Orchestrating CSCL - more than a metaphor?

Ingo Kollar, R. Hämäläinen, M. A. Evans, B. De Wever, C. Perrotta

Angaben zur Veröffentlichung / Publication details:

Kollar, Ingo, R. Hämäläinen, M. A. Evans, B. De Wever, and C. Perrotta. 2011. "Orchestrating CSCL - more than a metaphor?" In Connecting Computer-Supported Collaborative Learning to Policy and Practice: CSCL2011 - 9th International Conference on Computer-Supported Collaborative Learning, 4-8 July 2011, Hong Kong, China, edited by H. Spada, G. Stahl, N. Miyake, and N. Law, 946–47. Singapore: International Society of the Learning Sciences. http://www.lulu.com/shop/international-society-of-the-learning-sciences/the-computer-supported-collaborative-learning-cscl-conference-2011-volume-2/ebook/product-17435395.html.

Orchestrating CSCL - More Than a Metaphor?

Ingo Kollar, Ludwig-Maximilians-University of Munich, Martiusstr. 4, 80802 Munich, Germany, ingo.kollar@psy.lmu.de
Raija Hämäläinen, Finnish Institute for Educational Research, Keskussairaalantie 2, 40014 University of Jyväskylä, Finland, raija.hamalainen@ktl.jyu.fi
Michael A. Evans, Department of Learning Sciences and Technologies, Virginia Tech, 300 War Memorial Hall, Blacksburg, VA, USA, mae@vt.edu
Bram De Wever, Department of Educational Studies, Ghent University, H. Dunantlaan 2, 9000 Gent, Belgium, bram.dewever@ugent.be
Carlo Perrotta, Futurelab, 45 Great Guildford Street, London, UK, SE1 0ES, c.perrotta@ioe.ac.uk

Abstract: Orchestrating learning as a metaphor for developing and investigating learning environments has gained traction among CSCL scholars and practitioners. We propose a formalization of the metaphor attempting to assess its usefulness to reconstruct two CSCL scenarios and its power to influence future CSCL theory building, research, and practice. Also, we discuss what role digital technologies can play in orchestrating CSCL.

What Are Components of Orchestras and the Orchestration Process?

In CSCL research (e.g., Dillenbourg, Järvelä & Fischer, 2009), the term "orchestration" has been used to re-emphasize the central role of the teacher, which may be regarded as a reaction towards prior CSCL research that has tried to develop learning environments that would rather replace the teacher than put him/her to the centre. However, a critical discussion on the value of the orchestration metaphor appears to be missing. To determine its usefulness, we first decompose orchestras and the process of orchestration into six components.

The first component of an orchestra is the *conductor* (1), whose function is to interpret a piece of music and manage the orchestra to play well together to finally produce and perform a piece of music. Second, an orchestra consists of *musicians* (2) who play their parts of the score and who may be grouped according to their function for the orchestra (e.g., strings or woodwind). Third, orchestras rely on a *score* (3), which "tells" the conductor and the musicians the kind of music they are aiming to perform. Fourth, an orchestra uses a variety of *instruments and tools* (4), some of which are used by the conductor (e.g., the baton) while others are used by all (e.g., the music stands) or some of the musicians (e.g., the cellos). A fifth component of orchestration is its product, í.e. a *musical piece* (5) to an *audience* (6), which is the sixth component of an orchestra.

Can the Orchestration Metaphor Be Used to Reconstruct Different Learning Scenarios?

In the following we try to apply the orchestration metaphor to reconstruct two CSCL scenarios:

Example 1: Instruction for shared knowledge construction in a higher education setting. The first CSCL scenario was used in a course "Learning and Interaction" offered at a Finnish university. The aim of the course was to enhance student groups' understanding of relations between socio-cultural and socio-cognitive perspectives of collaborative learning. The idea was to structure the student groups' collaborative activities in f2f and virtual settings. The *teacher* (1) very much resembled a conductor of an orchestra: Her role was to manage the course by interpreting and applying conceptions of a national level curriculum of the Subject Studies in Education. Moreover, she set the learning goals, chose external resources, and managed and supported group collaboration, helping students to "play together" in the classroom "ecosystem". The *students* (2) could be viewed in analogy to the musicians in an orchestra. The aim of the student groups was particularly to combine their knowledge construction processes and play well together. The *lesson plan* (3) was influenced by National Curriculum standards (as a score is influenced/created by a composer), but in the end it was the teacher who designed the specific instance of the plan. This was done on the basis of the Jigsaw approach (Aronson et al., 1978), during which students became experts in one theory and were subsequently grouped together with students who were experts in another theory. Then, their task was to explain the theories to each other. During the course a number of different *instruments and tools* (4) were used. For example, there were two web-based learning environments, one primarily for the realization of the learning phases to be orchestrated by the teacher and participated in by the students, and the other for the groups' knowledge construction. The product of the "orchestra" emphasized *collaborative learning* (5) as culturally organized social interaction and a process of groups' knowledge construction. Like an orchestra, thus, the learning group created a joint product. There is friction in applying the metaphor for the audience level (6). Thinking about the audience, in educational contexts leads to ask "whom are we learning for and how is learning performed?" Thus, in our example, from an individual perspective learning could be "performed" within individualized, written tests. From a group

perspective, the whole classroom can be seen as the audience. We could also argue that learning produces competences that are required and welcome in our society, and then society may be interpreted as audience.

