
Editorial: Awareness and Reflection in Technology Enhanced Learning

Considering the multitude of views on awareness and reflection distributed over a wide range of disciplines (CSCW, psychology, educational sciences, computer science...) the workshop's theme is encapsulated in the following question: "*What do awareness and reflection mean in the context of TEL, and how can technologies support either?*"

The ARTEL12 workshop was a direct follow-up to the 2011 EC-TEL workshops "ARNETS11 (Awareness and Reflection in Learning Networks, Vol. 790 of CEUR)" and "ALECR11 (Augmenting the Learning Experience with Collaborative Reflection)". ARTEL12 pulled together research on awareness and reflection in Technology Enhanced Learning across disciplines (psychology, educational science, computer science) and across European TEL projects (MIRROR, ImREAL, STELLAR, MATURE, TellNET, TelMap as co-organising projects). The main audience of ARTEL12 were researchers and practitioners in the field of TEL.

The objective of this workshop was i) to provide a forum for presenting and discussing research on awareness and reflection in TEL and ii) to provide an interactive experience that connects participants' research, the co-organizing projects' latest prototypes and models with real end users' learning experiences and needs regarding reflection technology.

We received 12 submissions, of which 6 were accepted as full papers. The workshop was held on September 18, 2012. The workshop was organised in three sessions, where in the first session papers were presented and discussed that dealt with the topic of awareness whereas in the second session papers on reflection were presented and discussed. The final session was an interactive one, in which the participants collaboratively brainstormed about the connections between awareness and reflection. Moreover, the participants played educational games and worked with simulations, which have then been discussed considering their particular impact on awareness and reflection.

Papers on Awareness

As indicated by its title, the paper "Understanding the meaning of awareness in Research Networks" by Reinhardt et al. provides a theoretically and empirically informed exploration of 'awareness'. Grounded in the analysis of 42 interviews, the authors suggest 6 forms of awareness including being aware of others' activities, disciplinary differences in doing research or the geographical whereabouts of peers. A convincing argument outlines how these forms of awareness impact each other and lead to a layered model of awareness in research networks (LMARN). Although the LMARN is primarily presented as a heuristic device meant to guide the design of new tools supporting the formation of awareness, the paper also contributes to the wider discussion regarding novel forms of measuring the impact of scientific publications in Science 2.0 media.

Reinhardt and colleague's work, titled "Supporting Scholarly Awareness and Researchers' Social Interactions using PUSHPIN" examines an application designed to empower Research 2.0. Taking the scientific publication as its central *raison d'être*, it creates a unifying

layer on top of researcher's often fragmented communication and storage structures, creating recommendations using Big Data analytics and the social graph. PUSHPIN attempts to build a system that recommends related reading based both on what members of the social graph are also interested in but crucially additionally supported by content awareness of the publications within the system.

Kurapati et al.'s paper "A Theoretical Framework for Shared Situational Awareness in Complex Sociotechnical Systems" develop a framework to categorise socio-technical systems according to their purpose with respect to shared situational awareness. Sociotechnical systems may support Perception (being aware of surroundings etc.), Prescription (being able to modify existing plans) and Participation (being able to carry out joint actions). These levels of 'maturity' as they are called in the paper, are being discussed for individual, team and organisational levels. The paper thus provides a way to categorise, analyse, and understand socio-technical systems with respect to shared situational awareness.

In their paper on "Exploiting awareness to facilitate the orchestration of collaborative activities in physical spaces", Hernandez-Leo et al. discuss how the Signal Orchestration System (SOS) can be used in the classroom to raise awareness in dynamic group work situations. The paper introduces the wearable technology and discusses how the adoption of SOS leads to improved ambient awareness of the teacher.

Papers on Reflection

Krogstie and Prilla's contribution entitled "Tool support for reflection in the workplace in the context of reflective learning cycles" present a model for Computer Supported Reflective Learning (CSRL), created in the MIRROR project. The authors argue for a 3-step approach to the analysis and design of supportive reflective learning in the workplace, which is illustrated with a case of physicians in a hospital setting. They also present the results of the evaluation of the CSRL model.

Santos, Verbert, and Duval's paper on "Empowering students to reflect on their activity with StepUp!" advances their interests in using Learning Analytics to build dashboards that visualize their traces through learning material in ways that help learners and/or teachers steer the learning process. Studies of two use cases reveal complex issues surrounding implicit and explicit tracking, the influence of complexity on comprehension and goal setting and evaluate time spent as an indicator of depth of study. They conclude that these issues remain complex and recommend further work on both measuring instruments and visualisation, proposing further deployments of visualisations that embed both individual achievement and reflect that within the wider learning community.

In "Fostering reflective practice with mobile technologies", Tabuenca et al. report on a study they have carried on 4 days with 37 college students, where students were reminded to reflect about their learning via SMS, and entered their responses into a specific response-system. The idea was that students train the "self-as-a-learner" - alongside the EU goals of fostering life-long-learning. The study suggests, that while students are ready to reflect

on their learning activities, they are not used to seeing themselves as active learners.

Thomas Ullmann's paper on "Comparing Automatically Detected Reflective Writings in a Large Blog Corpus" presents work done to identify reflective elements in written text by the example of analysing a corpus from blogs. It uses sophisticated methods of text analysis and shows how the results of this detection compares to the same task assigned to humans. The mechanisms presented in this paper are very promising and can be valuable means to detect and support reflection in organization as well as to identify current issue that need to be known on the organizational level.

In their paper "The Functions of Sharing Experiences, Observations and Insights for Reflective Learning at Work", Pammer, Prilla and Divitini present preliminary work that investigates several apps in order to extract sharing functions that have impact on self-reflective learning. The three presented apps may assist knowledge workers to improve their work performance by critically reflecting their past activities.

Nussbaumer et al. describe in their discussion paper "Detecting and Reflecting Learning Activities in Personal Learning Environments" several building blocks, which have the potential to make learners aware of their self-regulated learning. The research challenge is to infer from measurable low-level data the high-level constructs of self-regulated learning. The goal is to obtain a mapping between key actions extracted from Contextualized Attention Metadata (CAM) and a learning ontology, which consists of several cognitive and metacognitive learning activities.

Degeling and Prilla report on their experiences implementing articulation support for collaborative reflection. A theoretical introduction to reflection at the workplace sets the scene to the actual cases studies describing their findings. The central piece of their analysis relies on the reflections carried out by physicians in a hospital. The paper demonstrates the potential benefits of sharing experiences, especially in areas where learning is more the product of past work experience than formal education. However, from a design point of view, the paper also highlights the need for contextual design and frequent end-user interactions, as multiple corrective actions were needed to adapt the technology support to the conditions on site.

You can find more information about the workshop and related workshops at the "Awareness and Reflection in Technology-Enhanced Learning" group on TELEurope.eu:
<http://teleurope.eu/artel>

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Figure 1: Parts of the organizing committee of the #ARTEL12 workshop (from the left to the right: Thomas Ullmann, Michael Prilla, Wolfgang Reinhardt, Viktoria Pammer, Lucia Pannese, Adam Moore)

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