

# Towards a TENCompetence ePortfolio

A.J. Berlanga, P. B. Sloep, F. Brouns, M. E. Bitter-Rijkema and R. Koper

Open University of the Netherlands, Heerlen, The Netherlands

**Abstract**—This article argues that the TENCompetence ePortfolio definition should integrate rhetorical, pedagogical, social, and technical perspectives. The rhetorical perspective is needed to show the learner’s competences, achievements and history; the pedagogical perspective aims at supporting learner’s self-reflection, through the definition of competences mastered, review and creation of (new) competence development plans, and assessment of competences; the social perspective aims at fostering interaction and social help support; and the technical perspective aims at supporting the other three perspectives. Guiding principles for the design of the TENCompetence ePortfolio are provided, and the aforementioned perspectives detailed.

**Index Terms**—ePortfolio, Learning Networks, personal profile.

## I. INTRODUCTION

Electronic Portfolios (ePortfolios) are commonly conceptualized as collections of learning evidences. Learners define these evidences through a self-reflection process through which they attribute their competences to learning products or outcomes, and reflect on how they acquired such competences. From the pedagogical point of view, this process helps learners better to understand how they learn and become self-directed learners. Learners, however, can use ePortfolios for multiple purposes such as: learning, professional development, assessment, job applications and promotions [1], showcasing, developing personal plans, accreditation, collaborative learning [2], and receiving feedback. Likewise, ePortfolios can be used for tracking learners’ development within a program and monitoring and evaluating their performance [3].

Not only because of ePortfolios’ versatility, but also because they recognise learning as a continuing process where individuals are responsible for defining and organizing their own learning [4], ePortfolios for lifelong learning have been claimed as the “ideal state” of ePortfolio usage [5]. In areas such as teacher education and medical education, in which professionals are accustomed to evidence their competences, show their work, and update their competences constantly, ePortfolios have been extensively studied and implemented. In these areas ePortfolios are perceived as instruments that enhance learning [6] and support the development of competences [7].

Nevertheless, ePortfolio implementations for lifelong learning represent, almost exclusively, their showcase purpose (see, for instance, <http://www.efoliominnesota.com>). From the technical point of view, at the same time, ePortfolio interoperability and exchangeability are perceived as important research topics (see, for instance, <http://www.nottingham.ac.uk/epreferencemodel>).

Therefore, in spite of their promise, which has prompted much research into their showcase and technical

aspects, ePortfolios are hardly used by teachers, learners and institutions in the context of lifelong learning [8]. We surmise that a lack of attention for its integrative powers, may well lie at the root of this.

Indeed, [9] suggests ePortfolios should be integrative. They should bring together a rhetorical, a pedagogical and a technical perspective:

*“Rhetorically, they provide an integrated representation of what a person knows, believes, values, and can accomplish. Pedagogically, they integrate diverse learning experiences and sources of evidence. Technically, supporting their development and use requires integrating numerous systems and applications”* (pp. 234).

We hold that this idea should even be extended further by including a social perspective. Thus ePortfolios acquire the potential to foster interaction [10], to encourage participation and motivation [11], to help develop initial trust [12], and to promote visibility [13]. In our view, ePortfolios should also be seen as instruments that foster interaction and knowledge sharing.

To this end, we believe that ePortfolios should fulfil the three prerequisites, identified earlier in the literature, that foster cooperation [14]: continuity, recognisability and history. Continuity means ensuring a permanent relation between participants that have already been in contact; recognisability means helping participants to identify each other by providing information about others in the community; and history means showing participants’ past behaviour. The visualization of the participant’s profile and her contributions to the community is also important. It raises participant’s awareness of her own actions and those of others [15].

## II. TENCOMPETENCE

TENCompetence (hereafter TENC) is a European project aiming at developing an integrated open source infrastructure that enables and fosters lifelong learning [16]. The infrastructure, called the Personal Competence Manager (PCM) [17], will integrate different services through the notion of Learning Networks [18], which has been envisioned to facilitate lifelong learning.

In Learning Networks the acquisition of competences is conceptualized as a process in which learners perform actions to attain their learning goals. These goals include, for instance, studying for a new function or job, keeping up to date with a job or profession, or improving a competence level. The definition of the goal in terms of competences is referred as a competence profile.

