Making sense of digital information
by Nikolaus Nützel

Computers are now a fixture in classrooms at all levels. But how best to use them as learning tools is not as obvious as it might seem. Frank Fischer is seeking practical answers to the challenge.

Frank Fischer is sometimes amazed by the naiveté displayed by many of our young “digital natives” – the rising generation who are reputedly at home in the digital world. He is quite willing to concede that today’s kids handle smartphones, tablets and PCs with a degree of confidence that he – a member of the cohort of 1965 – had to acquire the hard way. But a study of how young people use internet resources to locate information for school assignments gave him pause: Fischer, who holds the Chair of Education and Educational Psychology at LMU, learned that “Sophisticated search strategies are not their strong suit!”

One can observe the consequences when, for example, students researching Green Genetic Technology are led to certain sites – “Those maintained by the pharmaceutical industry, for instance,” Fischer sighs – and fail to notice that the information provided is not exactly objective. The art of strategic searching includes the ability to critically assess the information on offer, and Fischer argues that one aspect of technology-enhanced learning, which would help students to learn that particular skill, has so far been neglected: collaborative online learning.

According to Fischer, the advantages and inadequacies of learning programs, online vocabulary trainers and tutorials, where each student has his or her own monitor, have been studied extensively. As is so often the case, the results are less than clear-cut. Overall one can conclude that, in science subjects particularly, where the exercises and solutions are standardized, the programs really do lead to improvements in the students’ performance. But Fischer is quick to add: “The idea that software can replace teachers has been conclusively refuted.” Students need the support of people who can judge whether tests are appropriate for their level of knowledge, provide feedback on how best to use the programs, and gauge the development of the user’s competence.

“We can bring the world into the classroom”

So we are well supplied with studies of the efficacy of computers as cramming aids. As Fischer’s sees it, the important question for current research is this: How can computers be integrated into group learning processes – like what goes in a normal classroom – to achieve the maximum benefit for the group as a whole? He has no doubt that this goal can be reached: “We can bring the world into the classroom.” Let’s take Green Gene Technology again. School textbooks can certainly explain how plants can be genetically modified with the help of laboratory procedures. But Fischer argues that the question of how such a complex topic, which provokes such passionate controversy in politics and society, is evaluated by different sides in this debate, goes beyond what traditional textbooks and forms of learning can accomplish. The goal must be to find ways of using computer technology to enable people to do things that would not be possible without it. In other words, while they are searching for information on the internet, students should also be able to learn something else: media literacy.

For Fischer “media literacy” is not just a trendy catchword. The term refers to skills that are of fundamental importance: “How can one learn to collect trustworthy information on diverse issues – from the risks associated with EHEC bacteria to the recent scandal over horsemeat in hamburgers – and form one’s own opinion?” He believes that learning in a group is an effective way to acquire this element of media literacy. The problem is to find the right form. “It’s not enough for the teacher to say: ‘Sit down together there, and go through that section of the book. And when you get home each of you can look for more information about the topic on the net.’” The goal is to discover how to make the best and most creative use of information in one’s everyday life.
People in groups, and in learning groups specifically, behave in accordance with internalized patterns, many of them picked up, consciously and unconsciously, during childhood. These models must be adapted for group interactions that also involve computers. It is not enough for the teacher to set out the notebooks and then keep an eye on things from the back row. The exercise must be thought through in advance. One must have a plan of action, in which the prototypical roles and the sequence of events are defined. Everyone has internalized routines – scripts, if you like – that guide one’s reactions in everyday situations. They control how one behaves, and enable one to understand the behavior of the other actors. Communication within groups is also shaped by such scripts.

An effective way to go about teaching students how to search efficiently for information, assess its quality and discuss its significance, form a considered opinion and draw conclusions, is to provide them with appropriate scripts in which each is assigned a particular role. One might be tasked with following whether or not others in the group set goals or criteria for their searches and feed the search engines with the correct terms. Others might be designated to collect information and use it to formulate hypotheses and arguments – and to engage online with arguments advanced by others. Indeed, the exchange of views itself can be structured according to specifications in a script, to ensure that a real discussion ensues and that the disputants don’t simply try to shout each other down, as often happens in online forums.

The idea is to get away from the conventional teaching scenario based on the sequence: teacher’s question-student’s answer-teacher’s evaluation of response. Fischer remarks that projects in which he has been personally involved have clearly shown that this group approach really does lead to demonstrable improvements in media competence. For example, after participating in a computer-supported collaborative learning environment on Green Gene Technology in which such scripts were used, pupils were better able to evaluate information on Immunization: Arguments For and Against. – “In other words, Operation Knowledge Transfer really worked.”

