# STANDARDS AS ENABLERS FOR INNOVATION IN EDUCATION – THE BREAKDOWN OF EUROPEAN PRE-STANDARDISATION

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## ABSTRACT

*Content industries go through a demanding time adjusting to the digital age, revamping their business processes when sales of paper documents are not an option any more. Formal standardisation is facing the same challenges as organisations like ISO and CEN see sales of publications as their core business. This paper presents a case study from European pre-standardisation. CEN Workshop on Learning Technologies was in 2013 put on hold due to the threat the European standardisation body CEN sees to its business model. The conflict is centred on open work processes, and open and freely available documents. Standardisation experts in education claim that stakeholder engagement, input from research, and willingness to implement the developed standards will be harmed by following CEN's strict interpretation of their rules. Open Research, Open innovation, Open Data and a series of other open policies are now values that make up the foundation for driving the Innovation cycle underlying standardisation activities. Barriers to openness could hamper participation from research and restrict implementations and user engagement.*

*Keywords*— Standards management, Innovation management, Open standards, European pre-standardisation, CEN-CENELEC

## 1. INTRODUCTION

CEN Workshop on Learning Technologies (CEN WS/LT) was established in 1999, and has since then published 26 CEN Workshop Agreements (CWAs) made available for free from CEN's website[1]. A CWA is a consensus document, a kind of lightweight standard, designed by a group of experts representing themselves and their institutions. A CEN workshop is open to all willing to contribute, and has therefore been an auspicious vehicle for pre-standardisation activities in such an emergent field as learning technologies.

According to CEN-CENELEC Management Centre (CCMC), the Workshop has been under the false impression that CWA are free-of-charge documents. The

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[1] http://www.cen.eu/cen/Sectors/Sectors/ISSS/
CWAdownload/Pages/Learning%20Technologies.aspx

Workshop chairs and participants would rather see free availability of the results of their gratuitous work as a precondition to engage in standardisation. Therefore, when the CCMC chose to «redress the situation» in 2013, the Workshop was put on hold. The members could not accept a work process with only document exchange via email and a password protected repository, and no use of open collaborative tools like wikis. Therefore, they saw no point in contributing to closed CWAs behind a paywall, and the Workshop activities were suspended.

The current situation for European pre-standardisation of learning technologies raises questions that go far beyond this particular domain, e.g., how formal standardisation would work to engage stakeholders in standards development in a world that increasingly embrace openness policies (as in Open Data, Open Research, Open Innovation, etc.). The CEN policy also raises serious questions about how formal standardisation will approach innovation management.

This paper will position pre-standardisation as an essential part of ICT standardisation; furthermore, a simple model of the innovation cycle will be presented as the theoretical framework for discussing the case represented by the CEN WS/LT. The questions raised in this study is whether the closed model promoted by CEN Management could be sustained in the domain of learning technology standardisation in Europe.

## 2. RELATED WORK

Pre-standardisation is often the first stage in a standardisation process, where stakeholder representation is being prepared, requirements are solicited, the new work item for formal standardisation is scoped, etc. [1]. Pre-standardisation is said to offer a lighter and iterative process better tailored to interactions with the research community [2]. The European Research community has for some time been exploring how research and standardisation could be better aligned. In the European Union Framework 6 program, the INTEREST and COPRAS projects were examining how research and standardisation could cooperate. INTEREST pointed to CEN Workshops as a more generic tool to bring research and development (R&D) closer to standard-setting. «For medium-length projects (about 2–3 years), they offer the opportunity of

developing standards (in the form of CEN Workshop Agreements, CWAs) within the lifetime of the project (which may be very helpful, given the EU's current funding policies for R&D projects) [3].