Learners are one type of participant of a Learning Network; other types include teachers, tutors, providers or institutions. Participants can have various roles depending on the circumstances.

Therefore, participants need to contribute actively, creating and sharing learning actions and experiences with

peers and institutions. Learning actions can be any type of resource as, for instance, courses, lessons, workshops, assignments, blogs, or websites. When different learning actions are grouped and structured in such a way that together they define a learning flow that helps learners to acquire a competence, they form what is called a unit of learning; when different units of learning are grouped and structured to define a learning flow that aims to help learners to acquire a competence, they form a competence development plan (CDP).

Research on Learning Networks includes, amongst others, how technology can support Learning Networks in an efficient manner. A case in point is the PCM. It aims to enable the acquisition of competences in formal, non-formal, and informal learning contexts. Through this platform, participants can find, create, edit and share competence profiles, resources, learning actions, units of learning, CDPs, and experiences with others (for a complete description of the PCM see [17]).

The PCM itself could be seen as an ePortfolio system: it has information on the participants, such as current competences, competence profiles mastered, learning evidences and so on, that could be used to create a collection of learning evidences: an ePortfolio for each member of the Learning Network. However, this use is not evident to the learner nor has the PCM been designed or structured to double as an ePortfolio. Furthermore, in the current version of the PCM the learner cannot decide how to organize or visualize her own learning evidences, or how to make them available to others. We hold that a TENC ePortfolio should allow learners to present themselves, to reflect on how they acquire competences, and to show and manage their social presence in the Learning Network.

### III. THE TENC EPORTFOLIO SERVICE

As mentioned in [19], we believe that each learner in a Learning Network needs a desktop feature (e.g., a “My ePortfolio Desktop”) that helps her to control her activities throughout the communities in which she is involved. These activities include, for instance, her learning actions, contacts, and competence development plans. Using “My ePortfolio Desktop”, participants will actually perceive the PCM as their own point of development before they are aware of the rest of the Learning Network. It will be perceived as the starting point that connects a participant with the other members of the community.

The TENC ePortfolio objective then is two-fold: i) to allow a participant to control her own activity, performance and social interaction, and, ii) to provide information about herself to the other members of the community, in such a way that the continuity, recognisability and history conditions mentioned earlier are satisfied.

Following recommendations from [2, 20], we believe that the TENC ePortfolio should not be disassociated from the didactic concept of a flexible, personalized, and social-interaction education instrument based on competence development; it should be owned by the learner; it should use the technology the learner is already using, instead of replacing it; and it should explore the possibilities of social web applications to link formal and informal learning.

This idea also considers learning evidences as any outcome or product that the learner wants to use to indicate a competence. This is to say, evidences located both inside and outside the PCM should be considered. In the PCM

these evidences include CDPs, units of learning, learning actions, participation in learning networks and ad hoc transient communities (for a complete description of these types of community see [10, 21]). Outside the PCM they include, for instance, links to learner’s school records, activity in (social) web applications, links to external web pages or to resources.

Above all, the TENC ePortfolio should be designed from an integrative notion, which, naturally, will unite the rhetorical, pedagogical, social, and technical perspectives pointed out before.

The **rhetorical perspective** is needed to provide a visual overview of the learner’s achievements, past behaviour (history), current position in the Learning Network, communities joined, and created showcases. This should include showing learner’s:

- Competences and competence profiles mastered, linked to a list of their learning evidences.
- CDP, units of learning and learning actions followed, as well as learner’s current position in the Learning Network. The latter means provide an advice to the learner so she knows the learning actions, units of learning and CDP she should mastered in order to acquire the desired competences. This information can be provided by the positioning and navigation services [22], which are currently under development in the TENC project.
- Past and current communities and ad hoc transient communities [23] the learner has been involved in.
- Showcases the learner has created. The learner can create different showcases, based on competences mastered, for different audiences and purposes. Furthermore, exporting showcases in different output formats, such as XML, .pdf, IMS LIP, etc., should be also possible.

