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Technology enhances Collaborative Learning in educational and workplace contexts: the perspective of Sami Paavola

Francesca Amenduni*

Abstract

“Technology enhanced learning” is a buzzword in the field of education and professional training, but its real meaning is often hazy and not well known. In school education and professional training, technologies sometimes reproduce old-fashioned pedagogical practices rather than transforming or innovating. Sami Paavola, a researcher at CRADLE (Center for Research on Activity, Development and Learning) and lecturer at University of Helsinki, shares some useful reflections on this topic. Paavola and colleagues have been developing a new theoretical perspective on Computer Supported Collaborative Learning for the last ten years. In this interview, he describes kinds of challenges we need to face in technology enhanced learning. He also presents new trends and solutions for current problems in school and workplaces.

Q: What is your current role?

A: I am a University Lecturer at the University of Helsinki. My teaching focus is methodology and expertise, but I am also involved in many research projects, especially on the uses of Building Information Mod-

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elling (BIM) in construction projects and in the use of technology in higher education.

Sami Paavola has been also involved in research on knowledge creation, discovery, distributed cognition, and technology mediated collaborative learning and work. One of his most important contributions deals with epistemological issues related to learning and knowledge in contemporary society.

Q: In your opinion, what will be the most meaningful development of Technology Enhanced Learning in Finland?

A: This is a difficult question because there are so many things happening in many related areas of research. I can only speak from my own perspective, and some of my views are more like things I hope to see in the future.

Nowadays, at least in Finland, digital technology is taken for granted in educational contexts and it is a part of education almost everywhere.

The current problem is that people often still use technology with an old-fashioned pedagogy. In my opinion, it is important to consider how technology can be used to support students in acquiring the knowledge and skills used in professional contexts. With technology, it is possible to do much more than simply reproduce old-fashioned pedagogy in which, for example, the teacher says something and the student has to try to repeat the right answers in an exam.

The emphasis on practice perspective means that technologies are not significant in and of themselves, but in relation to specific skills and practices developed in web environments (Anderson, 2007).

Technology is a way of changing pedagogical practice, but it requires critical reflection. Nowadays, there are so many technologies that it is not a big leap to start using them, but we must think explicitly about our teaching and learning goals to enhance learning and avoid using technology for technology's sake.

Research suggests that in schools, teachers can sometimes use technology without thinking explicitly about the learning theories underpinning it. For instance, in a study conducted in Italy (Legrottaglie, &

Ligorio, 2014), 65 teachers thought that technology is useful to acquire information and to manage scholastic routines, but only four teachers considered technology a tool to enhance student learning. Despite the spread of collaborative learning theories in education research, teachers did not consider these theories at all. The gap between research and practice appears to inhibit innovation in schools.

Q: With regard to research in education, what do you think about the connection between theory and practice in the field of technology enhanced learning?

A: This is a good question. I think my own approach is to contribute to theory-based research into teaching and learning with technology. Currently, there is a divide between theory and practice. "Technology enhanced learning" is often dispersed into different areas of research. With our papers on the three metaphors of learning, we tried to create one general theoretical framework to connect different approaches.

Paavola and Hakkarainen (2005) tried to develop a framework that includes different conceptions of knowledge in the Computer-Supported Collaborative Learning traditions. They start from the two metaphors for learning described by Anna Sfard (1998) and then they introduce a new one: the knowledge acquisition (monological learning), participation (dialogical learning), and knowledge creation (triological learning). The Trialogical Learning Approach (TLA) focuses on the processes in which learners are involved to advance and build collaboratively a shared outcome (or "object") supported by the use of technology (Paavola, & Hakkarainen, 2009).

He continues:

Maybe, in workplace learning, research is more practice-oriented and I think that this approach should also be used in educational contexts. The research in schools is more focused on the relationship between the use of technology and effects on student grades. I would be more interested in studying what people do with technology and what kind of practices, skills, and habits they develop through the use of it. But it is difficult because the whole educational system is so focused on grades, which is difficult to change.

Q: What do you think will happen in the next two years in the field of technology enhanced learning?

In the near future technology should change ways to organize learning practices and make them more motivating and more in line with what is happening outside the school.

Social media, like Facebook, will be more and more used in an educational context. Such platforms can support learners' participation through commenting and sharing information and opinions, but they are not very good if the aim is to develop collaboratively something new. I think that currently there are not many systems that support "knowledge creation". From the point of view of technology, more needs to be developed to support collaborative work around the shared "object".

