

# The MUPPLE Competence Continuum

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**Abstract.** The idea of Personal Learning Environments (PLEs) seems to polarise the educational sphere into supporters and opponents. Both groups relate their enthusiasm or criticism to underlying competences motivated by or needed for building up, running, and maintaining a PLE. Within the following article, results of a qualitative study with multiple cases will be presented to shed light onto which competence and which of its building blocks are involved in running a (mash-up) PLE. Data about the involved skills, abilities, habits, attitudes and knowledge will be presented in a raster of the five dimensions 'plan', 'reflect', 'monitor', 'act', and 'interact' against the three stages 'start', 'trigger', and 'outcome'. The findings indicate that there is a continuum ranging from the ones needed right ahead to the ones ultimately sought.

**Keywords:** PLE, mash-ups, competence.

## 1 Introduction

In the beginning personal learning environments (PLE) were strongly motivated by their opposition to learning management systems, while today they form a movement on their own. PLEs provide a perspective on learning environments that focuses on the individual (not the institution): they envision an empowered learner aiming for self-direction for whom tightly- and loosely-coupled tools facilitate the process of defining outcomes, planning their achievement, conducting knowledge construction, and regulating plus assessing (van Harmelen, 2008) – either collaboratively or independently. Mash-ups relate to the ‘frankensteining’ of software artefacts and data. They serve end-users to glue together public web services in individual applications (Wild et al., 2008). Their combination with PLEs merely stresses the fact that the digital parts of a PLE are today typically web-based, distributed across a variety of web servers, and networked.

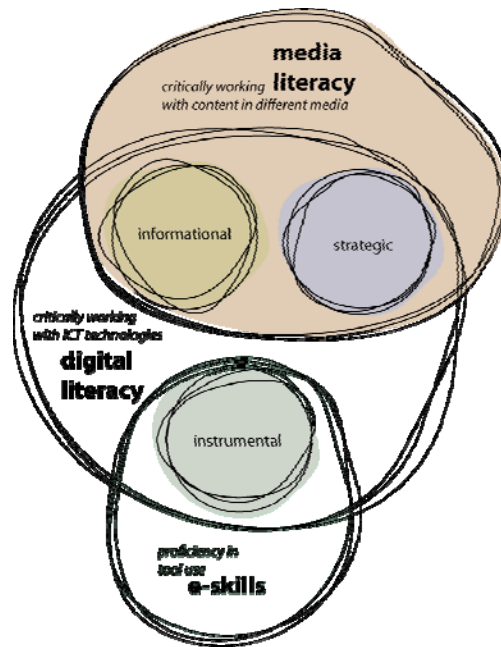
While there is currently an intense discussion about the concept of personal learning environments and its technological and organisational foundations, it remains an open question whether a particular set of skills or competencies is required for facilitators and learners to use PLEs in their education or educational design activity. This question is strongly related to the 'media literacy' and 'digital literacy' discussion in educational technology. Thoman & Jolls (2005) define media literacy as a "21st century approach to education. It provides a framework to access, analyse, evaluate, and create messages in a variety of forms – from print to video to the Internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy".

In their declaration on lifelong learning from 2006 the European Commission mentions eight key competences. One of these competences is defined as a "digital competence [that] involves the confident and critical use of information society technology (IST) and thus basic skills in information and communication technology (ICT)" (European Parliament and the Council of Europe, 2006). Furthermore, a digitally literate person is "equipped with the skills to benefit from and participate in the Information Society. This includes both the ability to use new ICT tools and the media literacy skills to handle the flood of images, text and audiovisual content that constantly pour across the global networks" (EC, 2007). Learners with a high level of digital literacy deploy information and communication technology efficiently depending on situation and aim, use them to generate information and knowledge in their profession, and transform knowledge and practice through innovation and creativity with the help of these technologies (DTI, 2007).

DTI (2007) argues that in opposite to digital literacy that is usually defined in terms of technologies, media literacy is defined in terms of contents (e.g. images, text, audiovisual) of which the skills in question are to allow mastery, see Figure 1. Also, instrumental, informational, and strategic skills – i.e. the ability to operate hardware and software, the ability to search for relevant information using hardware and software, and the ability to use information for own purpose and position – are all equally important for digital literacy whereas media literacy is primarily concerned with strategic skills which include the ability to evaluate and create messages (DTI, 2007).

A model of so called eSkills is proposed by Stucky et al. (2003). Their IT Competence Maturity Model categorises eSkills according to five degrees: (1) IT awareness (basic knowledge), (2) IT literacy (knowledge to operate a PC), (3) expert user (special knowledge or expertise with application software, helping other users), (4) professional entry level (professional knowledge) and (5) professional level IT skills (advanced professional knowledge). Different than media and

digital literacy, eSkills primarily focus on instrumental aspects and provide a model for developing proficiency in applied settings (see Figure 1 below).