The **pedagogical perspective** is needed to support the learning process through self-reflection and assessment. Self-reflection requires collecting learning evidences, attributing them to competences, and writing reflections about the competences acquired. To this end, the pedagogical perspective should support different tasks:

- Definition/modification of competences mastered. If this has not been done automatically by the PCM, the learner needs to specify the competences she already has (by attributing evidences to them), but also those that she wants to develop further.
- Review of CDPs followed. The learner adds and removes competences acquired, writes a reflection about the learning process, and rates CDPs. This will allow her to understand her own learning development and to plan further the competences she wants to acquire [7].
- Creation of new CDPs. If the learner has followed informal learning paths, discovering by herself different paths to achieve a competence, without following a predefined path; she needs to reflect and describe what she did to acquire a competence. This reflection can be done by creating a new CDP. Likewise, if the learner has followed only certain parts of an existing CDP, this new path has to be defined as a new CDP. In both cases, the CDP should be described, preferably in terms of an interoperable learning path specification, such as the one currently under development in the TENC project [24].

- Assessment of competences that could combine external assessment, mentoring, peer and self-assessment.

The **social perspective** is needed to foster social interaction, to connect the learner with all the communities and ad hoc transient communities she participates in. This connection can help learners to receive feedback from peers and tutors and collaborate with them, two functions that learners and teachers appreciate much [8]. This perspective should facilitate:

- Creation of personal profiles. Different profiles for different audiences should be possible. For instance, a personal profile to share with friends is most likely to be different to one for potential employers. What information the profile should include is still work in progress. Up to now background information on personal identity is claimed to be important for effective knowledge communication and trust [11, 25]. However, each learner should have the option to choose what information each personal profile should display.
- Social help support, by recommending peers to collaborate with, in terms of peer-support or peer-feedback. This is also carried out in the context of the TENC project, see for instance [23, 26].
- Get information about the past and current communities and ad hoc transient communities in which the learner has participated/participates, including information about participants already contacted, and their past behaviour. This will ensure compliance with the continuity and history conditions mentioned earlier in this paper.
- Creation and maintenance of contacts. To create a contact a learner can select or invite members of the Learning Network to be part of her contacts list. Contacts can include peers, teachers, tutors, institutions or even friends.

Finally, the **technical perspective** is needed to support the other three perspectives. This perspective should:

- Automatically create an historical record of the actions of each learner; information that should help different TENC services/functionality to run properly (e.g., positioning, navigation, peer-support, creation of showcases, etc.).
- Integrate the different services defined in the other perspectives.
- Support exchangeability and interoperability of the showcases.
- Support privacy and configuration of information for public, private, or reserved to specific audiences (e.g., public and private showcases, profiles, etc.).

#### IV. TENC EPORTFOLIO INITIAL DESIGN

Current work on the conceptualization of the TENC ePortfolio includes the definition of a usage profile. This is to say, the description of how a learner would use the ePortfolio in terms of the actions she can perform and the information she will get from the PCM, as well as how the PCM should support these actions. The initial usage profile describes that the first time the learner enters the PCM she has to create her profile, which includes compulsory information as first name, surname, screen name, and email. However, the learner has the option to choose the

additional information she would like to be included and displayed in her profile, as well as the level of privacy of her personal information. This information might comprise reasons for participating in the Learning Network, preferences, interest, competences to be developed, and favourite resources or contacts [25].

Furthermore, to ensure the learner creates a suitable profile, the PCM provides supporting mechanisms to inform the learner about the importance of filled in information to, for instance, finding people the learner might know or get advice regarding the best CDPs to follow. The learner could also include in her ePortfolio learning evidences obtained outside the PCM that she might think are relevant to demonstrate her competences.

Once the learner has completed her profile, she can start using the PCM, which will record her activity so the ePortfolio can show it. To that end, the learner has a “My ePortfolio Desktop” feature, which is divided into different options or tabs: rhetorical, pedagogical, and social.

In the first tab, the rhetorical option, the learner finds an overview of her activities, mastered competences, competence profiles, current position in the Learning Network, a list of past and current communities she has been involved in, and the showcases she has created. If she clicks on one of her mastered competences or competences profiles then she gets the learning evidences (i.e., CDPs, units of learning and learning actions she has completed) that sustain such competences.

Moreover, from this tab the learner has the option of creating showcases. She has to select those learning evidences she would like to include in the showcase, and then the PCM will generate an export file using the desired output format (e.g., XML, .pdf).

