

From Standard Computers to Shareable Interfaces? In Search of Appropriate UIs for Group Learning

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New user interface technologies are constantly developing and slowly spreading to various domains. One domain that can still immensely benefit from their adoption is collaborative learning. While laptops and computers are appropriate for computer-mediated over-distance learning where each person has an individual workspace, shareable user interfaces seem to be more suitable in co-located settings, as they allow interaction with multiple people at the same time.

However, it is hard to generally decide in which scenarios one shared user interface is preferable over cooperating individual ones and how either solution should be designed. One reason is that group learning sessions are usually divided into different phases, not all of which are collaborative. Often, there are individual phases in between, in which students elaborate on a specific issue or task by themselves and therefore need separate devices, such as laptops, tabletPCs, or PDAs. However, even during collaboration shareable user interfaces are not always the better choice. Imagine a scenario where two people are learning together. One of them plays the role of a teacher or examiner, who is listening to the other person's oral presentation and giving feedback. In such situations separate user interfaces are preferable: The presenter can be supported by a personal device that shows an outline of the talk he prepared, which the listener is not supposed to see. The listener, on the other hand, takes notes on another personal device as preparation for the later feedback phase. At that time these notes are not intended to be seen by the presenter. Later, the presenter's outline and the listener's notes can be compared and analyzed with either the help of the personal devices or one shared user interface.

To shed more light on this question it helps to examine the matter from an educational perspective. In order to structure collaborative learning sessions, educational scientists have developed collaboration scripts [1]. A collaboration script follows a specific learning target by defining a scenario, a set of activities, as well as roles that students have to play. Typical learning activities are explaining or summarizing learning material, talking or writing about the task, elaborating on ideas, asking thought-provoking questions, argumentation, and more [3].

These scripts offer a great foundation to study the effects of technology in group learning sessions. First, they provide insights on group learning from an educational perspective. Second, they can be seen as detailed specification of efficient group learning processes, which can be used by human computer interaction (HCI) researchers to think about suitable user interfaces. Finally, because of the high degree of structuredness, group

learning sessions that follow a collaboration script are comparably easy to evaluate in user or field studies.

Taking advantage of these possibilities, I am empirically exploring the impact of using different technologies in group learning sessions that are based on various collaboration scripts, for example ArgueGraph [2] and the MURDER script [4]. Coming from an HCI background, I want to find out how technology can be leveraged without any negative implications.

By comparing different technological setups among each other as well as to using no technology at all, I am working towards developing generic guidelines, which help designing collaborative learning applications and environments.

Some of the questions I would like to discuss in the workshop are:

- Under what conditions are shareable user interfaces preferable over multiple personal devices?
- Which interaction techniques are able to support individual as well as collaborative phases?
- Which interpersonal effects are influenced by using advanced technologies?
- What are measurable variables that may indicate potential benefit created by such technologies in group learning sessions?

References

- [1] Pierre Dillenbourg. Over-scripting CSCL: The risk of blending collaborative learning with instructional design. In P. A. Kirschner, editor, *Three worlds of CSCL: Can we support CSCL?*, pages 61–91. Heerlen: Open University of the Netherlands, 2002.
- [2] P. Jermann and P. Dillenbourg. Elaborating new arguments through a CSCL script. In J. Andriessen, M. Baker, and D. Suthers, editors, *Arguing to Learn: Confronting Cognitions in Computer-Supported Collaborative Learning environments*, pages 205–226. Kluwer, Amsterdam, NL, 2003.
- [3] A. King. Scripting collaborative learning processes: A cognitive perspective. In F. Fischer, K. Ingo, Mandl H., and J. M. Haake, editors, *Scripting computer-supported collaborative learning : cognitive, computational and educational perspectives*, pages 14–37. Springer, New York, 2007.
- [4] Ingo Kollar, Frank Fischer, and Friedrich Hesse. Collaboration scripts - a conceptual analysis. *Educational Psychology Review*, 18(2):159–185, 2006.