

# Teaching intangibles with technology

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Teach students some facts, and they learn for one exam at a time. Teach students to think and they learn how to learn for the rest of their lives. Ambitious work from European and Israeli researchers is making it easier to help students learn to think for themselves. This is exciting stuff for teachers.

A new system developed by European researchers will help students to learn critical thinking, social interaction, discourse, rhetoric and self-expression.

Better yet, they won't even know they are learning. And one final bonus, the process will help them internalise hard information relevant to the school curriculum.

It sounds unlikely, but the benefits of classroom discussion have long been known. It allows students to demonstrate learning in a real situation, thereby making the information more concrete.

Until now, it has been very difficult for classroom instructors to keep track of who is contributing, how much they are putting in, and how frequently. Often the interaction is reduced to forced responses from prompting by the teacher.

This can be overcome by breaking the class into small groups, but then the teacher cannot provide the supervision, encouragement and direction needed to ensure discussion stays on topic and productive.

## Technology enhanced learning tools

Step forward technology enhanced learning, specifically a suite of online discussion tools intended for use in school labs, initially. Now it is possible to break the class into small groups, have them discuss topics via computers and, with the recent work of the Argunaut project, give teachers powerful tools to keep track of who is saying what, using what kind of statements and with what degree of sophistication.

“The problem up to now is that classroom discussion couldn’t scale. It works fine in one or two small groups, closely supervised by a teacher, but once you spread that out to 30 students in six to ten groups, the unaided teacher easily loses track and control,” explains Raul Drachman, coordinator of the EU-funded Argunaut project.

Argunaut set out to build on discussion software that was very good at mapping conversations, and added to that a moderator’s interface with two important levels of operation. On one level, Argunaut sought to provide - in an easily grasped graphic - quantitative data to teachers, like who is talking a lot or not at all, and who has not contributed in the last 15 minutes. This is the shallow loop.

On another, far more sophisticated level, the researchers sought to use artificial intelligence to provide qualitative data, like the types of statements students were making and their potential value for the discussion and the underlying learning process. This is called the deep loop.

## Diving into the deep

The deep loop is a learning program that builds on records of previous discussions, with various exchanges annotated by teachers. The

annotations highlight types of comments that are relevant or irrelevant, and different types of arguments.

Over time, the machine learns offline but then can apply alerts, autonomously, during a real discussion. The system can also learn classic patterns of interaction that occur in certain discussions and can then spot them in a live setting.

These powerful aids are allied to a series of useful functions that help teachers do their supervising job better. Awareness and situation alerts can inform the teacher when students start to wander off topic, talking perhaps about an upcoming party.

They can alert the teacher when one student is not contributing, or is being ignored, or is dominating the conversation. It also renders exchanges in a graphic manner, readily describing the ongoing discussion at a glance. And teachers can program the software to signal when certain keywords occur, such as when Napoleon appears in a conversation about the French revolution.

The system can even tell teachers that one discussion contains only questions or comments, but no arguments. The teacher can then suggest to the group that it enlarges upon comments or statements that have been made. Along with the positive criticism, students absorb the essentials of rhetoric and critical thinking.

## **Enthusiastic responses**

The discussion software is highly regarded and long established, with the first version appearing in 2004 after the work of the DUNES project and the CoolModes / FreeStyler project.

That discussion visualisation software is enormously popular among

thousands of schools in dozens of countries across the globe, and Argunaut has enhanced the system with powerful moderator's tools, making it a complete package and allowing it to scale up.

So far, dozens of teachers who have tested these new moderators' tools are very excited by the developments and are eager to deploy them throughout the school. That should not be too difficult, because Argunaut is leaving the system as open source.

However, commercial opportunities for the software also exist. "If a company asks us to develop a specific, tailored package for them, then we can make that proprietary," notes Drachman. Rather like Red Hat Linux is a commercial version of the open source software.

And Drachman believes there will be many commercial opportunities to provide training, installation and set up of an Argunaut system in schools across the globe.

But that, really, is just the beginning. Drachman sees the Argunaut kit as an ideal collaborative tool for project management and planning. Executives can be sure they keep meetings on target and moving forward, ensuring that every voice is heard and every idea considered.

As Drachman concludes: "There are many, many potential applications for this software. Teaching is just the beginning."

The Argunaut project received funding from the ICT strand of the Sixth Framework Programme for research.

On the web: [www.argunaut.org/](http://www.argunaut.org/)

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