Timing of standardisation is key to understanding the different stakeholder positions to a particular project and their participation in different phases of a development project [4]. To boost European industry, the European Commission has proposed to use standards as a way to leverage R&D results, which "inherently means 'early standardisation': standardisation takes place at a very early stage of technology development" [4]. This means promoting anticipatory standardisation. Sherif [5] linked standards timing with the technology lifecycle, and derived three classes of standards. Figure 1 shows the technology S-curve depicting the trajectory of technology, from idea to mature technology, and transition to a new technology. Anticipatory standardisation works hand in hand with product design; while participatory standardisation is initiated only at the stage when knowledge of the technology is shared and products start being brought to the market. Responsive standards codify knowledge already established in practice.
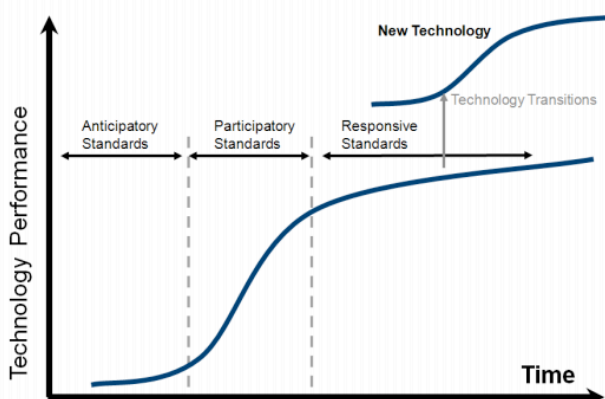


**Figure 1**. Timing of standards in relation with the technology S-curve (source: [5])

Most of the standards the Learning, Education and Training (LET) community has been working on fall into the first category, anticipatory standards. Early standardisation may inhibit innovation if introduced at an inappropriate time, with premature lock-in to a specific technology and economic inefficiency as a results [4]. The alternative, to wait till the technology is more mature before gathering the participants around the committee table is not very attractive when you realise that you then will be working with yesterday's technologies. E.g., to standardise content packaging technologies in 2013 modelled on the CD-ROMs of the 1990s is not very meaningful when the content is moved into the cloud. So, for the LET community the only viable approach is to find a way to do anticipatory standardisation right when it comes to timing and stakeholder engagement.

Egyedi and Blind [6] speak of 'standards dynamics', referring to 'the changes to and interactions between standards, that is, what happens to standards once they have been set'. Van den Ende et al. use the term standard flexibility for changes in a standard's contents over time applying an adaptation perspective, emphasizing the abilities of standard-supporting networks to change the standard as well as the network over time [7]. These authors include in their analysis the processes that create path dependencies in the evolution of a standard, i.e., the processes that gradually narrow down the range of options, going through a pre-formation phase, a formation phase and a lock-in phase.

In the simple model (Figure 2) provided by Egyedi [8] the factors influencing the standards development and the factors influencing implementation are highlighted as two different settings to be analysed.
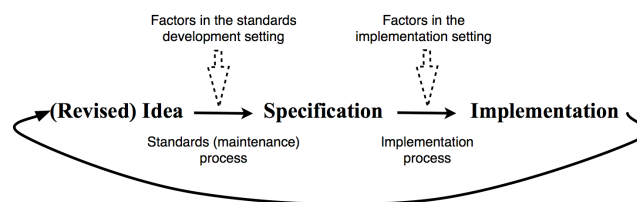


**Figure 2**. A simple model of standardisation phases, from [8]

This model will be used to analyse the standardisation management issues raised by the case study presented in this paper. The paper follows a single case study approach [9].

### 3. THE CASE OF CEN WS/LT

CEN WS/LT work has fallen into two categories, projects funded by the European Commission, and unfunded projects. For funded work, the EC has mandated open publication free-of-charge of the resulting CWAs. However, for the last 5 - 8 years the EC funding did not keep up with the need for standards, and therefore, for some projects the Workshop members have been willing to engage in unfunded work in order to get standards the market need. The CWA 15903 Metadata for Learning opportunities (MLO)[2] is one example of such unfunded work.

