"INTERACTIVE SCHOOL"[1] – LEARNING WITH NEW MEDIA[2] /INFORMATION AND COMMUNICATION TECHNOLOGIES: INSIGHTS AND EXPERIENCES

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Abstract

The objective of the project "Schule interaktiv" was to deliver an impulse, via the integration of new media, for school-specific development processes with regard to the development of media competence, the development of a new culture of teaching and learning, and enhanced learning support (see Sesink, Lampe, Trebing, Zentgraf, & Rüsse, 2005). The project thus addressed areas with potential for improvement which had been identified by PISA in German schools, and was conceived as a development project. This paper will focus on the relevance of new media for a new culture of teaching and learning, and the insights and experiences gained over the course of the project.

Project Goals

The development project "Schule interaktiv" was a partnership between four secondary schools (one "Mittelschule", two "Gymnasien" and one "integrierte Gesamtschule"[3]) in the German federal states of Saxony, Hesse, and North Rhine-

[1] The German term used is „Schule interaktiv"; http://www.schule-interaktiv.de

[2] The term "new media" contains the specifics of computer and network technologies in general. The particular aspect of these technologies is that they represent a wide range of specifications and forms of implementation. Computer technology includes the universal potential to generate machine technology and it is obvious that new forms of the tools themselves and of their application respectively will be generated permanently and most possibly at a constantly accelerating pace. Therefore the term new media contains as well those media that include the ability of permanently or constantly renewing themselves. (Sesink, Pädagogik der neuen Medien 1.3)

[3] The "Mittelschule" is a sophisticated form of school, which subdivides into two branches, one of them leading to the same graduation as the school form "Hauptschule," the other one leading to the same graduation as the school form "Realschule." The pupils gain the graduation form of "Hauptschulabschluss" after successfully attending ninth grade (at the age of 15–16). After attending tenth grade (at the age of 16–17) and passing the according school leaving examination they graduate by the form of "Realschulabschluss," which is considered as an educational achievement at medium level. The "Mittelschule" incorporates class levels ranging from fifth to ninth and from fifth to tenth grade respectively. The graduation pupils get when attending the school form "Gymnasium" is the equivalent to the British A levels and prepares the pupils for any form of higher education such as university studies. The school form of "Gesamtschule" is the equivalent to the British comprehensive school.

Westphalia, the Deutsche Telekom Stiftung (Foundation) and the Division of Education and Technology of the Department of General and Vocational Pedagogy at the Technische Universität Darmstadt. The project centered on the contributions made by the new information and communication technologies in shaping a so called new culture of teaching and learning, with the main focus lying on the actors (teachers and students) in the schools.

Description of the Project

Along this development project the participating schools were given the opportunity to realize their own version of good teaching practice with the help of new media. Every teacher was allowed to develop the individual content of his or her classes and could request the according resources (new media tools). The schools discussed their tutoring plan internally first and presented it at the Jours fixes[4] afterwards. Hereby the educational value of the new media used along their tutoring plan had to be evident in order to get approval for the financial support of these tools.

The development of these tutoring plans did not depend on either class level or school subject which led to a representation of all class levels and nearly all school subjects by the end of the project. The tutoring plans included a wide range of possibilities from the implementation of learning software for one lesson only up to the development of new school subjects that got lectured for a complete year at the according schools.

Characterization of a New Culture of Teaching and Learning

The term *new culture of teaching and learning* incorporates the attempt — both historically rooted (cf. reform pedagogy) and guided by the contemporary corpus of knowledge — to respond effectively to the challenges of society, science, and economics (Gasser, 2002, p. 7). For this to succeed, a new culture of *learning* must nurture a habitus which allows space for experimental and exploratory learning and encourages less prescriptive and directed and more self-motivated and self-regulated learning, allowing for "authorship" of the own learning process. This will lead to results which can to a large extent be attributed to one's own efforts. The culture of learning must be complemented by a corresponding culture

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[4] cf. Educational progressivism , e.g. Paolo Freire's plea for autonomy and freedom (Freire, 1974) or John Dewey's concept of democracy in education (Dewey, 1966).

of teaching, since the development of competence, knowledge, and skill, as well as their formation in processes of acquisition and communication/mediation, are also highly dependent on the abilities of the teacher. A corresponding new culture of teaching must grant students more autonomy and allow more space for exploration and experiment. Therefore, a form of teaching is required which encourages open forms of classroom instruction and enables more action-oriented and experience-based learning. A new culture of teaching also entails the willingness of teachers to purposefully relinquish control and thus support the students in steering the organization of their own learning processes (Gudjons, 2006).

