Adaptive or Collaborative Learning?

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Abstract: Adaptive Learning Technologies and Collaborative Learning have both been explored and argued for repeatedly. While the two approaches are not in opposition to each other, they include are a number concepts and aims that are potentially conflict such as optimising the individual learning gain or the quality of collaboration. This panel will explore where these conflicts are, where the limits of technological support for collaborative on-line learning are and how these conflicts might be resolved.

Introduction

Adaptive Learning Technologies aim to individualise the learning process by tailoring content and teaching strategies to the learner's specific needs, preferences, knowledge or learning goals (e.g., Brusilovsky & Peylo, 2003; Carro, Ortigosa, Schlichter, 2003).

Collaborative on-line learning has been shown to provide learners with a rich and engaging environment that overcomes many of the issues experienced with self-paced learning (e.g., Borthick, Jones, & Wakai, 2003; Sid-Ahmed, Lê, Moghrabi, Lanteigne & Roy, 2008; Tutty & Klein, 2008).

While both approaches seem to have significant advantages, there is a potential conflict between the two: Optimising the individual learning process may or may not be in line with the group learning processes, communication patterns and interaction requirements promoted in a collaborative environment. Moreover, collaborative activities are inherently more difficult to track and adapt.

The aim of this panel discussion is NOT to just agree that adaptation and collaboration have their merits and should thus be deployed where appropriate, but rather
- to explore when and for which learners collaboration can be of particular benefit for learning
- to outline the technological and conceptual limits of adaptive learning technologies in supporting collaborative learning
- to explore a roadmap for adaptive learning technologies from a pedagogical perspective: how can adaptive technologies implement or address educational theories on collaborative on-line learning

The panel has been selected to facilitate a lively discussion, bringing together experts with potentially contrary opinions from different perspectives on the topic: educational vs. technical, adaptive vs. collaborative, knowledge assessment vs. learning process, learning communities vs. knowledge acquisition. This is reflected in the following statements by the panellists.

Panellists

The following people will be part of the panel, facilitating discussion with the audience:

Paul De Bra (Chair/Moderator)
Paul De Bra initiated the development of the AHA! system (De Bra et al, 2006), and recently formed a consortium for a project to integrate *adaptive learning environments* (ALEs) with *learning management systems* (LMSs). This project, called GRAPPLE, is funded by the EU FP7 IST program (as a STREP project). These initiatives already show that he is a strong proponent of adaptive learning. Although the adaptive presentation of learning material suggests that each learner sees different information and is recommended to visit different links and thus study a course in a different order, experience shows that this seldom (perhaps never) leads to students who want to collaborate having a misunderstanding that is caused by them having studied course pages that were slightly different. Adaptation thus should not inhibit collaboration (unless it is done extremely badly). Adaptation can however be used to benefit collaboration by using the available information about users to find potential collaborators with a specific knowledge (or knowledge gap) or with a specific learning or collaboration style. It will be interesting to see whether adaptation can really be used in this way. The TU/e has no experience in adaptive collaboration yet.

Alexandros Paramythis
Alexandros Paramythis has long-standing experience in the design and development of adaptive systems, gained through participation in several international research projects in the field. His current work centres on adaptive eLearning, evaluation of adaptive systems and meta-adaptation. The focus of two ongoing research projects at the FIM Institute is on the employment of adaptivity techniques to go beyond individualised learning towards actively supporting collaborative learning. More specifically, the controversial question that these projects seek to address is whether we can provide adaptive support throughout the collaborative learning process, placing the emphasis not on learning material tailored to the individual, but on learning *activities* tailored to *groups of learners*.

Peg Ertmer
Collaboration, in its many forms, is a hallmark of Peg Ertmer's work. As the editor of the *Interdisciplinary Journal of Problem-based Learning* (IJPBL) and the co-author of the *ID CaseBook: Case Studies in Instructional Design* (1999, 2003, 2007), she advocates the importance of student-student and student-teacher collaborations within problem- and case-based learning environments. Additionally, as the co-director of a large 3-year federal (FIPSE) grant, she has promoted the effective use of peer feedback to increase the quality of student postings in online learning environments. However, despite the demonstrated advantages of collaboration, students are not equally prepared to contribute to and benefit from these learning opportunities. This has led educators, including Ertmer, to propose specific strategies for scaffolding students' work in PBL, case-based, and online learning environments. Scaffolds, by definition, serve as adaptive mechanisms for supporting individual learning needs, yet do not require students to work individually. Thus, these tools have the potential to support adaptive collaboration and should be investigated more fully.