In 2013, after the finalisation of InLOC[3], one of the most successful projects in the history of the Workshop (in terms of stakeholder engagement in development), the CCMC put on the brakes. The CEN Standards Director and Program Manager were alarmed by the openness of the work procedures, e.g., by using a wiki for collaborative writing,

[2] This standards was published free-of-charge by CEN, even if it was not funded by EC.
[3] InLOC stands for «Integrating Learning Outcomes and Competences» - CWA 16655-1
ftp://ftp.cen.eu/CEN/Sectors/List/ICT/CWAs/CWA%2016655-1.pdf

commenting, and consultation outside the password protected wall of the standards setting body. The CCMC insisted on a work process restricted to the use of an e-mail reflector with a limited list of participants, and document exchange via their Livelink repository system.

The CCMC also discovered that unfunded work had been published from their website free-of-charge (e.g., CWA 15903). This was inconsistent with CEN rules laid out by CCMC, and when the chairs of the workshop tried to write the current practice into a memo intended to clarify procedures, the CEN Management put up the red flag. Meeting minutes and e-mail exchange between CCMC and the Workshop chairs show that it is the «sustainability of the standardisation system» that is as stake. «CEN assumes the protection and legal responsibility for the copyright of its publications. CEN and its members are the only entities entitled to benefit from the exploitation rights on CWAs.»[4]

In 2013 CEN also introduced a new policy that will impact on the ability of CEN workshops and committees to solicit input from external organisations, e.g., EU projects. CEN-CENELEC Guide 25 on «Partnership with European Organisations and other stakeholders» regulates that each organisation has to pay 500€ as an annual fee to participate. While CCMC and the Workshop chairs were mapping the boundaries towards openness in formal standardisation the European Commission launched their new initiative Opening Up Education. On 25 September 2013 EC published a communication stating that all educational materials supported by EU projects should be available to the public under open licenses [10]. EC states that open interoperability standards are necessary to ensure economics of scale, and «such standards must remain open». Therefore, the Commission will «promote the development of open frameworks and standards for interoperability and portability of digital educational content, application and services, including OER, in cooperation with European standardization organisations and programmes» [10]. When CCMC learnt about this key action in the Opening Up Education initiative, they requested a meeting with the responsible EC Directorate General (DC EAC). Obviously the CCMC met no understanding for their view in the EC, as concluded in a report to the CEN Technical Board: «The policy officer made it clear that by open standards was meant free-of-charge specifications (which is clearly clashing with CEN's business model), and that a concrete list of actions to implement the action plan would be agreed upon in Q1 2014.» [11]

What to do with the Workshop on Learning Technologies is an issue to be discussed in the CEN Technical Board, which consist of one delegate from each CEN national member. CCMC explains that there has been a Technical Committee (TC 353 ICT for education, learning and training) established in 2007, with «no clear delimitation of the responsibilities of CEN WS/LT and CEN TC 353» [11]. However, a closer look at the interaction between the Workshop and the TC 353 will show that both groups find

this delimitation quite clear, the Workshop delivering pre-standardisation results that are brought forward to European norms by the technical committee (as EN 15981:2011 Metadata for Learning Opportunities (MLO) Advertising is a good example of, being built on CWA 15903).

## 4. DISCUSSION

The observed breakdown of European pre-standardisation activities in the field of learning technologies raises a number of issues related to the ability of standardisation to contribute to innovation. The European Commission seems to put a lot of trust in standards being able to «level the playing field for all market players» within education, provided they «remain open» [10]. A response by CEN, only focussing on the threat to their business model, seems to ignore what drives the innovation cycle within learning, education and training (LET). Resistance to pay for standards document is not due to lack of money in this sector, but the fact that a pay-per-document model conflicts with basic values in the education and research community that provides input to the standards development.

A framework for discussing the input factors contributing to standardisation is presented in Figure 2. The model is based on a simple innovation model, where Ideas form Design, leading to Implementations, and then a feedback loop back to new Ideas. In standardisation this gives three main states of a standards development: the conceptual idea, the specification, and the implementation, with two translation processes intermediating between these states, the standards process and the implementation process.

