

Personal Smartphones in Primary School: Devices for a PLE?

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Abstract

This paper describes the goals and first results of an ongoing two year case study in a European primary school (5th primary class) where the teacher and all students (n=17) were equipped with a personal smartphone (Apple iPhone 3G). Students are allowed to use phone and internet services at no charge and to take home their smartphones after school. In this project the students have anytime and anywhere access to an internet connected computing device which can be used for reading, writing, calculating, drawing, taking photos, listening or recording audio and communicating. Does this setting help to achieve the goals of the official school curriculum? How do personal smartphones in primary school influence teaching and learning, especially weekly planning ("Wochenplanunterricht") and learning outside school?

The paper describes the planning and introduction phase of the project as well as first best practice examples of using personal smartphones in and out of school after five months of use. We have qualitative data from questionnaires with students and parents and quantitative data of phone and internet use.

To date the results are promising in two ways: They help to formulate specific research questions for further research and they encourage enlarging the case study to several classes in the near future.

1. Introduction

Switzerland is on its way into the information society. In recent years Switzerland was number one worldwide regarding per capita expenditure for ICT (IDA IG, 2008) and in 2009 it was ranked 8th worldwide in the ICT development index of the International Telecommunication Union (ITU, 2009). This high ICT saturation also applies to mobile phones and especially to teenagers and mobile phones. In Switzerland teenage ownership of mobile phones is comparable to its neighbouring country Germany, where 86% of 12/13 year old teenagers own a mobile phone (MPFS, 2008). As in other countries (OECD, 2005) this high overall ICT saturation contrasts with a relatively low use of ICT in Swiss schools. Swiss School ICT administrators mention four main reasons why Swiss teachers do not use ICT in class more often (Barras & Petko, 2007):

- 70.5% mention a lack of competences among teachers to use ICT in class.
- 63.8% say that there are not enough devices available in class for learners.
- 59.3% mention lack of time among teachers to prepare lessons with ICT or exploring the possibilities of the internet for school use.
- 57.5% see a motivational problem among teachers to integrate ICT in class.

So in spite of a high overall ICT saturation in Switzerland the second most mentioned reason for not using ICT in class more often is lack of hardware among learners. This leads to a paradoxical situation: More and more learners in Switzerland own mobile internet-capable multimedia devices, but are not allowed to

bring them to class. In the past two years several Swiss school districts have banned mobile phones from school or are planning to do so.

Because the technological development continues, one can assume that in five years from now 90% of the 12/13-year olds will own smartphones. The pilot project described in this paper has been started to show that there is another way of dealing with smartphones than banning them from school and to gain experience with the learners' personal mobile internet.

2. The idea behind the Goldau iPhone Project

In a two year pilot project all 17 students of a 5th grade class in Goldau received a personal smartphone (Apple iPhone 3G) in fall 2009, which they could take home and use outside of school after an introductory eight week phase. The students are allowed to use phone and internet services free of charge. For at least two years the students have anytime and anywhere a device at their disposal for reading, writing, calculating, drawing, taking pictures, listening to music, recording sound, making phone calls as well as browsing the internet and communication via various channels. While using the device in and out of school, the students shall learn to use the smartphone as part of their personal learning environment. The students have to learn to deal with ubiquitous computing and internet in an emancipated manner.

The project has been initiated by the Institute for Media and School (IMS) at the University of Teacher Education Central Switzerland (PHZ). Devices and communication costs are sponsored by Swisscom, the largest Swiss telecommunication company. It is assured that neither the local school nor parents or students have to pay anything during the two year project period.

Up to now this project seems to be the first long term smartphone project in Europe, where the learners are allowed to take the devices home. The project can be seen in the perspective of Alan Kay as an implementation of his *dynabook* vision of 1972 (Kay, 1972), where he proposed personal internetworked computers for "children of all ages".

3. Preparation phase

Before distributing the smartphones to the students in August 2009 there was a longer preparation phase. After finding a sponsor for the project without obligations for the school, the teacher or the students it was necessary to gain the confidence of the school authorities and the parents involved. The first parent-teacher conference was rather unusual as the class did not yet exist when the conference took place. After the parent-teacher conference the parents were given one week of respite before all the parents agreed with the project. The parents' main concern was envy of siblings and students outside the project. There was not much project-specific teacher preparation as the involved teacher is the local school ICT manager and has worked with the University of Teacher Education Central Switzerland in pedagogical ICT projects for several years. There wasn't much technical preparation either. No special deployment software or internet filtering was installed. The smartphones were set up nearly identical as a private user would initialise them.

