

Discussion paper

Terms and definitions related to proficiency testing

Introduction

Following its 18th meeting in Rome (27-28 March 2006), the Eurachem Proficiency Testing Working group (PT WG) agreed to prepare a discussion paper on fundamental terms related to PT. The rationale is the ongoing revision of various guidelines from ILAC [1], ISO [2], and Eurachem [3]. These documents, as well as the revised international harmonized protocol [4] and the new international standard on statistical methods [5], already have or will affect the practical work of many PT providers.

Scope

This paper aims at providing a platform for discussing the most common terms associated with interlaboratory comparisons, especially PT schemes. The Eurachem PT WG has identified a need for such a discussion, based on the following observations:

- There is some inconsistency between terms and/or definitions in different documents. In some cases, the description of the terms or the context where they are used is misleading [1, 2, 4, 5, 6, 7, 8].
- In several European languages, the official terms are practically unknown by laboratory staff. There are also examples where the use of the official terms is even discouraged by official bodies. This became obvious during the production and translation of an information leaflet on PT [9, 10].
- The term “proficiency testing” is discouraged in some parts of the world, by organisations or individuals in certain sectors. One reason is that the term has become associated with regulatory aspects, e.g. in surveillance of laboratory performance, rather than focussing on the educational aspect [11]. Another reason is that the definition (or notes to the definition) of this term does not cover all the aspects that the provider associates with this type of interlaboratory comparisons [11, 12].
- None of the above-mentioned documents seem to list and define all basic terms related to PT. There are also examples of new standards [13], which emphasise, at least to some extent, other aspects of PT than those traditionally encountered in analytical chemistry. There might be a need to agree on new terms to describe such features.
- It is desirable that the revision of the core documents [1, 2] considers established terminology from the entire measurement community, e.g. by pointing to sound synonyms for official terms. Failure to do so, may lead to a demand for sector-specific standards/guidelines. It is, however, equally important that improper terms are highlighted and their use discouraged.

Structure of the document

The table in the following section lists basic terms (left column) related to PT schemes and other interlaboratory comparisons. The definition (or description) and the source are provided in the second column. The third column is used to underpin the statements in the introduction. At the end of this document, some conclusions and suggestions for further work are given.

Term	Definition (or description) and source	Remark
assigned value	value attributed to a particular quantity and accepted, sometimes by convention, as having an uncertainty appropriate for a given purpose [2, 5]	The definition is that for the term conventional true value (of a quantity) VIM:1993, 1.20.
coordinator	the person with responsibility for coordinating all of the activities involved in the operation of a proficiency testing scheme [1]	The EQAP-document by C-AQ IFCC uses the same term but refers to EQAS and EQAP instead of PT.
	organization (or person) with responsibility for coordinating all of the activities involved in the operation of a proficiency testing scheme [2,5]	
external quality control		This term is not defined in the guides or standards on quality assurance quoted here. In one publication [12] the authors discuss internal and external quality control and it is understood that the term is more or less a synonym for PT/EQA. However, it should be discussed if other activities can be considered as external quality control, e.g. regular audits by an accreditation body, or an inspection by a regulatory authority. It should be discussed whether or not a definition could rely on the general term "quality control" as defined in 3.2.10 of ISO 9000 [14].
proficiency testing	determination of laboratory testing performance by means of interlaboratory comparisons (2,5, 6)	In EN 45020:1998 [6] and ISO/IEC Guide 43-1:1997 [2] the term is (laboratory) proficiency testing . The term has not been included in ISO 17000:2004 [19] although it is stated in the foreword that the standard cancels and replaces clauses 12-17 from EN 45020:1998.* The expression "testing performance" in the definition is restrictive when compared to the definition of proficiency testing scheme and of interlaboratory comparison in ISO 13528:2005 [5]. The foreword of ISO/IEC Guide 43-1:1997 [2] mentions determination of "testing performance or measurement performance", i.e. a less restrictive tone, which in addition complies better with the definition of interlaboratory comparison in ISO 13528:2005 [5]. The "EQAP-document" [11] states that "In a strict sense, PT focuses essentially on laboratory performance evaluations for regulatory purposes."
proficiency testing scheme	interlaboratory comparisons designed and operated to assure laboratory performance in specified areas of testing, measurement or calibration [1]	The terms proficiency testing programme and laboratory performance study are sometimes used to denote the same activity.