**Figure 1.** State of the art: overview.

With the rise of social software in the last years and technologies for a programmable web like Ajax, a silent revolution has taken place that promotes a new era of end-user friendliness and usability that should enable an average user to access, manage, re-mix, create, and communicate information and knowledge to various individuals and networks more efficiently. At the same time public exposure and the ever-growing collection of own digital traces became a source of valuable information for constant improvement of the user's own performance.

It is still, however, an open question, which skills are needed to apply these technologies in an educational context. The here presented empirical study aims to shed light on the competences (skills, abilities, attitudes, habits, knowledge) required and motivated by the PLE and – more specifically – Mash-Up PLE approaches. We believe that our findings provide some valuable input on how literacies and skills are developed with the help of these environments. Furthermore, the findings allow to connect the MUPPLE and PLE debate to the ongoing media- and digital literacy debates.

## 2 Methodology

A qualitative research approach, particularly case study research, was applied as the key methodology in this study. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live. Kaplan and Maxwell (2005) argue that the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified.

The data for this investigation was collected in a series of interviews with representative people from the target groups facilitators, learning designers, learners, and researchers. All interviews were open-ended interviews, but they were roughly structured by a set of guiding questions. The interviews focused on identifying competences involved in PLE use of both learners *and* facilitators. This article only presents the findings about the learners. The length of the interviews varied between 40 minutes to one hour. Three sets helped to triangulate the subject under study in order to make it less subjective and in order to incorporate multiple stakeholder views.

The first interview partners were a group of eight European instructors attending a training workshop on how to use social software tools for learning delivered by the REVIVE project in March 2009 in Budapest. Six of the interviewees represent higher education institutions; two design e-learning courses for a chamber of commerce. All interviewees have previous experience in using a virtual learning environment for teaching, whereas only four declared to have some experience with social software tools such rss-feeds, blogs, google docs and social-bookmarking tools.

The first interview was followed-up by a (virtual, i.e. skype) focus group session comprising three experts on educational technology, followed by an expert interview with an educational psychologist. The picture has been rounded up by a (virtual, i.e. flashmeeting) interview of a group of three media pedagogy students. All interviews were recorded and a transcript was prepared which was used as data basis for the analysis.

Subsequently, analytical memos were elaborated sessions from the gathered data by the investigators, the content thereby grounded in and inductively distilled from the data. Coding was performed to group identical and strongly related concepts. Memos and codes were finally (re-)arranged in a large display to identify and elaborate the proposed conceptual structure of five dimensions along three stages.

	<b>minimal condition</b>	<b>necessary trigger</b>	<b>intended outcome</b>
<b>plan</b>	<ul style="list-style-type: none"> <li>- inquisitiveness</li> <li>- offer-oriented selection</li> <li>- adopting 3rd party planning</li> </ul>	<ul style="list-style-type: none"> <li>- ability to explicate intentions and objectives</li> <li>- ability to set priorities to tasks</li> </ul>	<ul style="list-style-type: none"> <li>- ability to design your own portfolio</li> <li>- ability to match formal and personal requirements</li> </ul>
<b>reflect</b>	<ul style="list-style-type: none"> <li>- willingness to change own attitudes</li> </ul>	<ul style="list-style-type: none"> <li>- collecting (digital) traces</li> </ul>	<ul style="list-style-type: none"> <li>- ability to identify strengths and weaknesses</li> <li>- reviewing traces</li> <li>- creative sense-making of the past</li> </ul>
<b>monitor</b>	<ul style="list-style-type: none"> <li>- adopting external evaluation criteria</li> <li>- systemic 'more-knowledgeable-other' evaluation</li> </ul>	<ul style="list-style-type: none"> <li>- ability to set evaluation criteria</li> <li>- willingness for public exposure</li> <li>- ability to network for feedback</li> <li>- ability to compare with others</li> </ul>	<ul style="list-style-type: none"> <li>- control &amp; direct facilitator(s)</li> <li>- self discipline</li> <li>- ability to autonomously control own progress</li> </ul>
<b>act</b>	<ul style="list-style-type: none"> <li>- willingness to try s.th. new</li> <li>- instrumental skills: basic operational ICT skills</li> <li>- information gathering skills: content-centred</li> </ul>	<ul style="list-style-type: none"> <li>- capability to deconstruct your PLE</li> <li>- ability to screen available tools</li> <li>- capability to repurpose: change tool context</li> <li>- ability to select tools</li> <li>- comprehension that information outside print has value</li> </ul>	<ul style="list-style-type: none"> <li>- productive and transformative ICT skills</li> <li>- ability to assess quality &amp; reliability of (sources of) information</li> <li>- process- &amp; content-centred</li> <li>- creative construction &amp; maintenance of tool set</li> <li>- constant build up of the range of personal experiences</li> <li>- ability to match the right tool with the intended purpose</li> </ul>
<b>interact</b>	<ul style="list-style-type: none"> <li>- social interest</li> <li>- basic social skills</li> <li>- (foreign) language skills</li> </ul>	<ul style="list-style-type: none"> <li>- willingness to open artefacts up to others</li> <li>- willingness to give</li> <li>- willingness to not only read, but publish</li> <li>- extended social skills: knowing how to handle mediated communication &amp; criticism</li> </ul>	<ul style="list-style-type: none"> <li>- networking competence</li> <li>- ability to network for feedback</li> <li>- decision competence when to work collaboratively</li> <li>- negotiation skills</li> </ul>