4. Introduction phase

The smartphones were distributed in the first week of 5th grade in August 2009. In the first weeks the students were not allowed to take home the smartphones. In the introduction phase emphasis was not on technology but on prevention. The students learned about dangers and behaviour on the internet both from their teacher and external experts. The students developed a written agreement with rules for the use of their smartphones in and out of school (Neff, 2009c). Previous experience shows that students are more rigorous when they have to write their own rules and that compliance is higher compared to teacher-given rules. Before they were allowed to take home the smartphone the students and their parents had to sign the agreement. In the first nine months of the project the compliance to the agreement was very good. After more than six months the students were even able to recall all the points of the agreement by heart. Before letting the students take the smartphones out of school there was another project-specific parent-teacher conference where the parents learned how to use their child's smartphone and how to control the programs installed and the websites visited.

5. Experiences in the first nine months

5.1 Explicit use

The smartphones have been used in various ways in the first nine months of the project. The teacher did not change the timetable, there was no such thing as a school subject "iPhone". But on several occasions the teacher told the students to use the smartphone in class. In most cases the students used the preinstalled generic, not school-specific applications (called apps on the iPhone). Important usage in the first nine months were:

- Search for information on the web, using the web browser or the Wikipedia app.
- Learning words in a foreign language (English, French) with a dedicated app (Neff, 2009a).
- Mental arithmetic training with a dedicated app (Neff, 2009b).
- Look up spelling with a dedicated app.
- Listening comprehension and pronunciation practice in foreign language learning (English, French) with sound files from the official teaching material provided as podcasts by the teacher
- Dictation practice and assessment with sound files recorded by the teacher enhancing equal practice opportunities for students with non German speaking parents (Neff, 2010a)

The smartphone is also used as a personal information manager (PIM):

- Use of a class calendar for birthdays, excursions, assessments etc. The calendar is fed by the teacher and automatically synchronised to all smartphones (Neff, 2009e).
- The smartphone is used as an email client for the official email account all students have.

Besides these common tasks where the teacher encouraged the students to use their smartphone there were also some special projects using the smartphones:

- Plan and produce stop motion films with the smartphone's integrated camera (Neff, 2009d).

- Document the school trip
- Visit at the local art gallery where the students had to take photos of an interesting picture and highlight certain details with an imaging app on the smartphone (Neff 2010b).
- Explaining how to use the iPhone to university lecturers and therefore reversing the teacher student role (Döbeli Honegger, 2010b).

Implicit use

In addition to the teacher initiated uses of the smartphones the students themselves found ways to use the devices for learning purposes in and out of school:

- The integrated camera has turned out to be very important for note taking. Students often take photos of information they need for their work or they have to remember.
- Students found out that they can prove the completion of some tasks by sending a screenshot of the app they used to the teacher.

