

## Designing e-tivities to increase learning-to-learn abilities

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### Summary

In this paper we present a detailed set of e-tivities framed in a learning design context. The e-tivities use Internet tools for teaching Personal Knowledge Management skills (PKM) to adult learners. PKM practices and the related required skills are strictly related to learning-to-learn competencies, which have been identified as key to grow an adequate attitude to lifelong learning. Internet technologies, on the other hand, are seen as having an undisclosed potential to let people more easily and effectively jump into the “lifelong *learning-to-learn*” experience. The learning to learn competence makes people aware of how and why they acquire, process and memorise different types of knowledge.

The results here introduced are rooted in the development of a theory related to Personal Knowledge Management skills presented in previous works, in which such competences are divided into two main groups: Basic and Higher Order PKM skills.

The e-tivities introduced in this paper can provide an initial reference framework, both for the definition of the learning objects (through the specification of the Basic and Higher Order Personal Knowledge Management Skills) as well as for the macro design of the Skills Development Modules in which the PKM skills should be taught.

**Keywords:** Digital literacy, Learning Design, Networked learning, Social Networking, Learning-to-learn, PKM, personal knowledge management

## 1 Introduction

“We have for years increasingly desired that education be considered as life itself and not as a mere preparation for later living ... it follows that to base education on purposeful acts is exactly to identify the process of education with worthy living itself” (Kilpatrick, 1918).

It was 1918 when W.H. Kilpatrick provided this sharp view on education. Digital society was far away at that moment. Now that the issue of developing a lifelong learning perspective is on everyone’s lips, we can benefit from thinking it as rooted in times when internet technologies were unimaginable. Retrieving the profound meaning of Kilpatrick’s statement, allows us to assign to technologies the role of a medium to support the identification of the process of education with “worthy living itself”.

### 1.1 Learning-to-learn as key competence

One of the basic skills for success in the knowledge society is the ability to learn (Hoskins & Fredriksoon, 2008). *Learning to learn* has been identified at the European level as one of the key competences<sup>1</sup> to grow today’s learners attitude to lifelong learning (European Commission,

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<sup>1</sup> Key competences are those competences which are quintessentially necessary throughout life for continuing to gain employment and be to integrated in everyday life activities including those of civil society and decision making (Rychen, 2004 p. 22).

2000) (Eurydice 2008). Competences are the ‘internal mental structures in the sense of abilities, dispositions or resources embedded in the individual’ (Rychen & Salganik, 2003) and these function in interaction with a ‘specific real world task or demand’. Rychen and Salganik (2003) describe the internal structures of a competence as the dimensions of ‘Knowledge, Cognitive skills, Practical skills, Attitudes, Emotions, Values and Ethics and Motivation’ (Eurydice, 2000).

The EU working group on “Key competencies” (European Union, 2006) identified ‘Learning to learn’ as the ability to pursue and persist in learning. Self-initiated, self-regulated, intentional learning at all stages of life are key to personal and professional advancement.

In Hoskins e Fredriksoon (2008), the learning to learn concept is studied in order to envisage a European framework and test to measure learning to learn. Such framework model is based on three dimensions of learning to learn, cognitive, affective and metacognition.

New Learning Framework		
Affective Dimension	Cognitive Dimension	Meta-cognition Dimension
<ul style="list-style-type: none"> <li>- Learning motivation, learning strategies and orientation towards change</li> <li>- Academic self-concept &amp; selfesteem</li> <li>- Learning environment</li> </ul>	<ul style="list-style-type: none"> <li>- Identifying a proposition</li> <li>- Using rules</li> <li>- Testing rules &amp; propositions</li> <li>- Using mental tools</li> </ul>	<ul style="list-style-type: none"> <li>- The problem solving (metacognitive) monitoring tasks,</li> <li>- Metacognitive accuracy</li> <li>- Metacognitive confidence</li> </ul>

**Table 1:** European test learning to learn framework (Hoskin e Fredriksoon, 2008)

From an epistemological perspective, learning to learn attains to two different research paradigms: cognitive psychology and cultural sociology: cognitive psychology traditionally considers the knowledge construction processes from a cognitive perspective, while sociology accounts for the social processes enacted during the relational dimension of learning.