The challenge for emergent technologies (like ICT for learning) is that the short innovation cycles make it necessary to keep the different sub processes well coordinated. To come up with a successful standard it is as important to have a grasp of the implementation setting as to make sure that the best ideas are fed into the design. This is difficult to achieve if the main stakeholders in the standardisation setting, implementation setting and the users are three dispersed groups. A problem for LET standardisation has been lack of participation from implementers, and weak representation of users. The activities of CEN WS/LT have mainly been supported by university researchers, often taking part in European projects. When participation from implementer's' side has been wanted, it has been pointed in the direction of the market to solve the problems. However, the market for learning technologies is very fragmented with a mix of small enterprise players together with big institutional and even governmental actors - none of them seeing LET standardisation as their main field of interest. With so many barriers to participation, the key question is how to design the standardisation cycle in a way that gives easy access to these different stakeholders to contribute.

The case study showed that open processes and open documents are considered to be «clashing with CEN's business model» [11]. However, all aspects of openness could be considered to be vital in order to provide visibility

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[4] Summary of discussion between CEN Standards Directors and the CEN WS/LT chairs 24 September 2013

to projects, to engage dispersed stakeholder groups, to disseminate results, solicit feedback, etc. The use of social media and online collaborative work practices in the LET community is built upon the idea of openness and easy access to information resources. The idea that only the ones with privileged access to a Livelink account (the CEN repository system) should be able to comment and contribute to specification development is not realistic, especially when the standardisation business in itself is highly competitive. There are a number of consortia in the educational domain that embrace open standards, e.g., www.open-stand.org.

Formal standardisation adheres to the principles of transparency and an open and due process, and would not like to be described as not embracing the principle of openness. However, Krechmer [12] have observed that different stakeholders in standardisation (creators, implementers, users) emphasise different aspects of openness (Table 1). Open documents are not an important requirement for standards creators, who are more concerned about the formalities of the process, like open meetings, consensus, due process, and open IPR. Implementers and users have more practical interests, and access to documents and functional aspects of the specification are highlighted.

**Table 1**. Open Standards Requirement [12]

|   |   | Stakeholders | | |
|---|---|---|---|---|
|   | Requirements | Creator | Implementer | User |
| 1 | Open Meeting | x | | |
| 2 | Consensus | x | | |
| 3 | Due Process | x | | |
| 4 | One World | x | x | x |
| 5 | Open IPR | x | x | x |
| 6 | Open Change | x | x | x |
| 7 | Open Documents | | x | x |
| 8 | Open Interface | | x | x |
| 9 | Open Access | | x | x |
| 10 | On-going Support | | | x |

The problem for the formal standardisation organisations like National Body Bodies, CEN and ISO is the fact that their business models are not in line with their core business, i.e., staging open and due processes and creating consensus documents. Their business model is to sell documents. This is not compatible with innovation in general, and ICT standardisation in particular. More than six years ago Van Eecke, Pinto Fonseca and Egyedi [4] recommended in a EU study on the specific needs for ICT standardisation that a coherent and harmonised (free) availability policy should be developed for Europe. They recommended that new business models should be investigated. Five years later, the CEN Standards Director is maintaining that «for the sustainability of the standardisation system, CEN assumes the protection and

legal responsibility for the copyright of its publication», and that «CEN and its members are the only entities entitled to benefit from the exploitation rights» [10].

The line of arguing by CCMC demonstrated in the case study shows a confidence in one's own competitive strength. If the Workshop does not comply with the rules, the LET standards could be developed by the CEN Technical Committee 353. This presupposes there is a strong need for LET standards in the market, and that the market already have candidate specifications ready for formal standardisation. This is not the case, and there are many reasons for this.