In the next tab, the pedagogical tab, the learner can reflect on the competences she has acquired. She can define and modify her mastered competences (e.g., attaching new learning evidences). She can also review the CDPs she has followed, create new CDPs, and assess her competences. Finally, in the social tab, the ePortfolio desktop displays the learner’s basic profile and the list of the profiles she has created, her list of contacts and the list of communities and ad hoc transient communities she was involved in or is currently involved in. In this tab the learner can create new profiles and modify existing ones. She can also add new contacts, edit their information and recommend a contact to other participants. Furthermore, from this tab, the learner can request help from other peers (i.e., social help support).

Lastly, there are additional features that will be highly desirable to consider, such as: a) supporting the integration of different Web 2.0 technologies, b) integrating the software the learner already uses, c) customising of the interface, so that learners can include the options/services they want, and choose different look and feel templates.

#### V. DISCUSSION AND FUTURE WORK

In this article we collected several arguments, if only succinctly, that support the importance of ePortfolios for lifelong learning and their relevance for the TENC project. Indeed, we argued in favour of a TENC ePortfolio designed and developed to follow an integrative approach. It should be noticed that such an approach is closely related to the one suggested by [8], which they claim benefits learning most effectively.

As mentioned earlier, most of the examples of ePortfolios for lifelong learning are intended only as showcases/CV tools. Although there are other ePortfolio examples that share functionalities with the TENC ePortfolio approach, they have been used only in formal learning contexts and for specific knowledge domains (e.g. <http://www.eportfolios.ac.uk/ePET>). Examples like Epsilon (<http://www.epsilon.com>) and My-ecoach (<http://my-ecoach.com>) are not restricted to formal education and include formal and informal learning actions from different institutions or providers; their design is similar to the one suggested in this paper: they enable learners to present themselves, reflect on their own learning, interact with others, and create and share their own communities, courses and resources. However, these examples are not designed with the idea of supporting learners' competence development; they do not have an infrastructure, such as the PCM, that supports learners in this process. Consequently, these ePortfolio examples cannot automatically provide tracking of CDPs (or other learning actions) the learner has followed, nor can the learners define their own CDPs to share with others. In addition, these ePortfolio systems do not have services to support learners in the process of developing their competences as, for instance, calculation of her current position in the Learning Network, providing recommendation on which learning action or CDP to do next, or provide peer support. It is worth to mention that advanced features of these ePortfolio systems are available only if a licence has been purchased. In the case of Epsilon, the service is restricted only to those who have an email address from a university of the USA. In contrast, all services and systems developed in the TENC project are open source products.

A main drawback of the TENC ePortfolio approach proposed in this paper is, definitely, the difficulties of its technical implementation. First, this approach not only implies orchestrating different services so they can work together, providing and receiving information to and from the PCM; but also combining information coming from different services, such as the past behaviour and competences mastered in diverse units of learning, CDPs or learning actions. Second, there are some functionalities described in this paper that still need to be developed as, for instance, the creation of personal profiles and the creation of showcases. For practical reasons, therefore, the development of these functionalities should be prioritized.

Difficulties of an entirely different, non-technical kind pertain to privacy issues, in terms of what legally may be stored and made available, as well as in terms of the extent to which learners will want others to access their personal data. The first barrier is encoded in law, the second of a behavioural kind; the first will be highly changeable and depends on policy, the second will be more constant, but depend on research for its delineation. Perhaps both barriers can only be overcome by restricting the openness of access or by layering access through explicit, learner controlled policies.

Future work includes, besides the full description of the TENC ePortfolio usage profile, the identification of the information the TENC services will need from the TENC ePortfolio, and *vice versa*; it will also be necessary to detail the information the ePortfolio will need from the services, so it can run properly. Certainly after that, to substantiate our claims, the TENC ePortfolio service needs to be implemented and evaluated.

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#### AUTHORS

**All authors** work at the Educational Technology Expertise centre. Open Universiteit Nederland PO Box 2960 6401 DL Heerlen, The Netherlands

(e-mails:  
[adriana.berlanga@ou.nl](mailto:adriana.berlanga@ou.nl),  
[peter.sloep@ou.nl](mailto:peter.sloep@ou.nl),  
[francis.brouns@ou.nl](mailto:francis.brouns@ou.nl),  
[marlies.bitter@ou.nl](mailto:marlies.bitter@ou.nl),  
[rob.koper@ou.nl](mailto:rob.koper@ou.nl)).

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