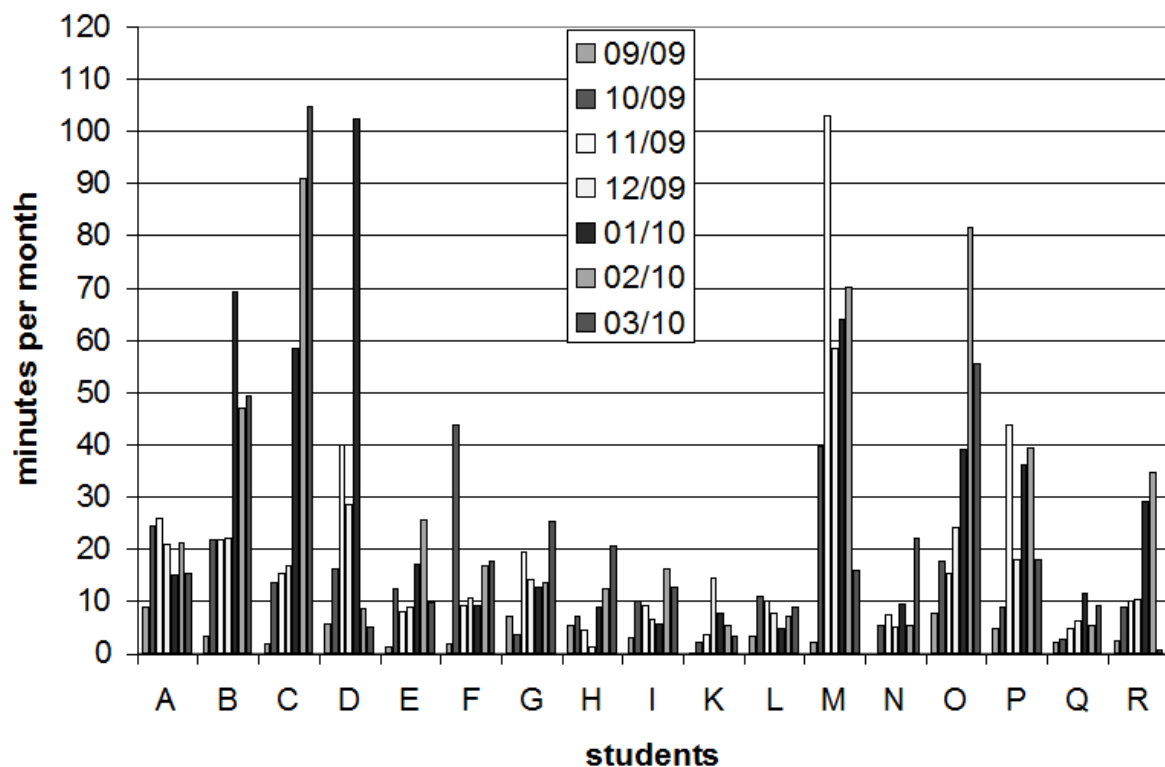


Figure 1: Duration of outgoing phone calls per student and month between September 2009 and March 2010

5.3 Phone calls

From a technological perspective GSM and UMTS connectivity for voice calls and internet is the main new functionality of this smartphone project compared to earlier one-to-one handheld and notebook projects. So an interesting question is how this anytime and anywhere connectivity would be used by the students. Overuse of the phone call functionality resulting in high (virtual) phone bills and escapism was a main concern of opponents of the project. Intermediate results after nine month show that phone calls are not as important as widely assumed. Figure 1 shows the total duration of outgoing phone calls per student in the first seven month of the project. The average is about 20 minutes outgoing calls per student and month.

One fear of critics of the project was phone calls during class. The disturbance from phones ringing during class and students trying to take the phone call or silence the smartphone would distract from learning. The teacher and the students said after the first two months of the project that there were no phone calls during class. Figure 2 proves them right. It shows all 245 outgoing phone calls in October 2009. Each phone call is represented by a circle positioned at the starting time and day of the call (enlarged by factor 10 compared to the time axis). Only one phone call took place during class: 37 seconds on a Friday. The teacher could explain this call: A student got sick and was told to call his parents if somebody was home.