One is the role of pre-standardisation and incubation. Timing is a key in anticipatory standardisation [13]. A project initiated too early could stifle innovation; a too late project could easily become irrelevant. Therefore, there is a need for incubation and pre-standardisation activities that explore the opportunities and come up with lightweight specifications that could be tested, built upon, or just ignored. When CCMC states there is «no clear delimitation of the responsibilities of CEN WS/LT and CEN TC 353», they clearly do not understand the distinction between pre-standardisation and formal standardisation. First, the TC participants need to be appointed by National Standards Bodies, and so far very few participating in TC 353 have had expertise in the domain. In contrast, everybody with an interest in the domain can sit around the table of a CEN workshop. Second, the timeframe of a TC projects says that a first draft should be ready six month after the project has been launched. Without first hand expertise and good initial proposals, there is no chance a TC will have high quality drafts after six months. This is the reason why the CEN WS/LT and the TC 353 potentially was such a good vehicle for standards development. The open process of the Workshop, engaging research and industry stakeholders in pre-standardisation activities, would fit well with the formal process of the TC 353, which could prepare for a rapid progression of work into a European Norm when the time was right for amplifying good results from the Workshop. Without a workshop to coordinate and prepare work items on a European level, the TC has to wait for national initiatives to emerge and mature – something that could be wishful thinking given the flux of learning technologies at the moment.

## 5. CONCLUSIONS

Successful standardisation of technologies related to Learning, Education and Training is rare and depending on a lucky coordination of a number of unruly factors. In 2007, the European SME interest group asked themselves what were the key factors to change the perception and the use of standards? Their study on the specific policy needs for ICT standardisation by the European Office of Crafts, Trades and Small and Medium sized Enterprises for Standardisation produced this simple list:
- Create better access to them,
- Effectively enable the users to participate in making them,
- Reduce the cost of using them,

- Make the text of writings simple and accessible to the unqualified (not standard specialist) reader. [4]

The SME interest group (www.normapme.eu) mapped reasons why people like or oppose use of standards, and they all centred around rather mundane aspects of running a business. It simplifies life to work with the same format all the time; it provides security for safe use fit for purpose. On the other side, multiple solutions to the same purpose is not good; neither is the suspicion that one commercial business solution is privileged.

More transparency and lower barriers to use are two recommendations that could improve legitimacy of standards. This study shows that the European Standardisation Organisation is moving in the opposite direction by establishing barriers that are not easy to understand or accept by the stakeholder communities. More closed working processes, price barriers to dissemination of results, and asking fees to allow expert provide gratuitous input are all actions that are breaking with the innovation model now being promoted by entities like the European Commission [10].

More research is needed to explore why a standard setting body like CEN feels that their business model is threatened by free-of-charge CWAs from a rather peripheral Workshop like CEN WS/LT. «The commercial exploitation of the Publications is fundamental to the maintenance of the CEN-CENELEC system as a whole», states the guidelines on distribution and sale of CEN publications. It seems that CEN has maneuvered themselves into a corner where the tiniest crack could crush the whole building. In reality, CEN members have not sold a single CWA on learning technologies, simply because there is no market for such documents. There is a need for the standards, but the market expects such documents to be free, and will have its ways to get them for free. The ICT industry is not like the building industry that is willing to buy a complete set of building standards for each new building project.

When a «substantial part of the standardisation work is financed by voluntary and gratuitous participation from businesses, through their participation in committees, financing of projects, etc.» [14], and there is no market for these standards and no sale, one would think the «obligation to protect the [commercial] value of these Publications» should be irrelevant, and other values of the CEN system could come into play. The same Guidelines 10 promotes the principle of «the widest possible dissemination and use of [CEN-CENELEC's] Publications throughout the world». After all, the sales of documents are only a means to an end; and CEN should look for solutions how to cover its developing cost through other schemes than sale of paper copies. This would imply that formal standardisation acknowledge that they are part of a content industry that need to update their business model to serve the needs for innovations in a new and digital economy.

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