Learning to learn competence makes people aware of how and why they acquire, process and memorise different types of knowledge. This competence includes awareness of one’s learning process and needs, identifying available opportunities, and the ability to overcome obstacles in order to learn successfully. Learning to learn engages learners to build on prior learning and life experiences in order to use and apply knowledge and skills in a variety of contexts: at home, at work, in education and *training* (Education Council, 2006). In this way, people are in a position to choose the learning method and environment that suits them best and to continue to adapt them as necessary (Eurydice, 2002).

In the context set up by the above definitions, technologies are seen as having potential to become an appropriate launch pad to let people more easily and effectively jump into the “lifelong *learning-to-learn*” experience.

## 1.2 From Learning to Learn to Personal Knowledge Management

Recent literature has conjugated learning-to-learn competencies and technologies closer to the domain of PKM - Personal Knowledge Management (Dorsey 2001; Sorrentino & Paganelli 2006) and the related required skills. PKM is a term gaining popularity both in academy and enterprise.

The set of PKM abilities were first identified by Dorsey (2001) and Pollard (2005) and described through seven main competences: retrieving information, evaluating information, organizing information, analyzing information, presenting information, securing information, collaborating

around information. However, in our perspective, PKM skills encompass a more varied and multi-faceted set of abilities which cannot be directly compared to digital and information literacy (Martin & Ashworth 2004; Martin 2006; Mayes & Flowes, 2006). Social and relational aspects knowledge construction and management (Siemens 2004; 2006) inevitably highlight that mastering technology and information is but one aspect of more complex skills.

The issue of PKM is hence rooted in a complex picture where individual instances and social and technological aspects, converge. Some of the authors who dealt with this topic (Frans & Hixon, 1999; Dorsey, 2001; Barth, 2003; Avery et al., 2000; Pollard, 2005; Grey, 2005; Wright, 2005) presented a detailed reference framework related to a unique terminological choice.

Our vision of PKM skills, which will be detailed in the next section, is focused on an interpretation of a set of skills closer to the concepts of *personal knowledge and learning* and *management of learning* within the context of social networking environments (Dorsey, 2001; Sorrentino & Paganelli, 2006; Pettenati, Cigognini & Sorrentino, 2007a; Pettenati, Cigognini, Mangione & Guerin, 2007; Pettenati & Cigognini, 2009; Pettenati, Cigognini, Mangione & Guerin, 2009).

The issues of the development and the acquisition of PKM skills required to support the lifelong learners in the Knowledge Society has been treated in previous works (Pettenati, Cigognini & Sorrentino, 2007; Pettenati, Cigognini & Edirisingha, 2007; Pettenati & Cigognini, 2007, 2009; Cigognini, Mangione & Pettenati, 2007; Mangione, Cigognini & Pettenati, 2007). Above research aimed at detailing the models of the skills that the learner should develop in order to be able to fully engage with a more meaningful, lifelong learning process availing of internet technologies.

In above-mentioned studies, we also provided a methodological link between PKM skills and learning design (Pettenati, Cigognini & Sorrentino, 2007; Pettenati, Cigognini & Edirisingha, 2007)(Cigognini et al., 2007).

PKM skills are grouped into two main categories, **Basic PKM skills** and **Higher Order PKM skills**; the former encompass abilities and skills which can be deliberately learnt and applied as direct “know how”, while the HO PKM need a more complex learning, reflection and experiential process, which calls for the mastering a more complex set of competences and “know to be”, as it is summarised in the next section. (Mangione et al., 2007; Cigognini, Pettenati, Paoletti & Edirisingha, 2008; Pettenati et al., 2008).

## 2 Guiding learners to become knowledgeable lifelong learners - PKM skills model

### PKM Basic and Higher Order Skills

As it is summarized in Table 1, we group PKM basic skills under three macro-competence categories, **Create**, **Organise** and **Share**. Each macro-competence is interpreted as composed of a number of specific PKM basic skills (Avery et al., 2000; Dorsey, 2001; Sorrentino & Paganelli, 2006). The basic skills identified ground a complex process which cannot be considered complete without accounting for a deeper mastering of deriving knowledge from the network and its resources. We therefore identify a set of **Higher Order skills** and competences which we group into four main categories (Pettenati et al., 2009), as detailed in Table 1: (1) connectedness, (2) ability to balance formal and informal contexts, (3) critical ability and (4) creativity.

