Interview Pierre Dillenbourg

By Lambert Berenbroek, Lectoraat eLearning, december 2005

Pierre Dillenbourg has proved by many articles and speeches to be a hands-on expert on the subject of collaborative learning. He started in 1976 as an Elementary school teacher; he graduated in 1996 in educational and psychological sciences and became PhD in artificial intelligence. At the moment Pierre Dillenbourg is working at the Ecole Polytechnique Fédérale de Lausanne (EPFL) of the Swiss Federal Institute of Technology, partly as a member of the board of directors. I happened to meet him for an interview at the Surf Education Days which were held recently on the 15th and 16th November this year.

When I asked him to define cooperative and collaborative learning, he answered that it is basically learning in groups: writing a paper collaboratively is writing together, while writing it cooperatively is just cutting and pasting parts of articles written by each individual. Collaborative Learning is the side effect of the effort engaged by team members to construct a shared understanding. In other terms: Collaborative Learning prospers in a group of people when there is a necessity of continuous explanation to each other.

Of course we are curious about the initial conditions when introducing Collaborative Learning. Pierre Dillenbourg states it is not possible to formulate the best conditions for implementation, because the success depends on many features: the group composition (gender, knowledge level,...), the task the students have to carry out and the medium (if they work face to face, are chatting by means of e-mail). It’s not easy to predict what the best initial conditions are. For brainstorming you need bigger groups. Again he emphasizes that learning occurs by arguing which encourages explanation. So discussion and agreement determine the conditions of the learning environment.
How much time will it require to transform individual learning into collaborative learning? Pierre answers: My first talk on technologies for Collaborative Learning happened in 1992 while these days 75% of the talk in learning conferences are about Collaborative Learning. Fifteen years ago there was no web and now we’ve got internet, so there was a technological revolution as well with the theory . . . But you have to realize that Collaborative Learning is not a religion, lots of things, like for instance multiplication tables, have to be learned individually. According to Pierre Collaborative Learning has to be integrated with individual education.

When asking about the benefits and the pitfalls of Computer Supported Collaborative Learning (CSCL), Pierre states when that when practicing CSCL benefits are not only substantial when you’re learning with someone who is elsewhere. The main benefit is the use of technology in order to organize and to streamline the learning process. Of course there can be many pitfalls like the rigidity of the social process.

When asking Pierre if there is significant difference in achievement on a test comprised of "drill-and practice" and of "critical-thinking" between students learning individually and students learning collaboratively, he doesn’t see many differences. There are regulation skills, e.g. when you regard an equation as \( x = y \), the place of \( x \) and \( y \) are determined as students must learn while solving a problem. So the planning skills will be improved by the students by putting the problem into the framework in order to get a solution.

When looking at three different theories of Learning and Cognition in Collaboration, could you indicate which of these is the most applicable in practice?
I am referring to

1. **Socio-constructivist theory** advocates that students master new approaches of learning through interacting with others. This theory is an extension of Piaget’s theory that focused on the reasons for cognitive developments in individuals. In socio-constructivist theory, emphasis is given to interactions rather than actions themselves. A given level of individual development allows participation in certain social interactions which produce new individual states which, in turn, make possible more sophisticated social interactions, and so.

   The socio-constructivist approach focuses on the individual’s development with respect to the social interaction, without really differentiating or identifying the underlying factors that enhance collaborative learning. Here the social interaction is assumed as a black box that boosts collaborative learning.

   The experimental setup for the socio-constructivist approach follows a three stage process of pre-test, individual or collaborative learning and post-test. The differences between individual and collaborative learning are identified with respect to the difference between the performances on the pre- and post-test. A number of empirical studies have been reported to validate this approach.

2. **Socio-cultural theory** focuses on the causal relationship between social interaction and the individual's cognitive development. This approach is
derived from Vygotsky’s zone of proximal development in this approach, each internal cognitive change is mapped onto a causal effect of a social interaction. In Vygotsky’s own words:
The Zone of Proximal Development is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.

This essentially means that a learner would use the technique(s) that are learned during the collaborative effort with the companion when the learner tries a similar problem independently. That is, self review by the student is the internalization of peer review. The zone of proximal development defines meta-conceptions that might evolve as learned concepts after a period of social interactions. Thus, the inter psychological processes are internalized during social interactions. Based on this theory, Dillenbourg and Self developed a computational model. In general, the socio-cultural approach supports collaboration as the means that would prove to be the catalyst to help the meta-conceptions mature into learned concepts.

3. **Shared cognition theory** is different from the other two theories in the sense that the environment in which learning takes place is given the focus rather than the environment-independent cognitive processes. The environment consists of both physical context and social context. The previous two approaches attributed the learning only to the physical context. But the shared cognition approach places the focus squarely on the social context that is claimed to make the collaborations happen and not just the presence of the collaborators.

Pierre emphasizes that it’s hard to say which is the most applicable in practice, because the socio-constructivist theory is an individual theory while the socio-cultural theory works the other way around. According to the constructivist theory, a child will be an engineer when you give it LEGO, but notwithstanding this it is the most influential one of the considered theories. The shared cognition theory states that the group itself is a cognition which is not applicable. Pierre stresses that a theory is more like a coloured lens: the landscape doesn’t differ but you’ll have another perception of it.

Concluding the interview with Pierre Dillenbourg I asked him for the latest challenges he faces regarding his own research programme. Pierre had a most surprising answer because it refers to the latest technology: location-based services in mobile technologies. The main advantage is the accessibility of the team by means of GSM technology and local WIFI since the last two years. There is also interactive furniture, e.g. the sofa we’re sitting on will change of colour when making too much noise. The walls and the ceiling can change of pattern which can be seen as a help for teachers while observing group interactions.

At the end he stresses again not treating Collaborative Learning as a religion but to integrate it with individual learning and small group activities considering the type of student like adults for example.