This sort of teaching module is no doubt challenging for teachers to implement.
First of all, it requires that they themselves possess a modicum of media literacy. But above all, as Fischer insists, they need some competence in media didactics. And, as a psychologist, he is well aware that the necessary changes in teachers’ perceptions of their role, and the appropriate alterations in their approach, cannot be accomplished overnight.

Here Fischer cites the case of one of his own courses, which he wanted to transform into a practical demonstration of computer-supported collaborative learning. In the script, each participant was asked to upload onto an online platform a brief description of an exemplary situation related to a particular educational problem, and to comment on at least one of the case-studies provided by the others. “In the end, we garnered 70 contributions in all. Only 20 to 25 people had responded – out of a class of about 800.” Fischer cites the result without comment but – perhaps surprisingly – he is not discouraged by this low rate of participation. Instead, he feels that it confirms his thesis that learning follows certain procedural rules or scripts. Responding to the unforeseen script for collaborative online learning obviously demanded some rethinking on the part of the students too. They were being asked to bid farewell to old habits and expectations, something which requires a conscious effort. Learning something new also means not slipping back into old and familiar patterns of knowledge acquisition.

This personal experience confronted the university professor Frank Fischer with the same sort of challenge as schoolteachers face in their classrooms. When they make new demands on their students, they must do so in such a way that they ask neither too much nor too little of the class. They must provide what is known in Educational Psychology as the appropriate “scaffolding”. In other words, the teacher’s task is to give the student a secure platform on which to add a new floor to his storehouse of knowledge. According to a now classical model of learning developed by the Russian psychologist Lev Vygotski in the 1920s, levels of instruction and scaffolding should not be determined by what the learner has already learned, but by what skills he is equipped to acquire next. Fischer emphasizes that providing the right scaffolding is especially important when it comes to technology-enhanced learning. Virtually all students have already picked up certain capabilities in this area. What schools need to foster are ways of using these skills that they are unlikely to acquire if left to their own devices.

No need to bone up on dates!

According to Fischer it would be wrong to assume that children and adolescents are capable of learning media literacy on their own. In particular, students with learning difficulties, low levels of prior knowledge and other sub-optimal prerequisites for learning need to learn at school how to make use of computers and the internet to improve their scholastic performance – instead of always opting for online games, YouTube or Facebook. This is necessary to avoid what sociologists and psychologists refer to as the Matthew effect: the rich get richer and the poor get poorer or, put another way, those who profit most from targeted support are those who are most receptive to it. It has become clear, for instance, that students who use home computers primarily as gaming consoles find it harder to employ computers and internet effectively as learning tools than classmates whose parents utilize them as sources of information. Fischer is certainly not about to condemn computer games per se. Media literacy for him includes the capacity to savor what technology offers.

Nevertheless, many authors continue to claim – in books that often top the best-seller lists – that overuse of computers leads to the decay of cognitive abilities. Are their arguments without merit? Fischer does not wish to comment on any of these popular publications, but he does make it clear that he takes a more nuanced view of the issue. “Of course, computers can mutate into thieves of time, with young people just sitting unprofitably in front of their monitors,” he says. “That is precisely the reason why educational and psychological research would do well to concentrate on developing ways of helping them to get more out of the Internet than games and music videos.”

Here too, it emerges that slow learners are again at a disadvantage when it comes to realizing when they need help in learning how to make use of the computer to solve their learning problems. Students who have learned to monitor their own progress are also more likely to use computer and internet resources in ways that promote further learning. They are also quicker to realize when they should ask for help from teachers or from their peers. Those who have learning difficulties react otherwise: “Those who need help the most are those least likely to seek it.”

Should one then treat the flat-screen monitor as a learning tool like any other? Is the tablet computer just the latest version of the time-honored slate? For Fischer, the important point to understand is that how the medium is used, not the medium itself, is what determines its educational impact. One must first identify the added value that these new technologies can contribute to processes of collaboration and learning. The nature of the medium involved does
however have a definite effect on how people deal with information. Recent studies show that people tend not to memorize in detail the kinds of information they can access at any time on their PCs, notebooks or smartphones. They are more likely to take note of where it can be found. If, on the other hand, one has reason to believe that one may not be able simply to call up the information later, then one will take more care to commit its content to memory. Fischer doesn’t regret the passing of an age when schoolchildren were forced to memorize dates, while admitting that rhymes like “In fourteen hundred and ninety-two, Columbus sailed the ocean blue” had a certain charm. Instead, he recommends that one should view the constant and ubiquitous availability of information (such as the date of Columbus’ first voyage to the Americas) from a different standpoint. Rather than regretting that the computer robs one of time that would be better spent having exciting new experiences, one might rejoice that, thanks to the computer, one no longer has to waste time learning certain things by heart. Seen in this light, the computer gives one the time to consider other issues carefully and critically – and then to ask: “What does this all mean for the life I lead?”

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