<b>PKM-skills</b>	
<b>Basic PKM Skills</b>	
<b>CREATE:</b> <i>Editing</i> (e.g., digital information creation in multimedia formats); <i>Integrating</i> (post-processing of recordings, digital annotations, automatic abstracting, etc.); <i>Correlating</i> (make connections, draw diagrams, mind maps); <i>Managing content security issues</i> (manage privacy, Intellectual Property Rights, Digital Rights Management, etc.).	
<b>ORGANIZE:</b> <i>Searching &amp; finding</i> (selecting search engines, querying search etc.); <i>Retrieving</i> (reading, managing cognitive overload etc); <i>Storing</i> (archiving, considering resource availability and accessibility, etc.); <i>Categorizing/classifying</i> (defining relations among pieces, use taxonomies and folksonomies, etc.); <i>Evaluating</i> (extracting meaning, attributing relevance, affecting trust levels).	
<b>SHARE:</b> <i>Publishing</i> (presenting relevant information, using appropriate publication channels, etc.); <i>Mastering knowledge exchanges</i> (being concise, using appropriate language, turn-taking, topic-focusing, etc.); <i>Managing contacts</i> (keeping profiles, contact, contexts and social-network representation, etc.); <i>Relating</i> (establishing connections, communicating through new media; understanding peers, using different languages, etc.); <i>Collaborating</i> (sharing tasks, working to common goals, etc.).	
<b>Higher-Order PKM Skills</b>	
<b>CONNECTEDNESS</b> – being connected emerged as one of the fundamental skills of the lifelong-learner 2.0. Being connected, however, does not refer to technological aspects. Rather, it refers to the process of being networked i.e., collaborate and interact with others for the purpose of constructing, developing and maintaining social-networks. According to this perspective, the connected person needs to develop specific abilities to communicate effectively on the Internet and to manage his or her online identity, while managing the multiplicity of identities and being aware of how his or her online identity and communication sits within a global system of communication.	<b>ABILITY TO BALANCE FORMAL AND INFORMAL CONTEXTS</b> – it includes the ability to listen to a variety of opinions sensibly; manage time and relations, being driven by what we call the "procrastination principle" i.e. "to deal with problems only as they arise – or leave them to other users to deal with"; combining job-training-leisure tasks to find a balance between the different learning contexts with which the learner can be confronted engaging in the quality participation as listener, observer/reader and author; be open to interdisciplinary working/learning; become methodical, systematic, punctual and goal-oriented; be "spongy" i.e. to absorb as much as possible, keeping the essence of the interactions with contents and relations so as to squeeze as much as necessary.
<b>CRITICAL ABILITY</b> - the adoption of a critical ability in the use of Internet-based resources (contents and relations) is closely related to the ability to identify the resources relevant to the context of use, i.e., in understanding possible uses of such resources and being aware of their limitations. A key part of this skill is being able to integrate the resources identified into a personal resource management method, which is constantly fine-tuned by the learner, closely linked to his or her learning objectives..	<b>CREATIVITY</b> – the process of developing a creative attitude to lifelong learning requires both structured and serendipitous explorations, observation, linking and association to imagine unexpected and unusual connections between the possible associations and links. Developing a creative mindset for lifelong learning provides concrete ways through which to engage in one's knowledge construction path: interpreting, linking, proposing and experimenting new knowledge construction strategies.

*Tab 1. PKM skills model: Basic and HO PKM Skills in details (Pettenati et al., 2009b).*

### 3 A Learning Design Framework for e-tivities centred on the PKM skills acquisition

In order to validate the Personal Knowledge Management skills model designed as well as to set the way for the translation of such theory into practice to support lifelong learners we conducted a set of semi-structured interviews during the period January-March 2008, whose partial results have been presented in (Cigognini, Pettenati & Paoletti, 2008) with 23 respondents involved in education (both from private sector companies and universities; from disciplines including biology, medicine and educational science). In this paper we present the results related to one of the main goals of the interviews: the identification of a set of learning strategies for each PKM HO skill.

