Interactive Learning Projects for Schools with Web 2.0 Tools

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1. Introduction

Web 2.0 has increasingly been adopted in education, which is evident from the increase of scientific attention given to this field. However, the professional deployment of innovative, technology-supported learning scenarios lags behind this development. Furthermore, the varying approaches of girls and boys towards new technologies have found little consideration in the pedagogical context. The research project "female" is devoted to this theme: fe|male places Web 2.0 technologies in education in the center of the research focus. These technologies are analysed under the aspect of gender and also in relationship to their didactical deployment within the framework of a gendersensitive academic education. Technology applied in E-learning is neither didactically neutral nor gender neutral (Baumgartner 2003; Kamphans et.al. 2003; Messmer & Schmitz 2004; Wiesner-Steiner et.al. 2009).

Departing from such a conceptional framework, the fe|male-project intends to inspire girls and boys for new technologies in educational and learning processes. fe|male explores Web 2.0 technologies under the gender aspect and identifies opportunities for their deployment on the basis of the competencies and needs of the students.

The project, took place in collaboration with three partner schools in Austria and Germany. Nine Web 2.0 projects (involving 165 students and covering fields like mathematics, biology, chemistry, physics and history) had been integrated in school practices and were evaluated with regard to its implications for gender sensitive teaching practices. Students had been integrated into the entire research process from the start, using interactive personal learning environments (PLE) and portals for the individual organisation of their learning processes.

The projects of the partner schools as well as the successing best-case projects were evaluated qualitatively and quantitatively. The evaluation focused on didactical and gender-specific aspects relating to the expedient deployment in education. In order to cover both individual perspectives and receive comparable data with regard to the specific projects and countries involved, interviews and questionnaires have been adopted.

2. Results

The main results display that between the girls and boys who participated in the evaluations much more similarities were observable than differences. Furthermore, a tendency is observable, that girls even profit more from Web 2.0 school projects than boys who need more support than their counterparts. In addition, we have detected some significant country-specific differences with regard to self-organisation or forms of assistance. The fe/male project thus sheds light on important didactical and gender effects that can evolve from Web 2.0 e-learning tools. The use of Web 2.0 applications like E-Portfolios or Wikis leads to "performative" learning. fe/male also makes visible how learning processes with interactive technologies can be optimized in a didactical, sustainable and gender sensitive fashion.

Overall, our results show that there are more similarities than differences in the students assessments and that the expectations of both boys and girls have been fulfilled. Nonetheless, different assessments exist with regard to the overall acceptance/refusal of the learning projects as well as for the need for self-organized learning. Both quantitative and qualitative findings show that girls have benefited even more from the projects than boys. Thus, they found themselves more motivated, more active and communicative:

> "*my girls have been addressed quite strongly and have shown greater motivations and commitments that my boys. This is especially interesting because of the fact that my girls were not especially interested in technology before but really got captured by the project."* (teacher)

In sum, the fe/male learning projects have received positive assessments with regard to their didactical and technical approach. Quantitative and qualitative evaluation results demonstrate that the students have been aquainted with the interactive possibilities of the Wiki-technology. Aside from the best case projects established in a second step of the fe/male agenda, especially the school project Cells/Biology and Mathematics received positive evaluations. In contrast, the interactive possibilites of the Wiki-technology have not been completely utilized. Although the learning projects and best case projects have been quite attractive for both girls and boys, girls have been slightly more attracted by their group work, interactive and self-organizational features.

3. Recommendations for future Web 2.0 projects:

Projects that draw from the natural sciences have been more accepted than projects related to other disciplines. One of the reasons for this important result can be found in their higher share of constructionist elements as well as their strong commitment to group work. This assumption is supported by the fact that the german project Zellatmung – although realized with a low levels of support – was also positively assessed.

The realization of a Wiki-project for mathematical teaching has proven to be a real challenge – both for austrian and german schools. Most mathematical schooling is practiced in a single work manner and with a low experimental level. Despite a high level of media competence, excellent support and an excellent didactical concept, the austrian math project received bad assessments. This observation is supported by student interviews that sum up: „Yes, we want to do Wiki-projects but not for math“. In sum, these results support the assumption that natural sciences disciplines with a high share of experiments fit best for Wiki-Projects.