**Fig.2. The PLE competence continuum.**

### 3 Results

Within the conducted interviews, five dimensions with three stages each could be identified. These dimensions encompass: plan, reflect,

monitor, act, and interact. The stages we could distinguish so far partition the underlying competences (skills, abilities, attitudes, habits, knowledge) into those that serve as a minimal condition, necessary triggers, and intended outcomes.

With 'minimal condition' we refer to those skills, abilities, attitudes, habits, and knowledge that need to be present or are typically present when beginning to consciously build a PLE, whereas 'necessary triggers' denote those that are developed along the way towards the 'intended outcomes' and on which the intended outcomes rely. They can be surrogate or just incomplete in nature.

In brief, planning competence refers to those skills, abilities, habits, attitudes, and knowledge that fix how goals, schedules, and paths are set. Reflection is creative sense making of the past and enables planning. Monitoring refers to how progress control is performed. Last but not least, the pair acting and interacting group social & collaboration and information & tool competences.

#### 4 Discussion

Within the *planning* sphere, the starting condition typically shows 3rd party domination accompanied by mere adoption and offer-oriented selection of goals while at the same time maintaining a degree of inquisitiveness ("stubbornness", "fun in learning", "interest", "inquisitiveness"). Among the necessary triggers we found the ability to explicate intentions as well as objectives and the ability to set priorities to tasks. These need to be developed in order to support the acquisition of the ability to design ones own portfolio and the ability to match formal and personal requirements where necessary.

With respect to *reflection*, willingness to change own attitudes was identified as the minimal condition to start building a PLE, whereas, at the opposite end of the competence continuum, we found the ability to actively engage in the process of reviewing own (digital) traces, identifying strengths and weaknesses of own performance and thus making creative sense of the past learning experiences. In this case the trigger allowing the passage from one stage to another is the process of "leaving (digital) traces" - producing, publishing, and collecting learning artefacts.

Looking at *monitoring*, the minimal condition typically includes such 'silver-spoon' learning habits as adopting external evaluation criteria and relying in the evaluation of performance on the more knowledgeable other (typically a teacher). Among the necessary triggers we found the ability to build up criteria for self-evaluation and willingness to "put yourself and your artefacts out [to the wider public] and get feedback by others, or read others contributions for measuring and comparison".

These attitudes and abilities are necessary to trigger the acquisition of the ability to control and direct learning progress in an autonomous and disciplined way, and to actively design and direct the relationship with the facilitator(s).

The next area, -- *acting* --, encompasses a set of skills, attitudes, abilities, habits, and knowledge that closely relate to the concepts of Media and Digital Literacies. As a minimal condition for constructing an own PLE a learner needs basic skills in ICT i.e. the ability to operate hard- and software, and the ability to search for, collect and store relevant information. Another very important minimal condition in this sphere is the willingness to try something new. Among the important triggers we identified the following competences (abilities and attitudes) from the interviews: comprehension that information beyond printed media (such as wiki pages, blog entries, or peer comments) have a high value for learning and knowledge construction; ability to deconstruct your PLE i.e. "capability to think about what comprises your personal learning environment"; ability to screen available tools and as a result make an informed selection; and, last but not least, the ability to re-purpose a tool, i.e. perceive affordances emerging from a new context. The above-mentioned abilities and attitudes are an important prerequisite for the acquisition of high levels of digital literacy. These intended high-level outcomes encompass: the ability to assess the quality and reliability of information and the ability to make productive use of technology including matching the right tool for the right job. Furthermore, the construction and maintenance of a tools portfolio is now a competence fitted with a degree of creativity and framed by constantly enriched experiences not only with the tools therein. Whereas the minimal condition requires information gathering skills that are by nature content-centred, the intended outcome is an ability to regulate with respect to both content as well as the learning process.