#### 3.1 Methodologies of the interviews

The adopted methodology was the one of the semi-structured interview (Corbetta, 1999) composed of some closed and some guided questions. Such a methodology proves to be effective for its flexibility, completeness, spontaneity, high degree of response, capacity to account also for non verbal and proxemic behaviours (Bailey, 1982).

The interviews were designed to take about 45 minutes and the answers are mainly oral, though supported by the filling of the closed questions of the questionnaire. The experts interviewed were composed by 23 subjects from the educational sector (both from private enterprises and academy); 16 subjects are researchers or professors, while 7 come from the professional training. Disciplinary fields in which the experts are engaged have been chosen purposely different, from biology, medicine, educational science, etc. because the methodological focus is to be verified as being transversal to specific cognitive domains. The deliberate choice to involve experts from different backgrounds is motivated by the fact that a meta-level methodology is to be pursued at a level of process and learning praxis which needs to be independent and placed at a higher level, from the reference cognitive domain.

The interviews have been audio-recorded and conducted using a semi structured-questionnaire (Cigognini et al., 2008b). Collected data, that is audio registrations of the interviews and their transcripts and answers to closed questions have been aggregated and analyzed (Corbetta, 1999). The described design of the interviews is actually focused on teaching and learning strategy, through the creation of a learning scenario; experts are required to train a novice on specific PKM HO skills. The experts' background is then valued both as regards the WHAT (contents) and the HOW (methods) because is translated into a fake learning practice thanks to the scenario.

To the extent of identifying the possible learning praxis to sustain the processes for the acquisition of the HO skills, four open-ended questions have been used, to detail, for each of the HO skills, at least one e-tivity<sup>2</sup>. The interviewees have been asked the following question:

*"You have to train a novice in order to improve his connectedness (or another HO skill). Please describe three different tasks you could assign him for such purpose. For each task/activity please specify the tools you would use."*

During the interviews, the interviewees had the possibility to consult the skills definitions as well as the theoretical learning design model proposed as well as its learning application (Pettenati & Cigognini, 2009; Cigognini, Pettenati & Edirisingha, 2009).

### 4 Learning Design framework

Each of the e-tivities designed by our experts is structured according to a three elements model described in Salmon (2002): **Purpose** (detailed learning outcome of the activity), **Task** (concrete and detailed indications of the actions to take), **Respond** (feedback and response actions related to the task accomplishment).

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<sup>2</sup> The term e-tivity was coined by G. Salmon (2002). It means "task online" and it is a framework to learn something in a dynamic and interactive way. This activity is based on intense interaction and reflective dialogue between a number of participants, such as learners / students and teachers, who work in a computer-mediated environment. E-tivities are text-based and led by an e-moderator (usually a teacher).

A useful 5-stage framework to design and run our e-tivities based on interaction among online learners and participants, is provided in (Salmon, 2002).

**Stage 1 - Access & Motivation** - New online learner can be experiencing considerable frustration in logging on. The e-moderator must play a role for ensuring access and welcoming and encouraging. The essential element is motivation to get online participants through the early stages. E-tivities at this stage must provide rookie online learners with a gentle introduction to using the new online learning milieu. However, at the beginning, high-esteem online learners need support sometimes.

**Stage 2 - Socialization** - The e-moderator by creating his/her own special online community through e-tivities must build the bridges for all online participants. Online participants can be excited to share and exchange their thoughts and collaborate with.

**Stage 3 - Information Exchange** - In this stage, not only must information be exchanged, but also cooperative tasks must be achieved. Online learners must explore necessary information at their own pace and place by respecting different and diverse views points of others. Dr. Salmon states that online learners in this stage interact with the course content and interaction with the e-moderators and/or other people.

**Stage 4 - Knowledge Construction** - E-tivities at this stage have online discussion or knowledge development aspects. Online learners must take control of their own knowledge construction in use of new ways. At this stage, e-moderators have imperative roles to build and maintain online groups.