Over the course of the project, this was realized with the aid of new media. Via the de-hierarchization of the organization of teaching and learning, cooperation between teachers and students becomes conceivable; furthermore, space is provided for new forms of evaluation and assessment of performance. In order to become an objective in its *own* right, which teachers are actively committed to, the new culture of teaching and learning must evolve from motives, goals, and the pedagogical quality criteria of the actors in the schools. Only on this basis does a sustainable implementation become possible, do necessary actions become apparent, are areas of responsibility accepted and the commitment generated which is required for change (Gasser, 2002). In the context of "Interactive School", this commitment was assured by the fact that all the participating schools had defined self-guided learning as the goal of their work.

What is New about the New Culture of Teaching and Learning

On close examination, a participant actor might be curious as to what is actually "new" about the requirements described above. It is certainly not the case that these pedagogical concepts are only of recent vintage. Much of what is today considered as *new* has in part merely been rediscovered. Not new is also that schools have so far not known and not practiced such a culture of teaching and learning. And finally, also not new is the fact that such a culture of teaching and learning was only made possible, for the first time, by the new media. What is new is that the public discussion — motivated by TIMSS[5] and PISA[6] — on what is

[5] TIMSS (Third International Mathematics and Science Study) represents the most extensive investigation of mathematics and science education ever conducted. The study is sponsored by the International Association for the Evaluation of Educational Achievement and funded in the U.S. by the National Science Foundation and the National Center for Education Statistics. Approximately 50 countries have participated in this comparative survey of education focusing upon nine-year old students, thirteen-year old students, and students in their last year of secondary schools.

[6] PISA (Programme for International Student Assessment) is the most comprehensive international assessment of educational outcomes to date. The study was initiated by the Organisation for Economic Cooperation and Development (OECD) as part of its INES programme, which provides the OECD member countries with internationally comparable data about their educational systems. In the context of this programme, PISA aims to examine the outcomes of schools in the participating countries.

expected of schools and which role they are to play, has placed a stronger emphasis on these forms of teaching and learning. This implies a newly discovered appreciation of the attitudes and competencies encouraged and fostered by these (curiosity and initiative, independence, self-responsibility, the ability to work in teams, etc.) as opposed to the traditionally required attitudes and educational goals (obedience, diligence, knowledge emphasis). Furthermore, the comprehensive integration of media use and student-centered methods into the current curricula (see, for instance, curricula for media education in Saxony (Sächsisches Staatsinstitut für Bildung und Schulentwicklung, 2001) and the Hessian curricula (Hessisches Kultusministerium, 2008)) challenges the conventional organization of teaching and learning.

Thus, the demands for a new culture of teaching and learning and a comprehensive media education coexist, but remain unallied. That an integrated view is not only possible, but actually necessary, will be put forth in the following.

New Media — New Potential for a New Culture of Teaching and Learning

The potential of the new media for the development of a new culture of teaching and learning has not been yet been fully realized. That this potential has not yet been fully grasped is illustrated by the fact that teaching concepts which have already for a while been critically reevaluated and confined to certain contexts or even considered outdated — both pedagogically-didactically and in regard to learning theory –nevertheless continue to be perpetuated on a higher technical level (e.g., programmed learning) On the other hand, the use of new media can also — as "Interactive School" demonstrates — encourage teachers to proceed along innovative routes (Rester, 2008). They make it possible to conceive and explore new teaching/classroom scenarios, especially if, as was the case in the project "Interactive School," the pedagogical justification for their use must be made clear. Thus, self-regulated, self-responsible, and cooperative learning processes can be facilitated extremely well. Furthermore, new media assist the teacher in placing responsibility for the process of learning to some extent into the hands of their students, and to reflect on new possibilities of teaching practice. Apart from a shift in the teacher's role from a controlling to a moderating function, the systematic integration of new media also initiates changes on other levels, for example cooperation beyond the boundaries of a specific subject or workgroup (Kozma, 2003). The developing cooperation can create synergies, which will at first have a limited scope of effectiveness. In order to apply to the entire School, a plan or (media-) concept will become necessary which is supported and put into practice by a majority of the staff. Only the conscious shaping of such a process provides the space for media to have a lasting influence

on school culture.[7]