Web 2.0 and Social media facilitate a socially connected web where everyone is able to add to and edit the information space (Anderson, 2007) with these virtual environments mainly supporting learning based on *participation*. According to Paavola, we need to develop new systems for the so-called *trialogical learning* that is the collaborative and works around a joint shared object. Currently, very simple software is used in education to achieve this purpose, often based on digital writing, such as Wiki and Cloud tools.

We have to think also about the issue of learning analytics. Learning analytics are becoming more and more popular in education. They are still quite a hazy field and sometimes are considered just a way to observe and control students, but they can potentially be used in more supportive ways. Currently, they are used mostly by researchers, and a future challenge will be to understand how learning analytics can support teachers in their own practices.

Following a generic definition, analytics is the science of examining data collected by database systems to draw conclusions, to establish predictive models and to make decisions. Learning analytics is a specific kind of analytics used in education. Some applications are: a) monitoring individual student performance; b) identifying markers for early intervention; c) predicting students' potential; and d) testing and evaluation of curricula (Picciano, 2012). Learning analytics are

obtained by specific software, such as course management systems (CMS) and learning management systems (LMS).

Q: Before, you said that technology should be used more in line with what is happening outside of the school. Technology facilitates access to new knowledge but it is also more difficult for students to manage information in the so-called “Knowledge Society”. What do you think about that?

A: It is true. Let's think about the role of textbooks in the school. If you are a student and you know the whole content of the book, you are an A-student; but those textbooks create an artificial world for students. Nowadays, of course, the problem is that students, and also teachers, could be confused and have some difficulties in focusing on essential issues and topics. But, I think that it is a more reasonable world where people realize how much there is still to know on a specific topic. It is good that students start to realize that there is an open-ended world behind all the topics.

The “Knowledge Society” requires that people develop Information Literacy skills such as digital reading, task-oriented browsing, and the ability to recognize the information's accuracy (PISA, 2012). In Italy, students (OCSE, 2015) show good results in simple web – searching tests (90%), but they have worse results in multi-step searching (from 16% to 23%). Based on the results of the OCSE survey, there is no significant correlation between the use of technology at school and student performance in these tasks. It is important to understand whether technology is being used to face new challenges or to reproduce old-fashioned pedagogy.

This is a big challenge for teachers to show that the student can handle it by focusing on certain issues and by having good sources. It is reasonable to realise that we live in an open-ended world: we cannot know anything “finally”.

Q: Can you tell us something about your latest research into workplace learning mediated by technology?

A: We have worked on projects in the construction industry in which architects and engineers are using Building Information Modelling (BIM) for producing plans of buildings (Miettinen & Paavola, 2014).

Miettinen and Paavola (2014) define Building Information modelling (BIM) as a combination of technologies and organizational solutions that are expected to increase disciplinary collaboration in the construction industry and to improve the productivity and the quality of design and construction of buildings. They outline three principles to develop the BIM's view: a) BIM is in an open-ended expansive process; b) The development is a differentiation-integration process; and c) Implementation of BIM implies learning by experimentation and invention of novel uses.

In big construction companies it is not possible to think about their work without technology. If there is a design meeting, very often people from another city are participating by using Skype or some video conferencing system. Technology is a natural part of the collaboration. Especially in bigger companies where they are using technology to support collaboration, or for design work. They are not only using technology for getting or sharing information.

Q: To conclude, what are you currently doing and what are you going to do in the future to support the development of technology-enhanced learning?

A: In the experience of the KP-Lab project (a big project we had on technology enhanced learning), I have been involved in projects where we have been developing 'design principles' for the Trialogical Learning Approach. During the project we realized that we will have to work with teachers on finding ways to change their own practices without to providing them with a ready-made pedagogical model. Design principles can be used to reflect about the existing practices and to think how to change them to support collaboration with relevant technologies. I would like to be involved in this kind of development of teachers' collaboration from the point of view of my own teaching, but also within research projects.

To conclude, I would say that the problem often is that technology for collaboration is thought of separately from the practices of using it. In the future, we have to face a common challenge in workplaces and in education. We need to think more innovatively about how to use technology and how to organize our use.

According to Sami Paavola, currently technology is often used in a monologic perspective, by transferring abstract knowledge from the

teacher to the student mind. This is not the best way to face the challenges of a contemporary knowledge society, as learners need to solve undefined problems and select good sources. They have to learn how to look for information in the open-ended world of the web. Technology can be used to renovate teaching practices, and support learners' motivation, collaboration and knowledge sharing. In the future, Social Networks, Learning Analytics and Cloud Tools will be more frequently used in schools and the workplace to enhance collaborative learning.

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