**Stage 5 - Development** - Online learners in this stage must become critical and self-reflective as well as responsible for their own learning to be able to build on the ideas acquired through the e-tivities and apply them to their individual contexts.

The set of e-tivities so delineated has proved to be composite and varied: its analysis could avail of different categories and theoretical models available in literature. The exercises designed from our interviews can be reformulated according to four main learning architectures as described in (Ranieri, 2005): receptive, sequential, guided-discover, and collaborative which open cognitive processes and the complexity level of the educational setting (Ranieri, (2005):

1. **Receptive:** is related to the transmission of basic information, suitable for the diffusion of the reference lexicon in a new cognitive domain or of preliminary concepts in a given domain;
2. **Sequential or directive:** is related to the sequential or procedural learning, is made of short lectures, exercises, feedbacks, progression and expansion from the simple to the more complex.
3. **Guided-discover:** it is an architecture dedicated to the acquisition of complex abilities such as problem solving, and meta-reflection; it can be articulated in different learning strategies such as problem-based-learning, situated learning, simulations, coaching, expert models, etc.
4. **Collaborative:** it is related to the acquisition of complex abilities, for the development of design abilities and critical thinking; inside such an architecture learning strategies such as peer learning, peer tutoring, project work and problem based approach can adopted.

The analysis of the collected e-tivities can be referred to the different learning strategies codified in literature (Reigeluth, 1999; Calvani, 2000), synthesised in the nine following items: lecture, tutorial, modelling, synchronous or asynchronous discussion, case study, simulation, role play, problem solving, collaboration.

## 5 e-tivities, learning strategies and tools

Hereafter we present a set of sample e-tivities for each of the four HO PKM skills.

Each e-tivity is framed in its learning design framework made of learning architectures and strategies together with the possible technological tools which can be used to support the interiorization of such abilities.

HO Skills	e-tivity	Learning design framework
CONNECTEDNESS	<p><b>Purpose:</b> collaborative activity using wiki.</p> <p><b>Task:</b> students log into the forum and trade a topic on "leadership" [or another abstract topic]. Students are required to google the definition of leadership then come back to the wiki and edit a convenient definition.</p> <p><b>Respond:</b> each student will do comment on other student's definition.</p>	<p><b>Learning architectures</b> Collaborative</p> <p><b>Learning strategies</b> Problem based learning, asynchronous discussion, peer learning.</p> <p><b>Tools</b> Wiki, collaborative editors (e.g. google document, writely).</p>
CONNECTEDNESS	<p><b>Purpose:</b> increase the tagging abilities (define, classify, organize, share) to support collaborative knowledge construction.</p> <p><b>Task:</b> get student to create tag cloud on leadership [or the same abstract topic] and then comment on others student's tag cloud, and then reflect on what they selected their own tag cloud.</p> <p><b>Respond:</b> comment each others.</p>	<p><b>Learning architectures</b> Directive, Collaborative.</p> <p><b>Learning strategies</b> Issue case, case study, modelling asynchronous discussion for collaboration.</p> <p><b>Tools</b> del.icio.us, blog.</p>
CONNECTEDNESS & ABILITY TO BALANCE FORMAL AND INFORMAL CONTEXTS	<p><b>Purpose:</b> increase the sense of network and creation and management of one's digital identity.</p> <p><b>Task:</b> create or enrich one's profile on a social network site mirroring the process of identity creation. Invite and search friends, colleagues, professors, and gaining ability in managing the contact lists and resource sharing according to different levels of views and permissions.</p> <p><b>Respond:</b> comment and write on other's walls. Comment on at least four shared resources.</p>	<p><b>Learning architectures</b> Sequential, Guided-discover.</p> <p><b>Learning strategies</b> Tutorial, modelling, problem-based, asynchronous discussion for free expression.</p> <p><b>Tools</b> Facebook</p>
ABILITY TO BALANCE FORMAL AND INFORMAL CONTEXTS	<p><b>Purpose:</b> increase the ability of managing his identity and resources.</p> <p><b>Task:</b> go to YouTube and find "wikis" in plain english", follow instruction and go to sign up for a wiki site; create your wiki or wiki page, adding your multimedia resources. Invite the teacher and three peers to edit your wiki page; report back in three days.</p> <p><b>Respond:</b> comment on the experience.</p>	<p><b>Learning architectures</b> Directive, Collaborative</p> <p><b>Learning strategies</b> Tutorial, peer learning, problem learning.</p> <p><b>Tools</b> Wiki, YouTube, photo-video-audio sharing.</p>
ABILITY TO BALANCE FORMAL AND INFORMAL CONTEXTS	<p><b>Purpose:</b> increase the ability of reflecting on different multimedia languages and communication styles.</p> <p><b>Task:</b> get students into iTunes and go to audio library. Get students search for interesting podcasting on "leadership" [or another abstract topic] (max 5 minutes) listen the podcast and then give a 2 minutes presentation about</p>	<p><b>Learning architectures</b> Receptive, Guided-discover</p> <p><b>Learning strategies</b> Case history, case analysis, peer learning.</p> <p><b>Tools</b></p>