A precondition for this is a decision as to where and how it is pedagogically meaningful to employ new media, and thus where they can or should be put to use. This decision can only responsibly be made, if the teacher's pedagogical self-concept has been clarified and feeds into (more than just pro forma) work on the school program. In the school program,[8] schools present their pedagogical and organizational concept, and describe the planed development steps as well as strategies for their realization. In this context, goals and initiatives for the integration of media must be developed, since the acquisition of media competence is considered a cross-sectional task, and as such becomes part of a media concept unique to the school (which is understood as part of the school program). With a focus on the question "what is successful teaching?" a process of dialogue on the concept and understanding of media education can be initiated which, on the one hand, has the function of self assurance, on the other hand, can represent a reorientation.

By concrete example, such as "under which conditions can successful teaching with new media be realized? Which equipment, which level of knowledge are prerequisite, which steps must be undertaken?" the discourse can be put in relation to the level of implementation and thus result in change. For example, a decision in favor of differentiating, participative learning processes involving the use of new media, frequently results in the scheduling of block periods, since the constraints of the standard 45-minute time-slot are often considered unsuitable.

If the goal is to systematically integrate the attainment of media competence into as many subjects and grades as possible, the impulse goes significantly beyond a mere organizational restructuring of the classroom lesson. The integration of new media can then only be implemented as a part of school development.

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[7] The term "school culture" is currently a part of administratively steered reform attempts at improvement of school quality, but should be viewed with ambivalence: The focus on culture, self-responsibility and self-guidance of the schools occurs in a context of tight education budgets and for this reason frequently generates skepticism amongst teachers (see Helsper, Böhme, Kramer, & Lingkost, 1998, p. 31). In the project "Interactive School", these aspects are not considered to be contradictory.

[8] Comparable to the so called "Schulwerkplänen" in the Netherlands. In some German states, school programs / mission statements are in the meantime considered an obligatory part of quality development processes (see Holtappels, 2004, pp. 13f).

Scientific Evaluation, Steering and Support: Evaluation as Learning Conception

Drawing on current concepts in school-development research (see amongst others Combe & Reh 2000; Rolff, Buhren, Lindau-Bank, & Müller 1998) and experiences gained from action research from the 60s and 70s (Altrichter & Posch 2007), evaluation in the project ”Interactive School” was understood to regard the teachers as participants in the process (see Beywl 1988, pp. 140ff).

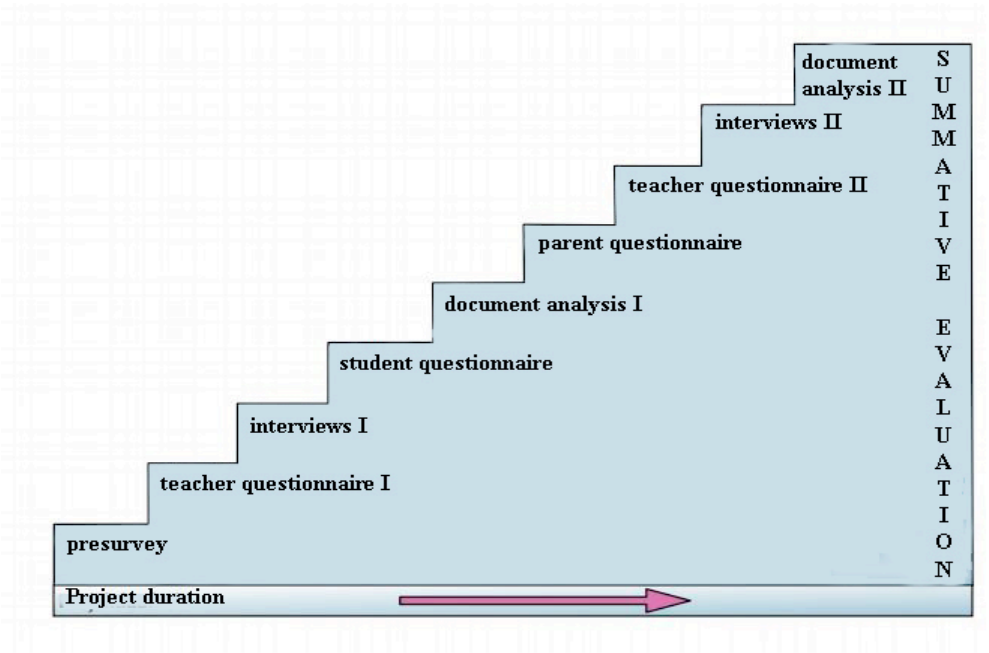
The scientific support assisted the teachers, in the sense of help towards self-help, in the conception and evaluation of teaching projects. The systematic integration of these into the classroom were to initiate a process of continuous growth in quality (in the sense of the “learning school” [Fullan, 2007; Rolff, Buhren, Lindau-Bank, & Müller, 1998, p. 38]). This was aided by embedding the (further) development of teaching into personnel- and organizational-development initiatives. These also benefit from new perspectives permitted by the premise of object orientation: Schools live their own unique culture and cultivate their own specific climate; they are more or less likely to develop trust — and of course have different requirements regarding support, guidance and training. In order to address this, a development-oriented project partnership was needed. A project culture was beneficial which understands all the participants as learning from, and with, one another, and makes use of learning concepts. The objective of the concomitant evaluation was to give an impulse for the school-specific development projects with regard to the higher-level project goals (new culture of teaching and learning, learning assistance, development of media competence) — with the schools’ self-derived goals being the guiding factors. Furthermore, the insights and experiences gained over the course of the project were relevant. These were documented and are to be made available to everyone working towards a pedagogically meaningful use of media in the context of teaching-, staff- and organizational-development initiatives in schools.