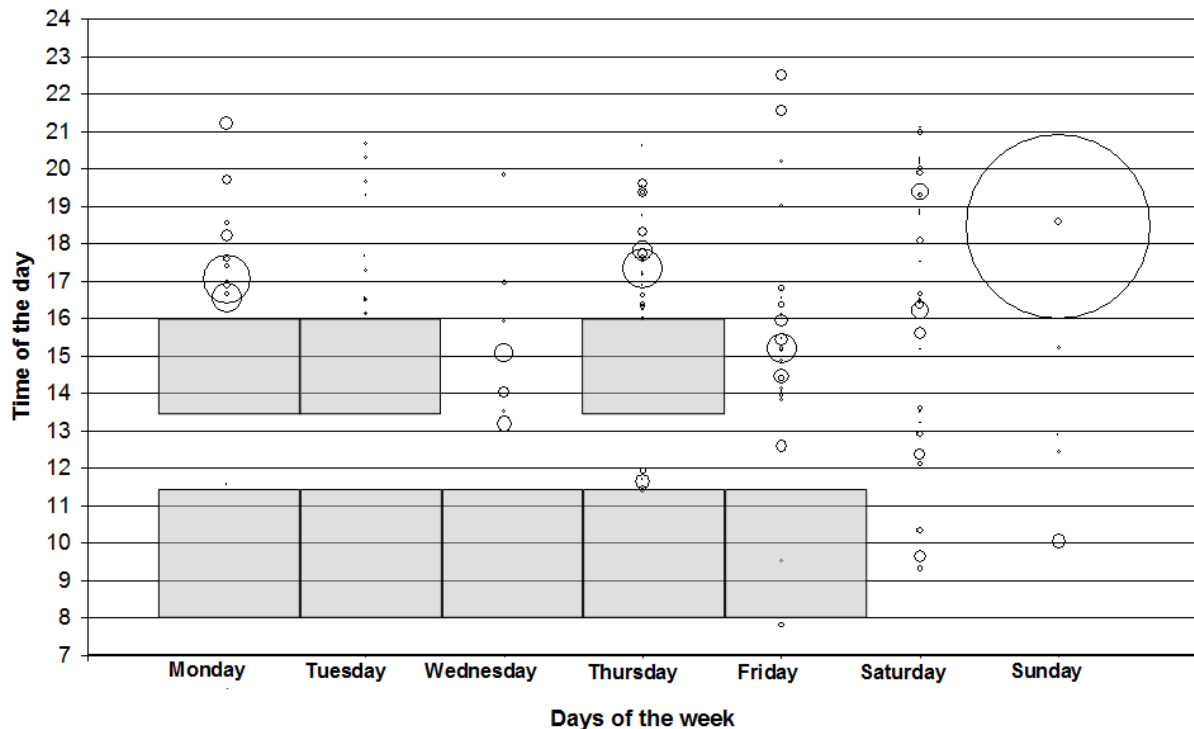


Figure 2: All 245 outgoing phone calls in October 2009 and class schedule plotted on a day/time diagram. For visibility reasons the duration of the phone calls (diameter of the circles) are enlarged by factor 10 compared to the time axis.

An interesting question is who the students call. Figure 3 shows the total duration of outgoing calls between September 2009 and March 2010 and the amount of time used to call other students inside the same class, the teacher and other people. On average the students used 33% of their talking time on the phone to call other students inside the same class. Up to now we do not know which amount of this time is used to discuss school subjects.

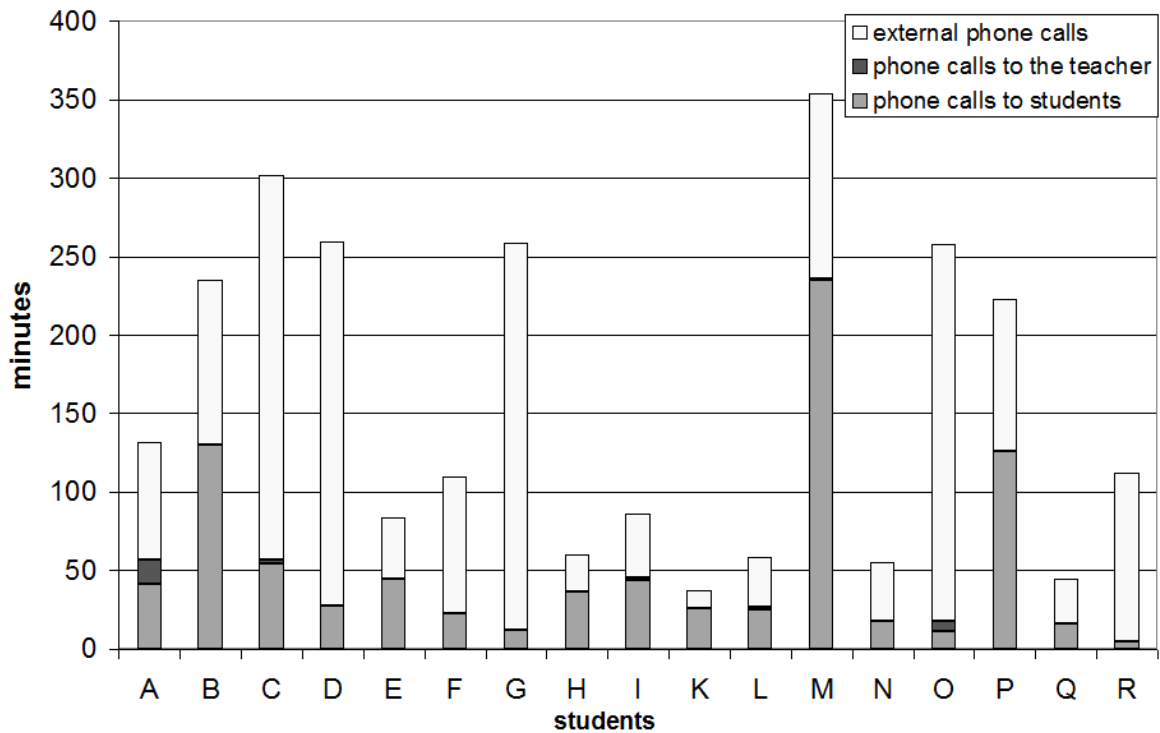


Figure 3: Duration of outgoing phone calls per student and month between September 2009 and March 2010 to other students, the teacher and third parties
 While phone calls are not as important as expected, the mobile internet is heavily used (see Figure 4). Although there is WLAN available inside the school building and 7 out of 17 students have WLAN at home, the amount of data transmitted per student over UMTS is about 300 Mbytes per month. Up to now it is not known where mobile internet is used and what kind of data is transmitted.