* There is an ongoing discussion whether or not PT is a conformity assessment activity.

Term	Definition (or description) and source	Remark
measurement comparison scheme	type of proficiency testing scheme where the test item to be measured or calibrated is circulated successively from one participating laboratory to the next [2]	<p>The description is based on the text in Section 4.2 of ISO Guide 43 [2]. Note c to Section 3.2 of the same guide refers to “single item testing”.</p> <p>It should be discussed if terms such as “round robin”, “ring test”, “ring trial” reflect this type of PT and if they should be recommended or not.</p> <p>The Dutch term “ringonderzoeken” and the German term “ringversuche” are commonly used to denote interlaboratory comparisons in general.</p> <p>The tem itself is not intuitive/self-explanatory and It should be discussed if it is necessary to restrict its use to measurement and calibration.</p>
Interlaboratory testing scheme	type of proficiency testing scheme that involves randomly selected sub-samples from a source of material being distributed to participating laboratories for concurrent testing [2]	<p>The description is based on the text in Section 4.3 of ISO Guide 43 [2].</p> <p>The tem itself is not intuitive/self-explanatory and it can be mixed up with the general term “interlaboratory comparison”. Furthermore it should be discussed if it is necessary to restrict its use to testing.</p>
Split-sample tes ting scheme	type of proficiency testing scheme that involves comparisons of data produced by small groups of laboratories which are being evaluated as potential, or continuing, suppliers of testing service [2]	<p>The description is based on the text in Section 4.4 of ISO Guide 43 [2].</p> <p>The tem itself is not intuitive and it should be discussed if it is necessary to have a separate term for PT activities that involve less than a certain number of participants.</p> <p>The term “split sample” may have a different meaning in some sectors, e.g. laboratory medicine.</p>
Split-level design (of a proficiency testing scheme)	[2]	
Qualitative scheme	[2]	It may not be necessary to define this tem but the description in Note a to Section 3.6 of ISO Guide 43 [2] may be modified since the word “qualitative” is interpreted differently in different sectors.
Known-value scheme	type of proficiency testing scheme that involves the preparation of test items with known amounts of the measurand under test [2]	<p>The description is based on the text in Section 4.6 of ISO Guide 43 [2].</p> <p>It should be discussed if the terms is necessary in a revised ISO Guide 43 since this aspect of PT is treated in association with the establishment of the assigned value</p>
Partial-process scheme	type of proficiency testing scheme that involves the evaluation of laboratories’ abilities to perform parts of the overall testing or measurement process [2]	<p>The description is based on the text in Section 4.7 of ISO Guide 43 [2].</p> <p>It should be discussed if the terms is necessary in a revised ISO Guide 43 since this aspect of PT can very well be mentioned in a note to the definition of “proficiency testing (3.6 in [2]). Alternatively a note to the definition can refer to “Pre- and post-analytical” aspects of PT, since this wording is not uncommon, e.g. in laboratory medicine [15].</p>

Term	Definition (or description) and source	Remark
interlaboratory comparison	organization, performance and evaluation of tests or measurements on the same or similar test items by two or more laboratories in accordance with predetermined conditions [5]	
	organization, performance and evaluation of tests on the same or similar test items by two or more laboratories in accordance with predetermined conditions [2]	Clause 5.9.1b in ISO/IEC 17025:2005 [8] and Section 1 of ILAC-P9 [7] refers to "...interlaboratory comparison(s) or proficiency-testing programmes...". This could be rephrased to "...interlaboratory comparisons, e.g. proficiency testing schemes..."
interlaboratory test comparison	organization, performance and evaluation of tests on the same or similar items or materials by two or more laboratories in accordance with predetermined conditions [16]	The source [16] was revised in 1998 and is identical to ISO/IEC Guide 2:1996. The revised version did not include the term.
interlaboratory test	series of measurements of one or more quantities performed independently by a number of laboratories on samples of a given material [17]	Note 1 to this definition, which is taken from ISO Guide 30 [17] states that "other terms including "round robin test", "collaborative reference programme" and "collaborative analytical study", are also used. In relation to this term, Section 2.2.3 of the Eurachem Guide [3] mentions "collaborative study", "certification study" and "co-operative study (also known as ring test or round robin exercise)", and describes their respective purpose, however, partly differently than in other sources.
collaborative assessment experiment	an interlaboratory experiment in which the performance of each laboratory is assessed using the same standard measurement method on identical material [18]	The standard ISO 5725 focuses mainly on interlaboratory comparisons aiming at establishing certain performance characteristics. It should therefore be discussed if the current definition to the term is appropriate (to avoid confusion with PT/EQA schemes)
external quality assurance programme	an interlaboratory comparison designed and operated to assure one or more of following aspects: Participant performance evaluation, method performance evaluation, vigilance of IVD's, continuous education, training and help [11]	The term is normally abbreviated EQAP .
external quality assessment scheme		The EQAP-document by C-AQ IFCC rather describes than defines this activity as "EQAS focus essentially also on laboratory performance evaluations but the purpose of the schemes is educational." The term is normally abbreviated EQAS .
participant participant in a system or scheme	body that operates under the applicable rules without having the opportunity to take part in the management of the system or scheme [19]	
performance assessment		

