Diversity in Virtual Math Teams

Gerry Stahl, Wesley Shumar & Stephen Weimar
Drexel University, 3141 Chestnut Street, Philadelphia, PA, USA 19104
Tel: +1-215-895-0544, Fax: : +1-215-895-2494
Email: gerry.stahl@drexel.edu, shumarw@drexel.edu, steve@mathforum.org

Collaboration and Learning in Digital Libraries

Considerable effort has recently been put into the creation of web-accessible digital libraries with a wealth of information that could be used for educational purposes. However, the overwhelming proportion of this effort has been dedicated to developing information storage and retrieval technologies or to compiling collections of documents. Our focus is on developing contexts in which these informational resources can be used for learning by students. In particular, we want to address the question of how to open up digital libraries for collaborative learning.

The Virtual Math Teams Project is a new research project based at The Math Forum and Drexel University, that also includes a number of international researchers in the learning sciences. (For a periodically updated description of the VMT Project, go to www.cis.drexel.edu/faculty/gerry/vmt.) The Math Forum (mathforum.org) is a well established digital library with about a million unique visitors during a year. Among its popular services is the Problem of the Week (PoW), which offers challenging word problems in pre-calculus school math (e.g., algebra, geometry, number theory, statistics). The VMT Project is the first project funded by the NSF digital library program to apply digital library resources to collaborative learning by K-12 students. VMT aims to increase the level of collaboration and interaction at the Math Forum site, thereby (a) fostering reflective and metacognitive interactions, (b) driving the elaboration of deep understanding of math, (c) leveraging peer interaction to increase support without burdening adult mentors and (d) further building the structure and coherence of the online community. In the process, we hope to demonstrate a general model for using the resources of a digital library for collaborative learning.

Online Formation of Diverse Groups

The primary service to be developed by the VMT Project is a collaborative learning version of PoWs. Students surfing to The Math Forum site will be invited to join a team of their peers from around the world to discuss a PoW. VMT software will match students up based on a survey that the students complete when registering for this service and on prior performance. The software matches them because they collectively have the prerequisite math knowledge to do the problem and because they can all be online during the same time period – but also because they bring different personalities, skills, backgrounds and interests to the group. Although the project will conduct experiments to measure the effects of various combinations of similarities and differences among group members on the quality of the group interactions and the effectiveness of the group knowledge building, we hypothesize that the inclusion of specific forms of diversity (e.g., gender, culture, technological bent) combined with the matching of practical considerations (native language, time zone, prerequisite knowledge) will make for the best groups with the deepest discussions of math.