Example 2: Knowledge-building in an informal science learning setting using digital video games. The second CSCL scenario involved a group of Grade 10 students (n=12) who participated in a series of workshops led by four graduate students from a research university to introduce participants to two videos games titled *Spore* and *Spore Galactic Adventures (SGA)*. *Spore* grants the user the ability to navigate a simple cell creature through a series of challenges meant to parallel the evolution of a species. *SGA* provides a level builder whereby students generate their own games. Given the informal nature of the arrangement, the teacher played less the role of the *conductor* (1) and more the manager of the orchestra and composer of the score. The actual conductors were the four graduate students who ran the workshops as part of a course assignment. The 12 workshop participants can partially be regarded as resembling the *musicians* (2) in an orchestra, particularly in the earlier stages as they played through the stages of *Spore*. However, once they began building games in *SGA*, they gradually became co-authors of the *score*. The *lesson plan* (3) consisted of biweekly ftf workshops during the school year. These workshops provided a clear sequence of learning activities (e,g., participants watched instructional videos that demonstrated the capabilities of the software and later created their own creatures and game levels) which thus resembled the score of an orchestra. However, it left room for interpretation on behalf of the students, which stands in some contrast to the idea of a "score". With respect to *instruments and tools* (4), the used digital technologies were designed in a way that went beyond the familiar role of instruments and tools in an orchestra. In *Spore* and *SGA*, one person can play at a computer, but has access to thousands of Spore players via the Internet, cracking up the boundaries of the orchestra to a virtually infinite number of players. The envisioned *product* (5) of the project was to have the learners act as a knowledge building community that contributes to the knowledge on Spore and SGA already available on the WWW. This goes well along with the notion of orchestras delivering a group product to an audience. Finally, the scenario shows how digital technologies can bring an *audience* (6) into educational processes, since each group created its own evolution adventure and shared it on the Sporepedia website to a virtually infinite number of other players.

Discussion

The two examples show that the extent to which the orchestration metaphor can be used to reconstruct different CSCL scenarios depends on the type of scenario under study. There certainly is friction when one tries to adopt the metaphor, but we think that this friction can be used productively to re-think important issues in educational theory-building, empirical research, and practice. Two exemplary questions are presented to justify this claim:

(1) How should learning look like and what should be learned in future formal and informal learning? In an orchestra, the conductor is the centre. Based on the score, s/he signals the players what to play, when to play, how to play, and with whom to play. It may however be questioned if a teacher should always be "on the podium", or whether an alternative exists. The discussion about the so-called 21st century skills (Voogt & Knezek, 2008) revealed that besides a systematic knowledge base, students also need to acquire more general skills such as communicative and collaborative competences. For such rather general (social) skills to be acquired, direct instruction may need to be augmented by more participatory instructional approaches (e.g., Scardamalia & Bereiter, 2006), as is the case in the two scenarios we presented.

(2) What should the role of digital technologies be in future formal and informal learning? Digital technologies can be interpreted in analogy to instruments used in an orchestra. Some of them are used by the teacher (e.g., a learning management system, see example 1), whereas others are used by the students (e.g., laptops to access Sporepedia, see example 2).Yet, the use of digital technologies can also lead to challenging the orchestration metaphor: Example 2 showed that technologies can make the group of "musicians" much bigger than an orchestra could ever be, since it brings together players from all over the world. An adjacent research question could be how learning is affected by the presence of such a large group of collaborators and spectators, which deonstrates that the orchestration metaphor bears potential to inspire future CSCL research.

References

Aronson, E., Blaney, N., Stephin, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage Publishing Company.

Dillenbourg, P., Järvelä, S., & Fischer, F. (2009). The evolution of research on computer-supported collaborative learning: from design to orchestration. In N. Balacheff, S. Ludvigsen, T. de Jong, T., A. Lazonder & S. Barnes (Eds.), *Technology-Enhanced Learning* (pp. 3-19). New York: Springer.

Scardamalia, M. & Bereiter, C. (2006). Knowledge building: Theory, pedagogy and technology. In K. Sawyer (Ed.), *Cambridge handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge Univ. Press.

Voogt, J. & Kezek, G. (2008). IT in primary and secondary education: Emerging Issues. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education. Part one* (pp. xxix-xlii). New York: Springer.

Watts, D. M. (*2003*). The orchestration of teaching and learning methods in science education. *Canadian Journal for Science Mathematics and Technology, 3*(4), 451-465.