More on the case of using “analyte” as “measurand”

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In a previous Column in this Journal, the following question was formulated [1]:

“Analyte” is frequently used as synonym for “measurand”: is that correct?

It was intended to trigger thinking about the common occurrence in the chemical literature of analyte as synonym of measurand.

It did.

Although admitting the occurrence, on reflection, most of the reactions confirmed that analyte should be replaced by measurand, defined as it is in the 2008/2012 VIM (see entry 2.3 in [2]): quantity intended to be measured. What came to light (again) is the widespread—and still largely unrecognized—difference in our thinking about a term and a concept.

A concept is what we—literally—conceive in our mind about the world surrounding us. We also conceive concepts when we think about measurement and we describe the concept by means of a term (a name if you like). As long as we keep to ourselves what we mean by a concept we use, we more or less understand it because we more or less understand what we say to ourselves. We understand the *term* associated with the concept. However, when we need to communicate with others and want to be understood, we have to *define* the concept we use in order to make sure that

it is understood in the same way in which it was conceived. In communication, a concept is represented by a term (the *label* of the concept) in the given language thus creating the very possibility to communicate. When translators have to translate the term from one language to another, they have to understand the concept hiding behind the term in the original language. Hence, they must have access to a definition of that concept in the original language before a valid translation of the term can be made into another language and be understood in the same way as intended in the original language (all in a given field of course).

It is the very justification of defining concepts in the VIM.

Is that useful to have in mind in the case of measurand and analyte?

Yes.

For use in the “science of measurement and its application” (i.e., in metrology, see entry 2.2 in [2]) on the global scale (intercontinentally, i.e., between—sometimes very—different cultures), the concept measurand is defined in the VIM. For that reason, any translation of the term measurand into any other language should henceforth be consistent with this definition. Because of the international formal approval of the VIM, the definition allocated in the VIM cannot be changed anymore (at least for years to come). Ideally, full unambiguity would require that one term (used in a given field) covers only one concept, and that one concept is covered by only one term (with abbreviated forms of this term permitted).

It is the logic underpinning the VIM.

Remains the term analyte.

In the various contexts in which analyte is used, most of the time a chemical species is meant [3, 4]. And, strictly

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speaking, we do not measure a chemical species such as Cd, or cholesterol, or a given protein, etc. We measure quantities such as mass, temperature, length, mass concentration, or mass fraction, density of a specified solution, etc.

Hence, it is confusing to use analyte as designating a measurand. Analyte is not a quantity in the sense of the definition of quantity in the VIM, which reads as: “quantity is a property of ... a substance ... that can be expressed in a number and a reference” (see entry 1.1 in [2]). Also, one would think that analyte has to do with analysis. That is much more restrictive than measurand.

Conclusion from all of this:

Apparently, many people frequently use the **term** analyte when they mean measurand (analyte being considered as a synonym of measurand so to say). That gives rise to ambiguity. The way out is to define the concept analyte. That is a condition anyway for becoming unequivocally translatable into other languages. Such a definition should take note of the context in which analyte has already been described (i.e., that of being a chemical species) in 1995 [3], 1998 [4] and again in 2004 [5]. We will only understand each other well on the global scale in matters of measurement, when we all understand in the same way the concepts which we use. That also requires a definition of the concept analyte.

Can the field come up with proposals for a logical definition of the concept analyte? We look forward to proposals.

Did this Column achieve the intended aim?

Maybe.

The whole exchange of views is in the spirit of a Column in ACQUAL which is: “thinking aloud” and in a public way about defining concepts and associated terms for use in our global communication about chemical measurement results.

I would like to express my sincere appreciation to all who have been contributing to this open debate.

As usual, any comment, question, or amendment is welcome, preferably as a contribution to the Discussion Forum of this Journal.

They can also be addressed to the author of this Column for assembling and comparing them for one of the next Columns. Hopefully, that could lead to conclusions.

References

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