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standard deviation for proficiency assessment	measure of dispersion used in the assessment of proficiency, based on the available information [5]	
provider	a body (organisation or firm, public or private) that undertakes the design and conduct of a proficiency testing scheme [1]	The EQAP-document [11] uses the term organizer in the same context
robust statistical techniques	techniques to minimize the influence that extreme results can have on estimates of the mean and standard deviation [2]	
ranking (of participants)	grouping of participants according to their performance in a PT scheme [20]	Description based on text in Ref 20. Note: This reference discourages from the use of ranking.
stability (of the test material)	Ability of a test material, when stored under specific conditions, to maintain a stated property value within specific limits for a specific period of time	Adapted from Section 2.6 of ISO Guide 30 [17].
homogeneity (of the test material)	<p>condition of being of uniform structure or composition with respect to one or more specified properties</p> <p>Note 1. A test material is said to be homogeneous with respect to a specified property if the property values, as determined by tests on samples of specified size, is found to lie within specified uncertainty limits, the samples being taken either from different supply units (bottles, packages, etc.) or from a single supply unit</p> <p>Note 2. between-bottle homogeneity: the bottle-to-bottle variation of a property of a material</p> <p>Note 3. within-bottle homogeneity: the variation within one bottle of a property of a material</p>	<p>Definition and Note 1 Adapted from Section 2.6 of ISO Guide 30 [17].</p> <p>Notes 2-3 from....</p>
viability (of the test material)	[11]	
test item	material or artefact presented to the participating laboratory for the purpose of proficiency testing [2]	The note to the definition of proficiency testing scheme in ILAC-G13:2000 [1] refers to test or tests on "...particular products, items or materials."
proficiency testing round	a single operation of a proficiency testing scheme [1]	The terms survey , exercise and event [21] are also used in the same context.
		This definition may be interpreted in such a way that a round of a PT scheme covers just the distribution of samples.

Term	Definition (or description) and source	Remark
advisory group	group that include technical specialists with detailed experience in the relevant field of testing and , include, or have access to, a statistician to design and implement each proficiency testing scheme and analyze the test results submitted by participants [1]	<p>The term is described rather than defined in clause 3.3.1.3 of ILAC-G13.</p> <p>ISO Guide 43-1 [2] refers in Section 5.2.2-5.2.3 to an advisory group and uses the words "should" and "may" when discussing the need for such a group. ILAC-G13 [1] states in 3.3.1.2 that, e.g. a management/technical advisory group shall be established. Furthermore, in 3.3.1.2 it says that the provider should establish an advisory group.</p> <p>The term expert group is also used in the same context.</p>
steering committee		The role and need for such a committee should be discussed in view of the role and responsibilities of the advisory group/ management/technical advisory group (see above).
collaborator (subcontractor)	a body (organisation or firm, public or private) that undertakes subcontracted activities for a proficiency testing scheme provider [1]	The EQAP-document [11] uses the same term but refers to the organizer of EQAS or EQAP instead of the provider of PT scheme.

Conclusions and suggestions for further work

The compilation illustrates a need for revision of some terms in order to improve harmonisation among providers and users of PT. It has been noted that:

- The term “proficiency testing” in one document is viewed as linked to determination of laboratory performance for regulatory purposes. There is no support for this view in the official definition of the term.
- The definitions of the terms “proficiency testing” and “interlaboratory comparison” contain inconsistent or restrictive descriptions. Since PT schemes and other interlaboratory comparisons are used at all metrological levels, and in testing as well as measurement activities, the definition should not impose any limitations.

References

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