Noldus
Information Technology

By Martijn van Schaik

Looking at learning in practice

Classroom observation with Noldus Observer XT

In Dutch education and in education in general, there is an ongoing debate regarding how well new pedagogy and curricula work. *The question is: "What works?"* (Slavin, 2004).

That is not an easy question to answer. However, both policy makers and researchers are looking for forms of evidence that address at least part of that question. Often the answer is either qualitative or quantitative. In the research described below, I will show how using The Observer XT has allowed us to integrate different sources of data.

Figure 1: *Workshop classroom*

For our study we designed an educational program for preparatory senior secondary vocational education [1]. Students had to design and build a tandem tricycle for elementary school students. Teachers guided them through that process. After 10 weeks, students along with the teachers worked in groups of three to five in big workshop classrooms. We then studied how teachers guided the students and tested them in what they had learned during the process.

The data came from three separate phases:

- Phase I: an initial design of the program was implemented in one school and studied only qualitatively.
- Phase II and III: we tested the redesigned program in two schools and five schools, respectively. In the latter phases, we collected video observations and test data on knowledge, understanding, and student characteristics.

COLLECTING OBSERVATION DATA

We looked for interactions on how the students used knowledge and mathematical models, and how the teachers assisted them when solving the problems they encountered. We had three cameras in the classroom: two overall (fixed) cameras and one handheld camera. The two fixed cameras were continuously recording: one recorded the audio captured by means of a wireless microphone attached to the teacher. The third handheld camera was operated by one of the researchers and captured interactions in which students and teachers together, or students by themselves, were solving problems. In addition, we video recorded the interviews with students and teachers that were held shortly after each observation.

Figure 2: *Fixed camera shot from handheld camera recording*

USING OBSERVER XT

After collecting the data, prior to using The Observer XT, we pre-edited the video in order to obtain two continuous streams of video, which we could then synchronize in the software. We created one video strip from the fixed camera that recorded the audio of the teacher along with the footage of the handheld camera. We did this by creating a picture-in-picture (p-i-p): the little strips of video from the handheld were placed, resized to a quarter of the frame, over the continuous stream.

In The Observer XT we synchronized this p-i-p stream with the other fixed camera stream. Thus for analysis in The Observer XT we had two streams, of which one consisted of two camera standpoints.

[1] Preparatory senior secondary vocational education (VMBO in Dutch) is part of the compulsory education for students from 12 to 16 years old. 60% of Dutch students attend VMBO. It is the educational stream that educates for senior secondary education in a more practical way.

The analyses differed across the three phases of the research. First, in the single school phase we were looking for patterns in the video data. That is, the video data was reviewed and then commented on. After discussing the comments of two observers, we started combining the comments into patterns. With these initial patterns we content-logged the video in The Observer XT to check if

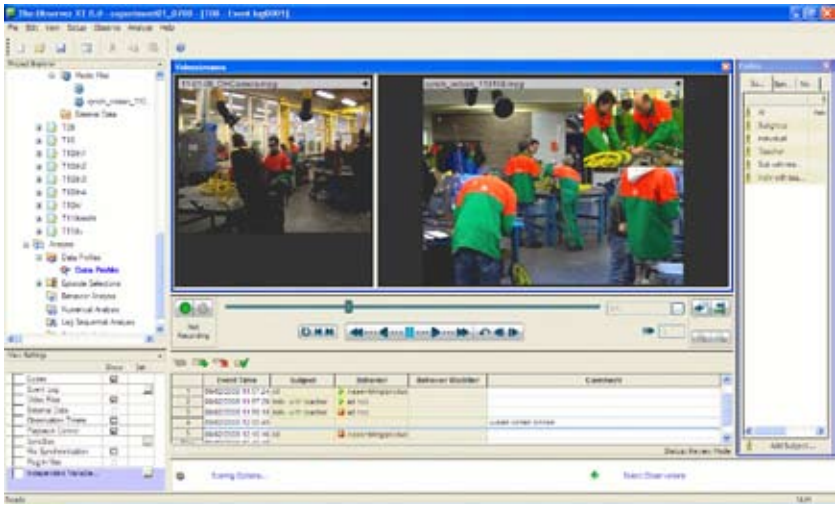

Figure 3: *Two streams (with inset in one) in The Observer XT*

our patterns were consistent with the data they were on. Doing this we found three patterns in the data. The first pattern descibed that theoretical and more general knowledge were mainly addressed outside the practice workshop. It was either homework for the students, or the practice teacher told the students to go to a subject matter teacher. The second pattern was that models were used to solve problems initially, but they were provided as pre-fixed solutions instead of tools for deeper understanding and problem solving in a more general way. The third pattern showed that the assignment and the practical environment were stimulating for the students, however, an actual client was crucial for real motivation. Secondly, in the next part of the research the video came from two schools and we wanted to compare their pedagogy. After again pre-editing the video in a similar way, as mentioned above, the data was indexed according to the classroom activities. By this we obtained an overview of the implemented program which in turn helped us to explain differences in learning outcome as measured by the tests. For the final phase of the research the analysis are roughly the same.

At the moment we are planning to analyze more closely the interaction on a micro level. With both the statistical data and the overview of tagged classroom interactions, we will look for typical and a-typical instances of guidance. These will be compared within and between the schools. Note that no video data is transcribed so far and that every analysis has been done viewing the video itself. This is one of the strengths of the software: it is possible to easily find and review clips and re-analyze those.

INTEGRATION OF DATA

So far, we were not yet able to proceed with integration of the qualitative and quantitative using The Observer XT. However, when continuing the analyses, we will try to combine those two sources of data. Up till now we took results out of separate sources (logs of the processes, indexed video and results from the tests) and found explanations for our test findings in the video. Next, we will try to integrate the two sources. One way to do that is putting test scores in The Observer XT and hence using that data as mediators for behaviors. We will for example enter, for some individuals, test scores as independent variables. Then, we will be able to combine ways of interacting (qualitatively) with the results of their tests. In addition, we could score, in The Observer XT, the quality of the models that are subject of discussion. As a result, we will then be able to relate different guiding activities of teachers with the models the guiding is on. This all could, and hopefully will, lead to a sophisticated image of the learning environment as a whole.

We started working with The Observer XT software in 2006 and have done so for the following three years now.

We are very enthusiastic about the Noldus software and will continue using it in our next analyses. At our department awareness has arisen that video data is not completely different from the quantitative data. Although many still fully transcribe the video, colleagues start to see that the data do not have to be reduced to be manageable. This is a result of the potential of the software (and of course the computers running it).

REFERENCES

Slavin, R. (2004). Education research can and must address "what works" questions. *Educational researcher*, **33(1)**, 27-28.4

CONTACT INFORMATION

Drs. Martijn van Schaik, VU University Amsterdam
Faculty of Psychology & Education, Department of Theory and Research in Education .