Having been conceived as a development project, the formulation of ex ante hypotheses and a predefined evaluation concept were avoided in the project “Interactive School.” The design of the evaluation and the development of suitable evaluation instruments took place embedded in the context of the support and assistance offerings. The concept, as well as the instruments employed, was continuously adapted to the current process. In this manner, a flexible, “living” concept was created which was in line with the requirements of the schools and is in agreement with the principles of process orientation, interactive communication and openness (Lamnek, 1995a, p. 25). Vital in this context were the continuous reflection and, coupled to this, the necessary willingness to adapt the evaluation methods and expand or limit the scope of the evaluation: Precondition for the

formative, responsive evaluation (Zentgraf, Rester, Trebing, & Lampe 2005, 2006, 2007) were an openness on the part of both the researchers and their subjects.[9]

Taking this into account the concept of evaluation builds on a combination of self-evaluation and external evaluation, whereas qualitative as well as quantitative methods are being used according to the subject matter. Through the combination of qualitative and quantitative methods the triangulation of methods and data as often requested in the context of evaluation by applied research is being heard (Bortz & Döring, 2005, p. 370; Flick, 2004).

Figure 1: Schematic representation of the stages of the evaluation. Stages marked by numerals I and II denote two-point sampling (pre-post survey)



The survey participants were given feedback of the collected data by the evaluation team as soon as possible, if feasible within a month of the survey. This feedback was initially limited to short written reports (one to five pages) combined with an invitation for discussion at the jour fixe — this was however frequently

[9] Loosely based on 4th Generation Evaluation (Guba & Lincoln, 1989). The evaluation concept for "Interactive School" was continuously developed and adapted to changes over the course of the project. At this point in time it is in its 5th "edition".

not taken advantage of over the duration of the project, the offers very expanded to include a presentation of the results to the teachers at the school conference. Whether, and in which way, the schools finally accepted these offers highly differed; partially the results were presented but the discussion was requested for a later date, partially the discussion was scheduled directly following the presentation. Towards the end of the project — and with an increased familiarity with their project partners — some of the schools would themselves initiate a dialogue on their evaluation results.

Initial Insights

Based on the course of the project so far, the following findings can at this point be reported.

New Media as Motor for a New Culture of Teaching and Learning

Utilizing new media in the classroom does not per se result in development towards a new culture of teaching and learning. Without question, old-school concepts, such as teacher-centered instruction, can be conducted and supported by the new media. But this, precisely, was not the aim of "Interactive School". The idea behind the use of new media was not to make the classroom experience lighter, more colorful or more "hip and happening" but for them to be integrated into the teaching design in a pedagogically meaningful way.

