed evaluations?

1.3 Building a theoretical basis

The existing situation is a consequence of the difficulties of considering profoundly the educating/learning phenomena, the lack of awareness of the professional quality concepts and principles in education, and the lack of metrological foundation of the evaluations. The situation can be solved only through deriving the approaches from the profound knowledge of the ontological and epistemological basis of education and learning, quality and metrology (Figure 1).

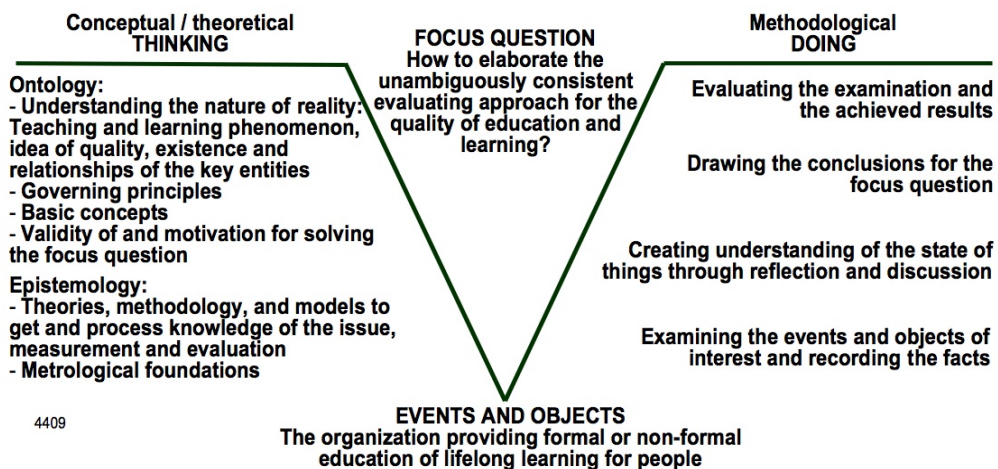


Figure 1. Analyzing and synthesizing the evaluation of quality of education and learning in a systematic and comprehensive way by using the “Vee heuristics” methodology (Wheeldon and Åhlberg, 2012). This methodology connects theory to practice in a consistent way.

Ontological insights form the foundations of our beliefs about the reality with regard to the matter at issue. Epistemology refers to the nature and sources of knowledge and the assumptions upon which they are based. Hence in this our context, ontology refers to the phenomena of education, learning and quality, and epistemology is especially related to characterizing those phenomena, their measurement and evaluation.

The archetypal teaching/learning phenomenon (Anttila and Jussila, 2015) consists of interaction of the teacher and the learner in a certain structure making transformation of knowledge possible between them as a direct human connection or indirectly via hardware and interactive information technology (Anttila and Jussila, 2015). The interaction of the teacher and the learner includes rational, non-rational (mental), or irrational (spiritual) aspects. Learning is the co-created output of the processes of providing and receiving learning. Connectivism, interaction and collaboration are at the core of learning.

The essence of *quality* according to its standardized definition (ISO, 2015 & 2009) is the perception of satisfaction of all involved educational parties. Especially the teacher and the learner should both perceive the teaching/learning event valuable. The key challenge for quality is to recognize and *fulfill the needs and expectations*, in particular the needs and expectations of the learner and the teacher, and other interested parties of education including involved organizations and the whole society. They cannot be standardized, nor even easily identified.

Individuals' needs and expectations for learning are related to persons' different life cycle stages, quality of life expectations, and their world-views. When the person is acting as a member of an organization, also special requirements exist according to the purposes and needs of the organization. As a member of a society, a person's learning themes may relate to (Anttila and Jussila, 2015):

- Usage of and operation with the variety of the community services
- Human factors and ergonomics
- Security with regard to property, belongings, privacy and life, societal stability, and regional defense
- Human rights, freedom and equality
- Esthetics
- Ethical aspects
- Social performance, including connectivity, interactivity and sharing, innovativeness, and incorruptibility
- Ecology and sustainability
- Economy and efficiency

In educational organizations teaching processes and their supporting processes are managed as a system (Anttila and Jussila, 2012). Quality is ensured through *quality management* that means *the management of the organization with regard to quality* (ISO, 2015 & 2009). Quality management is primarily for the organization's own internal managerial purposes. A part of the quality management is quality assurance, and its purpose is to create or strengthen confidence among the organizations external stakeholders that the organization is capable to fulfill their requirements (ISO, 2015 & 2009).

1.4 From theory to practice

Theoretical foundation is a necessity also for measurements and evaluations (Anttila and Jussila, 2011). Measurement means experimentally obtaining one or more quantity values that can reasonably be attributed to object of the measurement. Especially the concepts fact, data, information, and knowledge should clearly be understood, and their roles and relationships recognized (Figure 2). Facts represent the reality in the educational processes and in the educational organization. Through measurements we can get data, and analyzing the data its meaning and importance with regard to the teaching and learning. This information can be the basis for understanding the situation in the educational processes and knowledge for actions according to the purpose of the evaluation and the situation.