	<p>communication styles and way to speak. Post the .ppt presentation in student's PLE (Personal Learning Environment).</p> <p><b>Respond:</b> comment each others presentations.</p>	<p>Podcast</p> <p>google presentation documents</p> <p>PLE</p>
<p>ABILITY TO BALANCE FORMAL AND INFORMAL CONTEXTS</p>	<p><b>Purpose:</b> increase the ability of detect and manage the communication styles and network identity.</p> <p><b>Task:</b> get students with group and assign each group of students to view a video on leadership [or another abstract topic]. Get them to observe the communication styles and proxemic.</p> <p><b>Respond:</b> get the students to comment on the style and weakness of the leader's communication.</p>	<p><b>Learning architectures</b></p> <p>Receptive, Guided-discover</p> <p><b>Learning strategies</b></p> <p>Case study, issue case, asynchronous discussion oriented to dialectic argumentation, modelling.</p> <p><b>Tools</b></p> <p>YouTube and class blog for comments.</p>
<p>CRITICAL ABILITY</p>	<p><b>Purpose:</b> increase the ability to reflect on his network knowledge construction processes.</p> <p><b>Task:</b> during one week, get students use status feed of their social networking site to trace their network actions (e.g. while tackling a given exercise).</p> <p>A peer tutoring is guaranteed during the development of the task.</p> <p><b>Respond:</b> student publish blog posts on their PLE commenting on their network activity.</p>	<p><b>Learning architecture</b></p> <p>Directive, Guided-discover.</p> <p><b>Learning strategies</b></p> <p>Modelling, coaching, peer tutoring, case study.</p> <p><b>Tools</b></p> <p>Twitter, Facebook, PLE.</p>
<p>CRITICAL ABILITY</p>	<p><b>Purpose:</b> stimulate critical reflection and meta-reflection starting from other student's reflection.</p> <p><b>Task:</b> get students to log into YouTube and search for videos on leadership [or another abstract topic] and then comment on the video.</p> <p><b>Respond:</b> post comment on other comments and synthesize the debate using a wiki.</p>	<p><b>Learning architecture</b></p> <p>Receptive, Guided-discover.</p> <p><b>Learning strategies</b></p> <p>Issue case, asynchronous discussion, case study.</p> <p><b>Tools</b></p> <p>YouTube, comment, wiki.</p>
<p>CRITICAL ABILITY</p>	<p><b>Purpose:</b> stimulate lateral thinking (De Bono, 1970).</p> <p><b>Task:</b> get students into six groups. Introduce students to "six hat thinking" (De Bono, 1985) and assign each group a specific hat. Get students engage the resolution of the problem using the assigned viewpoint. Exchange roles.</p> <p><b>Respond:</b> comment, improve the sough solution, final debriefing of the solution.</p>	<p><b>Learning architecture</b></p> <p>Collaboration.</p> <p><b>Learning strategies</b></p> <p>Problem-project based, strategic performance, decision taking, case study.</p> <p><b>Tools</b></p> <p>Collaborative editors (Wiki, Google document), instant messaging and mind mapping for the synchronous brainstorming phases.</p>
<p>CREATIVITY</p>	<p><b>Purpose:</b> increase ability to be concise in expression, creative elaboration, and meta-reflection.</p>	<p><b>Learning Architecture</b></p> <p>Collaborative.</p>

