

ViLM: Visualization of Learning and Teaching Strategies with Multimedia in Teacher Education

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The ViLM-Project at the University of Paderborn (Germany) in the faculty of computer science started in October 1998. The aim of ViLM is to use Multimedia and Hypermedia in a Teacher Education Program to support students of computer science (informatics) in modelling effective teaching. By ViLM students shall integrate new technologies into their teaching and learning processes and use Multimedia as a very convenient tool for self-assessment of their educational practice in the class room.

Teacher students in informatics usually participate in a course of class room work to gain experience in teaching students, organizing learning processes, developing teaching strategies and creating and testing curricula for informatics in secondary schools.

The evaluation of this practical teaching experience takes place in face to face meetings and discussions between teacher students and their tutors who observe class room work.

The concept of ViLM now provides teacher education with a highly integrated course of theory and practice in teaching informatics. Therefore, supported by Multimedia, it aims to improve classroom teaching.

The steps of ViLM:

- In a problem based course with the topic 'methods of teaching informatics' at university, teacher students should become acquainted with typical class room situations. They should be prepared to develop their own course materials and to plan informatics lessons together with their fellow students. Materials and concepts of teaching will be delivered in form of webbased documents on a hyperwave-server and can be accessed by all participants of the course.
- During this period of ViLM-Project students also visit schools to attend lessons in informatics and to analyze the teaching strategies of teachers and the students' concepts of learning. Theoretical assumptions about teaching informatics and practical experience of class room situations will be discussed with their tutors in the course at university.
- After having been prepared for school practice at the university course, teacher students now have to teach informatics in the class room on their own. They will be observed by some of their fellow students and their tutors. The communication and collaboration in the class room will be recorded by two video cameras, one for the teacher's and one for the students' perspective.

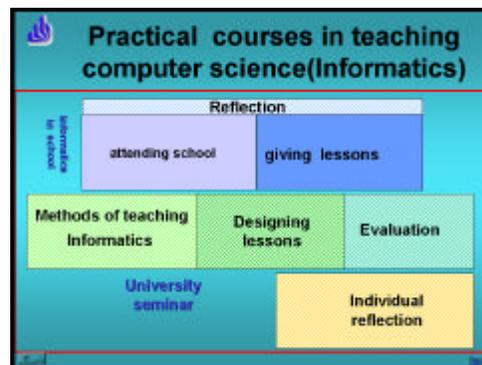


Figure 1: Organizational structure of courses in teaching computer science

- Based on theories of constructivism, ViLM wants to facilitate the development of critical evaluation of learning and teaching processes by letting the students analyze their behavior in the class room by themselves. To foster this concept, course materials, plan and reality of their class room work, the videos and the assessment of the attending students and tutors will be discussed in the teaching-course at university. Specific class room situations can be analyzed, different opportunities can be discussed. By this way, evaluation on the one hand remains a social process, supported by video, and the result of intersubjective social nego-

tiations of meanings through interpersonal discourse. On the other hand, it becomes a process of individual reconstruction, supported by multimedia authoring tools:

- Teacher students have to document the evaluation of the lessons they held at school as webbased multimedia-applications. Lesson designs, school oriented course materials, video-sequences arranged in a schedule of the lesson and annotated evaluation-remarks will be arranged within a multimedia-document. The main objective of this process of reconstruction class room reality by teacher students is to establish sensibility towards effective teaching strategies and class room interaction. They also will be qualified in using Multimedia and producing webbased multimedia course-materials with authoring tools. Therefore e.g. they have to learn, how to digitalize videos and how to insert them into their multimedia documents. Last but not least they have to consider the effective integration of interactive hypermedia in informatics lessons and to think about the new role of teachers in computer supported collaborative learning environments. To guarantee a high level of integration of theory and practice in teachers education the course at university and the practical phase of class room oriented training will be held parallel in the same term.
- The multimedia-documents will be added to a multi-media database of school oriented teaching methods and materials in informatics. Later on, this database can be used by next generation students as foundation for efforts of their own in planning and implementing school curricula and class room practice. Step by step, the database will be completed and will be developed towards a source of evaluated examples of lessons in informatics.

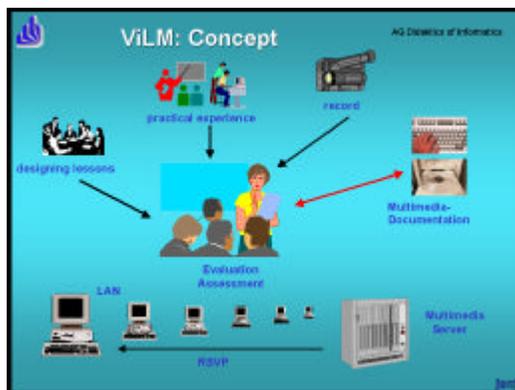


Figure 2: Concept of the ViLM-Project

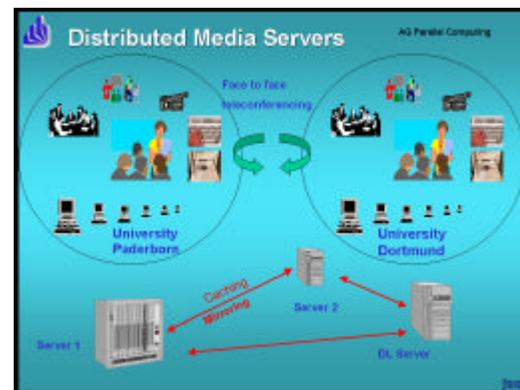


Figure 3: Distributed Media Services in ViLM

- The ViLM project will be evaluated in regard with the possibility to increase the quality of teacher education at university-level with multimedia. There will be computer based questionnaires for teacher students as well as for their tutors and there will be an evaluation of group discussions between people who are involved in the project. We suppose that not only the implementation of Multimedia in teacher education but also the synergy of technical and multimedial support during phases of individual evaluation by the teacher students on the one hand and the consideration of the importance of social discourses during interactive phases of group discussions on the other hand will cause the anticipated effects.

There are plans to connect different institutions of teacher training and teacher education via internet later on. These institutions shall be encouraged to organize their courses in the same way as described before. So it will be possible to enlarge the multimedia database, to exchange concepts of informatics lessons, informatics school curricula and evaluated examples of class room work. Discussions between teacher students in the participating institutions about curricula and teaching strategies could be organized by using the internet and via videoconferencing tools. By this way, we might finally establish a kind of webbased distance learning concept in teacher education with the topic 'teaching strategies and effective learning with multimedia'.

For such a project it also will be necessary to develop suitable webbased tools of communication and assessment which can be used by the students and groups in the distributed sites and institutions to organize their collaborative process of learning and evaluation.