Shedding light on *interacting*, basic social skills, a social interest, and particularly foreign language skills define the minimal condition. The triggers are mainly characterised by attitude changes: a willingness for exposure needs to be developed -- a willingness such as "[releasing] artefacts to others", "publishing not only reading", or -- more general -- "giving not only taking". Additionally, extended social skills are required to set off the acquisition of the targeted competences. These extended social skills specifically relate to dealing with mediated communication and mediated criticism, often underestimated in their impact on performance. Intended outcomes were identified to be networking competence including the ability to network for feedback, decision competence on when to work in a group (and when not), and negotiation skills. The latter relate to reaching agreement within a group with respect to, e.g., roles, rules, and tools.

## 5 Conclusions

Within this contribution, we have proposed a draft framework for studying the competence spectrum along five initial dimensions we have elaborated from the given set of interviews. We have partitioned the competence building blocks of skills, abilities, habits, and attitudes into three stages guiding from the situation at the beginning to the intended outcome.

This draft framework sheds light on the competences required for and developed by Mash-UP PLEs (MUPPLEs). Although the framework clearly shows that basic instrumental and informational digital literacy skills are a prerequisite – ‘minimal condition’ – for starting to consciously build a personal learning environment, MUPPLEs can effectively support the development of higher level (strategic) digital and media literacy skills.

The reason for this may be found therein that monolithic applications (such as virtual learning environments, also known as learning management systems) used in education are outdated and do not promote the development of relevant digital literacy skills. It seems that the PLE concept incorporates more recent IT approaches and a more challenging qua truly distributed setting that both require the learner to take a more active role in managing and configuring the involved systems. In short, PLEs can be said to be means to promote digital literacy.

The proposed draft framework and partitioning seems to be valid, but while analysing, we already identified gaps and possibilities for continuing studies. The validity, however, needs to be further studied with the involved stakeholders. We plan to enhance the study with the complement: the competences needed for and developed by facilitators following the PLE approach. Additionally, we plan to verify both frameworks with a quantitative study.

Future work will have to follow up on this to create a more detailed picture of the competence continuum necessary for and motivated by the concept of a personal learning environment.

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## References

- European Parliament and the Council of Europe (2006). Key competences for lifelong learning. Recommendation of the European Parliament and of the Council, of 18 December 2006, on key competences for lifelong learning [Official Journal L 394 of 30.12.2006].
- European Commission (2007). Digital Literacy: Skills for the Information Society, online at [http://ec.europa.eu/information\\_society/tl/edutra/skills/index\\_en.htm](http://ec.europa.eu/information_society/tl/edutra/skills/index_en.htm), last access: 16.9.2009
- Danish Technological Institute (2007). Analytical Framework. Deliverable of the project 'Supporting Digital Literacy', Online at [http://www.digital-literacy.eu/\\_root/media/24823\\_Project%20description.pdf](http://www.digital-literacy.eu/_root/media/24823_Project%20description.pdf), last access: 16.9.2009
- Kaplan, Bonnie; Maxwell, Joseph A. (2005): "Qualitative Research Methods for Evaluating Computer Information Systems", In: Anderson & Aydin (Eds.): Evaluating the Organizational Impact of Healthcare Information Systems. Springer.
- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record*, Volume 108, Number 6, June 2006, pp. 1017–1054.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14.
- Stucky, Wolfried; Dixon, Matthew; Bumann, Peter; Oberweis, Andreas (2003): Information Technology Practitioner Skills in Europe: Current Status and Challenges for the Future. In: Klein et al. (Eds.): *Comp. Sci. In Perspective (Ottmann Festschrift)*, LNCS 2598, pp. 304–317. Springer Verlag Berlin Heidelberg
- Thoman, Elizabeth; Jolls, Tessa (2005): Media literacy education: Lessons from the center for media literacy. In: Schwartz & Brown (Eds.): *Media literacy: Transforming curriculum and teaching*, Vol. 104, pp. 180–205. Malden, MA: National Society for the Study of Education
- Van Harmelen, Mark (2008): Design trajectories: four experiments in PLE implementation, In: *Interactive Learning Environments*, 16:1, pp. 35 – 46
- Wild, Fridolin; Moedritscher, Felix; Sigurdarson, Steinn (2008): Designing for Change: Mash-Up Personal Learning Environments, In: *e-learning papers* (9).