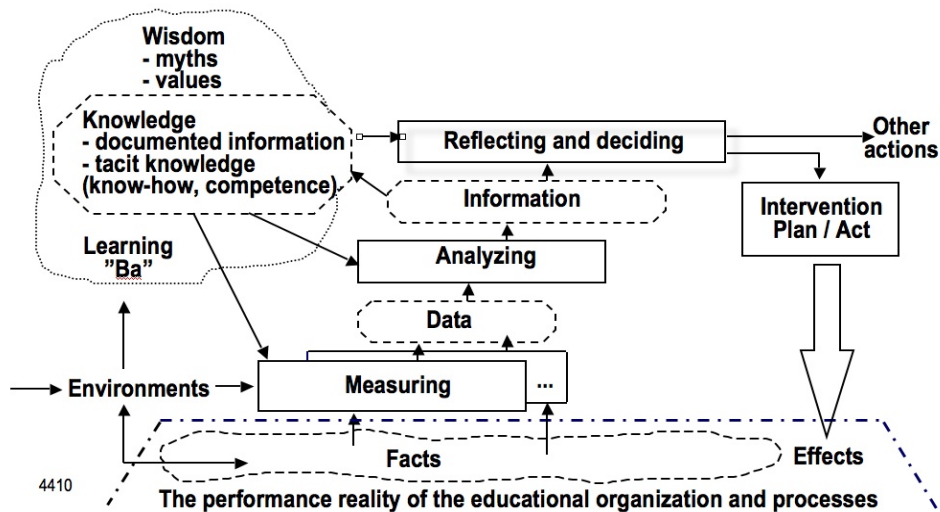


Figure 2. From fact-based evaluation to knowledge-based action: Evaluation or measurement actions and methodologies are based on knowledge of some individuals or community (“Ba” = a learning community environment (Nonaka et al., 2000)). Also the results of the evaluations are used for a certain purpose by somebody. The target should be to contribute to the improvement of the quality of individuals, organizations and societies

Knowledge is always built on certain theory (Deming, 1993). Theory is a window into the world. Interpretation of data from measurements or evaluations depends largely on how much one has knowledge of the subject matter. Knowledge of somebody always depends on the paradigm of knowledge theories that one follows intuitively or consciously. Pragmatic knowledge theory (Hookway, 2013) is based on the idea that knowledge is true if and only if it works satisfactorily. Hence it is useful also in the purposes of educational evaluations.

In performance measurements and evaluations, one should follow the basic principles of the metrology. This means that quantitative indication of the interested issues, e.g. various aspects of the quality of education and learning, requires the following steps (Anttila and Jussila, 2011):

- Understanding the interested phenomena to be considered and their characters
- Defining measures or indicators, characteristics, and quantity (metrics, measurement unit)
- Selecting numerical values and value range of the quantity

After this, it is possible to determine logically practicalities needed for the evaluations and actions including:

- Target / required values, and observed values
- Meter, gauge, or means to measure or observe the quantity
- Measurement, assessment technique and process
- Uncertainty of the measurements
- Conclusions, decisions and actions based on measurements
- Approach and practices for performance improvement

There are many different purposes for professional measurements and evaluations. These purposes include:

- Research activities for getting new knowledge
- Acquisition of information for planning the organization and its operations
- Controlling operations and processes
 - Performance monitoring
 - Determination measurements for getting information on certain actual situation
 - Verification measurements for requirement or acceptance testing

- Validation testing
- Measurements for problem solving and performance improvement
- Measurements for providing quality assurance information for creating or strengthening confidence among interested parties

Evaluation of the educational organizations, systems and processes is fundamentally different from the evaluation of the learning results, inter alia learners' and teachers' quality perception.

2. Evaluating the quality of educational processes and organizations

Evaluating the quality of an educational organization focuses on the effectiveness and efficiency of the organization's quality management according to the organization's principal purpose. Evaluations are the key activities of the professional quality management (Anttila, 2015; Anttila and Jussila, 2011). Well established practices of the quality profession are available for organizational quality evaluations and generally practiced in different sectors of our societies, although they are not widely used in the educational organizations.

The evaluation covers the organizational enablers (i.e. processes) and the results to learners and teachers and other interested parties of the organization. This also includes the needs of quality assurance (providing confidence among the organization's stakeholders that the quality requirements will be fulfilled) and quality improvement (increasing the organization's ability to fulfill quality requirements) (ISO, 2015 & 2009). Figure 2 summarizes the different viewpoints of the organizational evaluations.