	<p><b>Task:</b> get students into groups and get them involved in the creation of a 3 minutes video on "leadership [or another abstract topic] synthesizing the concepts and discussions emerged during the previous exercises. Get them post the video on a video-sharing site.</p> <p><b>Respond:</b> comment on other groups' videos.</p>	<p><b>Learning Strategies</b> Project work, modelling.</p> <p><b>Tools</b> YouTube, Flickr, podcast.</p>
CREATIVITY	<p><b>Purpose:</b> reflect on different styles and communication contexts to increase the effectiveness of student's creativity and self-expression.</p> <p><b>Task:</b> given a specific scientific news published in a pdf format get students make it more accessible and publishable in different contexts and for different types of audience (e.g. teenagers, university students, mid-age employee). Get students use different multimedia editing systems as preferred. Get students post the results in a shared section of their PLE.</p> <p><b>Respond:</b> comment on other students' news.</p>	<p><b>Learning architecture</b> Guided-discover</p> <p><b>Learning strategies</b> Problem-based learning, peer learning</p> <p><b>Tools</b> Wiki, photo - video - audio creating, photo - video - audio sharing, slideshare, PLE</p>

*Tab: 2 Sample e-tivities and related learning design framework for teaching the Higher Order Skills.*

The e-tivities designed and presented in the previous sections have been used in different learning experiences (Cigognini et al., 2009) during May 2008 - October 2008.

We have designed and delivered basic PKM Skill Developed Modules (SDMs) and a HO PKM Skill Developed Modules (SDMs): The experimental phases were conducted inside the academic course of Professor Gisella Paoletti, as laboratory lessons, by the Psychology Faculty at the University of Trieste.

Each SDMs made use of Moodle as VLE (Virtual Learning Environment) and a special set of 2.0 tools in order to implement the above presented e-tivities. The methods used to evaluate the effectiveness of the courses - the improvement of the PKM skills - was centred on the use of questionnaires (initial, final, after six months from the end of the course) and results obtained are very encouraging. Indeed the effectiveness of the courses perceived by the students are confirmed by the measures of the improvement of the basic as well as higher order skills. The students provided evidence of a more mature and effective use of technologies in their learning and knowledge construction. Detailed results of the experiments are presented in (Cigognini, 2009).

## 6 Conclusion

In this paper we presented a synthesis of the PKM skills model and we provided an overview of a subset of 11 e-tivities which can be used for teaching Higher Order PKM skills. The full set of such e-tivities (65) is detailed in (Cigognini, 2009) together with the completed PKM skills model, the related Learning Design model. The details and results of the Skills Development Modules conducted within such framework, are also fully described in the same dissertation.

The PKM skills model we designed and adopted is closely related to the learning to learn competences framework, in that it addresses a subset of the skills and dimensions addressed in learning to learn. Indeed, learn to learn is as much a result of the learning environment and a process of positive attitudes towards learning as a cognitive ability, thus a competence based approach that highlights both the cognitive and affective dimensions is useful. It also emphasises testing competence in relationship to real world tasks that people may face.

However the adoption of a PKM skills model (Pettenati et al., 2009), together with the Learning Design Model (Pettenati & Cigognini, 2009) allows building educational experiences encompassing all the three dimensions - affective, cognitive and metacognitive - related to the learning to learn competence (Eurydice, 2008).

Hence, gaining proficiencies in the acquisition of the Personal Knowledge Management Skills can be a step in the direction of sustaining the change of paradigm from a “education for future living” to a true “life long learning-to-learn” perspective.

Educational institutions at all levels must reshape their policies introducing the teaching of PKM skills at a transversal level in their educational offers.

Once such policy was interiorized and became praxis, the results presented in this paper could provide a starting reference framework both for the definition of the learning objects (Basic and Higher Order Personal Knowledge Management Skills) as well as for the learning design and method for the macro design of the Skills Development Modules.

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