The teachers planned and documented their classes over the course of the project (to be found under www.schule-interaktiv.de) and in this manner shared their experiences. As to how much the objective of a more open style of teaching and a stronger involvement of the students — allowing them to autonomously take charge of learning speed and methods, and control of the learning process — can be realized with the aid of new media, was an open question when the project first began. As the document analysis towards the end of the initiative's duration showed, nearly all the schools' projects had implemented this goal. Furthermore, the analysis of the class projects showed that one third had implemented a project orientation with exploratory, experimental and self-regulated learning components, and more than half had realized the objective of "encouraging the self-initiative of students." This permits the assumption that there is a positive correlation between the use of new media and the development of a new culture of teaching and learning.

Self-evaluation — No Self-starter, Not to be Taken for Granted

Schools being conjoined and cellular-structured organizations (see Lortie, 1975, pp. 14ff; Rolff, 1993, p. 132), change is initially adopted by individuals and then only after being implemented successfully, successively "multiplied" amongst the

colleagues. This also applies to the area of self-evaluation, which regardless of its currently obligatory inclusion in quality- and school-development concepts, still often has only a minor role to play. In the development project "Interactive School" it was intended not to initiate change from the outside, but rather to support the existing desire for change; in particular since this desire — being a product of self-initiative — allows a higher level of motivation to be expected. Here, intensive one-on-one consultations, coupled with workshop offerings, were found to be a good approach. Nevertheless, this process was found to be protracted and in no way a self-starter: It requires constant reflective monitoring and support. The willingness of the actors to shape the transformations in specific terms can not be underestimated in its importance. Neither the systematic inclusion of the students' views, nor their participation and stake in taking responsibility for the teaching and learning process belong to the normal modus operandi of schools. Democratic teaching and learning scenarios of reform-pedagogical ("constructivist") design, and a teaching culture focused on feedback, are development areas; in the eyes of the participants, their value must still be proven.

In order to more thoroughly anchor an awareness for evaluation and self-evaluation competence among teachers and counteract antagonism, the exchange of experiences amongst teachers proved to be highly effective. The transfer of competence between teachers, in the sense of multiplication, bears a potential for the shaping of a "new" common culture, in which (self-) reflection is given a high degree of significance. For this kind of awareness, systematic self-evaluation seems particularly important; the student perspective offers more than just the opportunity for content- and perspective-related triangulation: Where attitudes and opinions of teachers and students are not only confronted but also put in relation with one another, opportunities are created *in* the classroom for communication *about* the classroom.

The Challenge of Reciprocity

In spite of its object orientation and a conscious decision by the research team not to apply any pressure, there were limits to how much of the desired reciprocity of the concomitant evaluation could be realized. This for instance became apparent during feedback of the evaluation results into the running project. Initially, purely written feedback methods were used, occasionally resulting in face-to-face discussions. Neither were there explicit reactions to the evaluation results, nor could direct impulses be seen which had been generated by these; the desired responsiveness, in the sense of a real dialogue, was lacking. The idea that the teachers participating in the project would act as multipliers and further disseminate information turned out to be unrealistic. On par with the discussion offerings, there was much reticence to take up the multiplier function.

Learning Concept — Trust and Openness

Under the condition of increasing dynamics of societal development, not only the students, the teachers, and the schools must learn new things, and "rethink themselves" in the sense of Hartmut von Hentig, (2003). Scientific evaluation must reposition itself and further develop approaches by qualitatively oriented empirical research which to a larger degree understand and conceptualize the empirical as theory-guided formative element of process reflection in the sense of cybernetic feedback loops.

Scientific evaluation and support then understands itself as:

- a moment of communication and cooperation of the participating actors fostering reflection,
- a mediated moment of the dialog between school practice and science and
- a catalyst of "reflexive modernization" on the organizational level.

It functions as quality control in an iterative process of trial, verification, and adjustment of methods, and finally serves as an impetus towards self-critical meta-reflection of the over-all process, including the option of fundamental reorientation.

It is certainly difficult to put such an understanding of scientific support and evaluation into practice in the shape of short-lived project cooperation between school practice and academia. It requires time to build the required level of trust between the project partners. On the other hand, the capacities at research institutions are not sufficient for comprehensive and long-term realization of such a concept for school development, for example in terms of a lasting partnership between schools and universities (Herzig & Grafe, 2006, p. 132). Nevertheless, the project "Interactive School" can in this sense function as a model, offering important insights for a sustainable concept of scientific project support and evaluation.

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