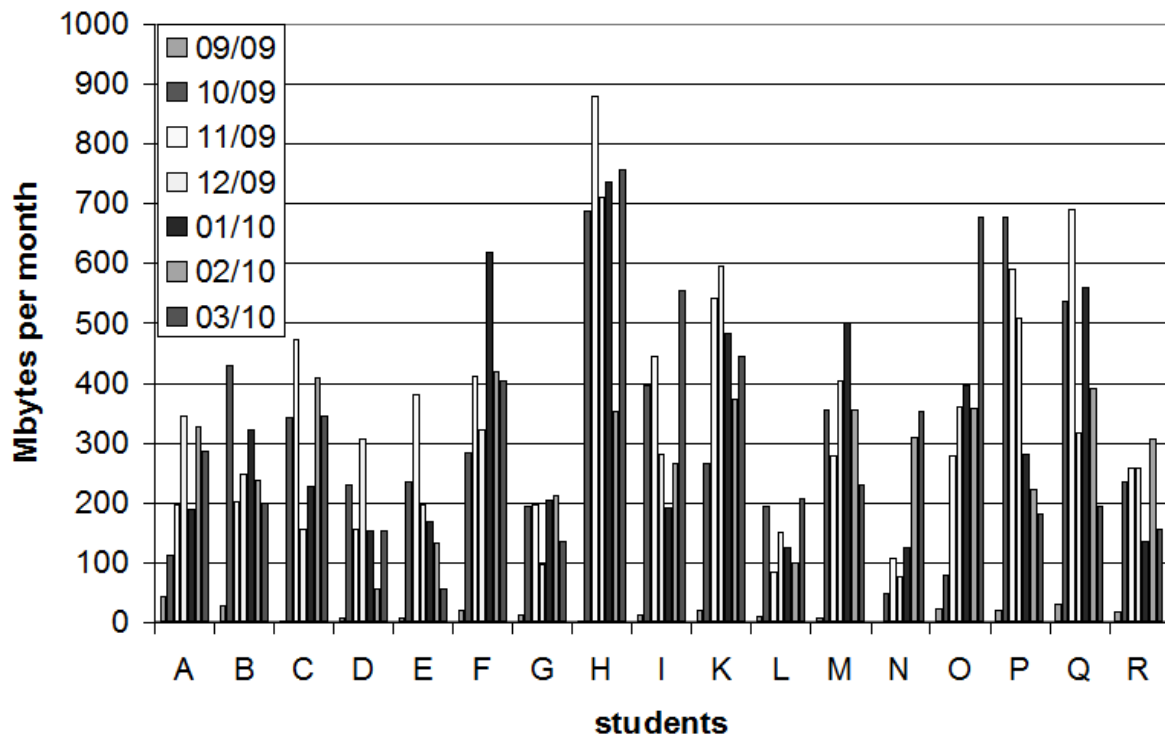


Figure 4: mobile data traffic per student and month

6. Smartphones as part of a PLE?

There are various definitions of the term Personal Learning Environment (PLE) (Döbeli Honegger, 2010a). Some authors define a PLE as the collection of software tools someone uses for learning (Attwell, 2007) while others see a PLE as a combination of only web based social software tools. Schulmeister (2009) on the other hand provides a wide definition of a PLE including non digital artefacts and even non tangible aspects like the personal history and memory of the learner. Common to all definitions of the term PLE is the focus on the learner, his/her activity and the self regulation of the learning process. So the more general question is if personal smartphones support or even foster self-organised learning.



Figure 5: The learning environment of the project class including digital and analogue tools and media

Anderson (2006) points out five advantages of PLEs compared to Learning Management Systems: identity (also outside of school), ease of use (installation and customisation by the user), ownership, social presence, capacity and speed of innovation. In the described project the personal smartphones support all these advantages identified by Anderson:

- Students always have access to their smartphone.
- Students are always connected to the internet and therefore to their colleagues.
- The students' smartphones have no filter or limitations for content.
- Students are allowed to install their own applications on the device.
- Students personalize their smartphone with cases, stickers and personal content (music, pictures etc.)