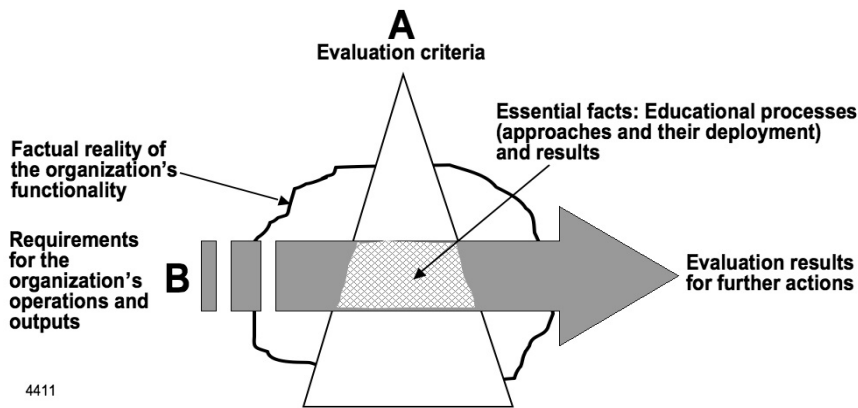


Figure 3. Perspectives to the performance evaluation of an educational organization (Anttila and Jussila, 2012)

Organizational evaluations consist of strategic and operational evaluations that are fundamentally different but must be consistent with each other. Strategic performance evaluations deal with the whole educational organization and are aimed at managerial decisions and activities for enhancing organization-wide performance. The organization is considered in the evaluation through enablers (i.e. the organizations processes including operational, managing and supporting processes) and results it provides to the stakeholders (Anttila and Jussila, 2012). Teaching processes are the most important processes in the educational organizations (Bramley, 1991). They, however, consist of a great variety of many different types of processes including direct interaction between the teacher and the learner and indirect teaching through teaching material, experiment facilities and interactive social media (Anttila and Jussila 2015). Teaching processes are interacting with the learner's learning process that are very individual consisting the following main activities (Mellander, 1993):

- Generating attention to make the learner receptive
- Receiving the information

- Processing the information with the prior knowledge
- Concluding and understanding
- Applying and testing for confirmation

Major strategic evaluation approaches (Anttila and Jussila, 2012) are based on (a) excellence models that focus on organizational learning, process refining and integration and (b) maturity models that focus on fulfilling prescribed performance criteria. We prefer the approach (a), because it appreciates new creative solutions. Principally the evaluations should be made as self-assessments.

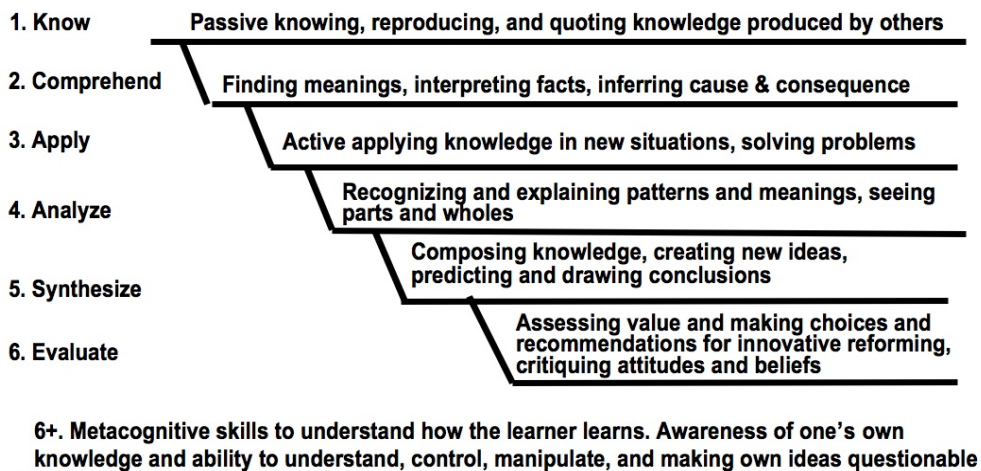
Operational daily evaluation of the individual educating and learning processes relate to performance monitoring, auditing, control and diagnostics, performance improvement, and quality assurance, and particularly managing performance of the individual processes.

Audits are empirical performance evaluations that are more operational (process-oriented) than the self-assessments. Auditing is based on the international standard definition and principles (Anttila, 1997; ISO, 2011). and it is carried out by people who are independent from processes being audited. Internal auditing focuses on the organization's business needs and is an important management activity. External auditing emphasizes how the requirements from the organization's external stakeholders are being fulfilled. Often external auditing is linked with certifications that refer to indicating with a certificate that an organization complies with the specific requirements (Anttila, 2015) and closely related to the organization's communication with its stakeholders. Certifications have been granted with too big (and even an erroneous and deleterious) role in the media. Criticism has been directed at commercialized certifications made by third parties due to the fact that these often entail an emphasis on the standard requirements that not necessarily satisfy the real needs of the organization. Hence, it would be desirable, that the certification actions should not impact too much on the education sector, because it does not represent the genuine quality thinking.