François Desjardins

Although the benefits of collaboration in learning are being widely recognized by the academic community, institutionalization and implementation are still often resisted. François Desjardins has been using and promoting strategies such as problem based learning in e-learning contexts, firmly anchored in a social-constructivist perspective, as a fundamental direction in which to guide and prepare the next generation of teachers. Further, in accordance with Piaget's view that knowledge is constructed by the learner and Vygotsky's perspective on the role of social interaction, it was concluded that online learning environments need to follow a model that would be both learner-driven and process-centered. Following this, the design and implementation of a Collaborative Online Learning Environment (COLE), initiated by professor Desjardins, has been the research focus of a group at the Faculty of Education of the University of Ontario Institute of Technology (UOIT). The development of this environment follows the perspective that the Web offers possibilities far beyond mere accessibility of information in a seemingly interactive manner and is a much more powerful tool when used by learners to co-construct knowledge. As the prototype of this COLE (Desjardins, van Oostveen, 2007) is run through trial uses, it is hoped indications of the potential of using collaborative social software concepts will emerge to help guide further developments in online education in spite of the resistance offered by the traditions of teaching.

Stephan Weibelzahl

With his background in psychology and computer science, Stephan has long-standing research expertise in developing and evaluating Adaptive e-Learning Systems. Most of his research has been driven by the questions whether adaptivity is of any value and how systems may be improved. Collaborative learning presents a particular challenge in this respect because evaluation study designs are inherently more complex than in single learner research and collaboration can be difficult to control and facilitate. The evidence for advantages and disadvantages of adaptive collaborative systems so far is sparse. Moreover, criteria for successful collaboration are not obvious.

Organisation

We plan to apply a format that facilitates goal-oriented group discussions (among the panellists and participants). The panel will have start with opening statements from the panellists being followed by discussions and a summary. For the opening statements, each panellist will be asked to introduce and briefly defend a thesis (5min max). A second session will then be explicitly dedicated to challenging the panellists on their thesis by collecting questions and controversial statements from the floor. Both opening statements and challenges will be recorded and visualised. Chair and audience will then decide which of the points raised shall be addressed in the discussion and in which order.

The session closes in a summary where each panellist may vocalise any final conclusions.

Duration	Activity	People
20 min	Opening statements	panellists
15 min	Collecting questions and challenging statements from audience	audience, chair
20 min	Discussion	all
5 min	Summary	chair, panellists

Table 1: Panel schedule

References

Borthick, A. F., Jones, D. R., & Wakai, S. (2003). Designing learning experiences within learners' zones of proximal development (ZPDs): Enabling collaborative learning on-site and online. *Journal of Information Systems*, 17(1), 107-134.

Brusilovsky, P. & Peylo, C. (2003). Adaptive and Intelligent Web-based Educational Systems. *International Journal of Artificial Intelligence in Education*, 13(2-4), 156-169.

Carro, R.M., Ortigosa, A., Schlichter, J. (2003). Adaptive Collaborative Web-based Courses. In: J.M Cueva,, M. González, L. Joyanes, E. Labra, and M.P. Paule (eds.) *Web Engineering*. Lecture Notes in Computer Science. pp. 130-133. Berlin: Springer.

De Bra, P., Smits, D., Stash, N. (2006). The Design of AHA!, *Proceedings of the ACM Conference on Hypertext and Hypermedia*, pp. 133, Odense, Denmark. The adaptive version of this paper is available on-line at http://aha.win.tue.nl/ahadesign/.

Ertmer, P., Quinn, J. (2006). *The ID. Casebook: Case Studies in Instructional Design*. Englewood Cliffs, NJ: Prentice-Hall Inc.

Sid-Ahmed, S., Lê, T.H., Moghrabi C., Lanteigne, B. & Roy, J. (2008). Online collaborative learning system using speech technology. *International Journal of Social Sciences*, 2(2), 110-115.

Tutty, J., & Klein, J. (2008). Computer-mediated instruction: A comparison of online and face-to-face collaboration. *Educational Technology Research & Development*, 56(2), 101-124.