To create sustainable Web 2.0 school projects, it is furthermore crucial that project experiences and techniques can be relatively easily adopted for other topics or disciplines. Another important precondition for the sustainability of Web 2.0 projects at schools lies in a functioning technical infrastructure and teachers that have enough media competence. In other words: projects with a high degree of technical dependency but a bad technical infrastructure are bound to fail, if the teachers are unable to apply their media competence or technical support is not given.

If we compare the participating countries, the austrian learning projects at first sight do get better assessments than their german counterparts. This is due to the fact that the austrian schools already had a developed multimedia profile (including good technological infrastructure) and the austrian students developed less need for support than their german colleagues.

Another important result is that Wiki-based projects are especially fitting for the natural sciences. The projects that received the best evaluation results therefore were Cells/Biology, Cemical Olympics and Biology Laboratory (AUT) – alltogether projects with a high degree of student activity. From our data, we have identified further important challenges that should be confronted before the integration, adaption and use of Web 2.0 technologies are:

- How can we add value to the learning and working processes?
- Additional work load for teachers, especially in preparation phases have to be taken into account
- Common organizational problem at school: to find the right time slot within daily school routines
- Projects should combine technologies that work well together.
- Calculating enough resources in order to guarantee technical as well as professional support.- technological support and training is a necessary prerequisite for the success of any project[1]
- Introductory phases into the Wiki-technology should be enhanced by handouts and notes that explain the interactive features but also common problems of the Wiki-technology

- Depending on the disciplines and tasks, projects should not be too technology-driven. Teachers should have knowledge about available/functioning technological infrastructures
- To address gender aspects, clear arrangements about the different kinds of cooperation, organization of the groups and distribution of tasks should be made from the beginning
- Age differences should be as small as possible (not more than four/each group)
- In order to gain sustainability, teachers and students must pass their experiences to other teachers/students and try to establish further networks
- Self organization, cooperation and group work can not be presumed automatically but has to be carefully developed according to grades, technological knowledge and learning contents
- Web 2.0 projects should take into account that students and pupils want to maintain the border between schooling and spare time.

If teachers take such recommendations seriously, they can create and mediate new learning processes. Teachers involved in female are already planning on future projects or want to share their experiences with colleagues. Moreover, sustainability is a big learning goal. Yet to establish sustainability, different levels of knowledge and technical know how must be taken into account *before* projects (and especially cooperation projects) start. The enhancement of technological curiousity is thus strongly related to the technological affinity that students already have gained as well as to their learning experiences within the projects.

Notes

1. In order to overcome technological obstacles of Web 2.0 projects, several key factors should be addressed at the introductory and practical project phases. For a detailed description of these key factors see Bruck/Schumacher (2010)

References

Baumgartner, Peter (2003). 'Didaktik, E-Learning-Strategien, Softwarewerkzeuge und Standards - Wie passt das zusammen?' In Maike Franzen (Hrsg.), *Mensch und E-Learning. Beiträge zur eDidaktik und darüber hinaus* (S. 9-25). Aarau: Sauerländer.

Bruck, Alexander, Schumacher, Dirk (2010) 'Der Mehrwert für den Endbenutzer. Ein Umsetzungsansatz als Handlungsempfehlung', unpublished Paper

Kamphans, Marion, Metz-Göckel, Sigrid and Tigges, Anja (2003). 'Wie Geschlechteraspekte in die digitalen Medien integriert werden können – das BMBF-Projekt „MuSofT'. Internes Memorandum des Lehrstuhls für Software-Technologie der Universität Dortmund, Memo Nr. 141, MuSofT Bericht Nr. 4, Dortmund ftp://ls10-ftp.cs.uni-dortmund.de/pub/Technische-Berichte/MuSofT-4_SWT-Memo-141.pdf

Messmer, Ruth, & Schmitz, Sigrid (2004). ‘Gender demands on eLearning. ‘ In K. Morgan, C. A. Brebbia, J. Sanchez & A. Voiskuonsky (Eds.), *Human Perspectives in the Internet Society: Culture, Psychology, and Gender*, Vol. 4, (pp. 245–254). Wessex: WIT-Press.

Wiesner-Steiner, Andreas, Wiesner, Heike, Schelhowe, Heidi and Lucht, Petra (2009). ‘The Didactical Agency of Information Communication Technologies for Enhanced Education and Learning‘, in: Tomei (Ed.), *Information Comunication Technologies for Enhanced Education and Learning. Advanced Applications and Developments,* Information Science Reference, Hershey – New York, 59-76