3. Evaluating the quality of learning achievements

Evaluating the quality of learning focuses on examining the development and satisfaction of the learning person according to the person's needs and expectations and should emphasize the on changes that have been born in the learner. That may be considered from very different points of view including cognitive, behavioral or neuroscientific perspectives.

Learning achievements may represent results on different levels of deepness (Lamb and Johnson, 2003) (Figure 4) and be considered as a single loop or double loop learning (Smith and Argyris, 2001).



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Figure 4. Deepness in knowing and learning (Lamb and Johnson, 2003; Mayer, 1998)

Different kinds of recognizing and rewarding are normally linked with the personal evaluation. However, warnings have been presented about the testing and evaluations of human performance, and rewarding people on the basis of the results. The strong concern has been pointed out against standardized evaluations of people, including learners, teachers and leaders or workers of the educational organizations. Especially the following aspects have been brought up:

- People do not have to be ranked in terms of standards. The assessment is artificial, and ranking is harmful and destructive to learner's own potential and creativity. It creates an "economic man" and "human capital," what one can sell on the market (Chomsky, 2015). This kind of standardization of the outcomes-based education represent neoliberalism in education ('Four Seasons In One Kiwi', 2015). The well-known GERM (Global Education Reform Movement) (Graham 2013), which is widely followed everywhere in the world, is also seen as an example of this practice (Sahlberg, 2015).
- Evaluating and rewarding people by quantitative measurements or merit rating nourish short-term performance, annihilates long-term planning, builds fear, demolishes collaboration, nourishes rivalry and politics. It leaves people bitter, crushed, bruised, battered, desolate, despondent, dejected, feeling inferior, some even depressed, unable to comprehend why they are inferior (Walton, 1990).
- Formal degree classification of the success at the university does not necessarily correlate with achievement in later life (Sherriff, 2015).
- Standard evaluations may not bring up negative risks and impacts of weak or bad education and learning. An acute issue is the neurodegenerative impacts, "digidementia", of the modern information technologies of education on the minds of learners (OECD, 2015; Wisnioski, 2015).

Standardized evaluations do not comply with the general quality principles that require the consideration of the real, genuine and individual needs and expectations, which cannot be standardized.

4. Evaluation-based actions

Organizational performance evaluations and their results should be linked to the management of the organization. PDCA (ISO, 2015 & 2009) is the most well-known general model that describes four consecutive management activities that also are strongly involved with evaluations and information:

- P: Planning activities what should be done and what results should be achieved
- D: Getting the obligations done according to the plans (P)
- C: Checking what was done (D) and what results achieved
- A: Acting rationally taking into account the observations and results of the checking (C)

The PDCA model should be applied in three different scopes:

- Control: Daily operations are managed through operational processes so that the planned results are achieved. Observed non-conformities are rectified in connection with control.
- Prevention and operational improvements: This especially means solving acute problems, preventing non-conformity.
- Breakthrough improvements: This includes innovating and implementing strategically significant changes in the way the organization operates.

A lot of methodologies and proved managerial tools have been developed within the general quality profession analyzing evaluation results and carrying out performance improvement actions.

In considering the evaluation results one should avoid possible traps (Schein, 1987) generated by the intrapsychic processes and including:

- Misperception
- Inappropriate emotional response
- Rational analysis based on incorrect data
- Intervention based on incorrect data

6. Conclusions

A lot of different methodologies are used for evaluating educational organizations and learners. However professional quality viewpoints have been weakly considered in these evaluations. In order to ensure effectiveness and efficiency of the education for improving the performance and quality of individuals, organizations and societies, the quality topic should be approached seriously and professionally. As the conclusion we can summarize the following recommendations for the consistent evaluations of the quality of education and learning:

- Consider quality in education and learning evaluations in the professional way, especially recognizing the real genuine needs and expectations
- Evaluate educational organizations' capabilities and abilities (processes) and learners' learning results (process outputs); understand organizations as manageable systems and learners as rational, non-rational (mental) and irrational (spiritual) personalities
- Clarify the purpose of evaluation
- Understand the general metrological principles of measurements and evaluations.
- Ensure the suitable evaluation methodology
- Make clear what to do with the evaluation results for improving quality of the individuals, organizations and the society
- Reveal also the problems and risks with regard to the quality of education and learning

Results of the evaluations represent explicit knowledge but organizational intentions and real educational and learning results are of tacit knowledge of leaders and workers in the educational organizations and of the learners. Evaluations cannot be objective but they are always affected by somebody. What is being evaluated, by what kinds of means or methodology, what is obtained through the evaluations, and how the results of the evaluations are understood; they all depend on the intention and awareness of somebody.

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