On the one hand students have to learn when the use of the smartphone helps them with their learning; on the other hand students also have to learn how to deal with

the possible distractions and the potential of addiction of such devices. First observations show that some students are able to find new ways of using the smartphone for learning purposes while other students only use the smartphone for tasks their teacher told them to do. Surprisingly, some students leave their smartphone in school over lunch time, overnight and in rare cases even over the weekend.

7. Outlook

In fall 2010 the students will start using an ePortfolio system called *lerntagebuch.ch*, developed by the Institute for School and Media (Moser & Petko, 2007). This consists of a personal weblog based on the blogging system Wordpress enhanced with school specific privacy settings and features for the teacher to ask questions and give tasks. Its aim is to foster learning strategies by writing about the learning process. This system will also ease the collection of students' thoughts about learning with a smartphone and provide qualitative data for the question posed in the title of this paper.

For 2011 an extension of the project with more classes is planned. It has not yet been decided if more smartphones will be used or if the iPad is an alternative. The research questions will focus on one or more of the following aspects:

- Learner's perspective: Do personal mobile internet devices foster self regulated learning?
- Teacher's perspective: What are best practices for integrating personal mobile internet devices into a teacher oriented education?
- Media pedagogical perspective: Is the integration of personal mobile internet devices in school an effective strategy to help students handle the dangerous aspects of ubiquitous computing?
- Techno-societal perspective: Is a closed system as the Apple iOS-ecosystem suitable for school?

8. References

- Anderson, T. 2006. PLEs versus LMS: Are PLEs ready for Prime time? In: Virtual Canuck – Teaching and Learning in a Net-Centric World, <http://terrya.edublogs.org/2006/01/09/ples-versus-lms-are-ples-ready-for-prime-time/>
- Attwell, G. 2007. Personal Learning Environments – the future of eLearning? *eLearning Papers* Vol 2, Nr. 1. <http://beat.doebe.li/bibliothek/t07223.html>
- Barras J-L, Petko D, School and Internet in Switzerland. Overview and Developments between 2001 and 2007. (In French and German) <http://beat.doebe.li/bibliothek/t07870.html>
- Döbeli Honegger, B. 2009. Wann wird telefoniert? Nicht im Unterricht! German blog posting, <http://www.projektschule-goldau.ch/permalink/757>
- Döbeli Honegger, B. 2010a. Beats Biblionetz: Begriffe: Personal Learning Environment (PLE), <http://beat.doebe.li/bibliothek/w01997.html>

- Döbeli Honegger, B. 2010b iPhone-Weiterbildung für PH-Dozierende, blog posting in German, <http://www.projektschule-goldau.ch/permalink/869>
- Graber, M. (2008) Lerntagebücher, Lernstrategien und Lernerfolg. Eine quasiexperimentelle Studie im Kontext neuer Medien. <http://beat.doebe.li/bibliothek/b04044.html>
- IDA IG, Interdepartementaler Ausschuss Informationsgesellschaft, 2008. Informationsgesellschaft Schweiz in Zahlen. In: Bericht des Interdepartementalen Ausschusses Informationsgesellschaft (IDA IG) für die Jahre 2006 - 2008 zur Umsetzung der Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz. <http://beat.doebe.li/bibliothek/t09186.html>
- ITU, International Telecommunication Union 2009. Measuring the Information Society, The ICT Development Index 2009. <http://beat.doebe.li/bibliothek/b04033.html>
- Kay, A. 1972. A Personal Computer for Children of All Ages. Proceedings of the ACM National Conference, Boston, Aug. 1972 <http://beat.doebe.li/bibliothek/t03304.html>
- MPFS, Medienpädagogischer Forschungsverbund Südwest, 2008. KIM-Studie 2008. <http://beat.doebe.li/bibliothek/b03536.html>
- Moser, T. & Petko, D. 2007, Lerntagebuch.ch, Lernstrategien mit Weblogs fördern. Unterricht konkret 2007 (6), 44. <http://beat.doebe.li/bibliothek/t11725.html>
- Neff, C. 2009a, iMemento – Effektiv lernen mit Karteikarten, blog posting in German, <http://www.projektschule-goldau.ch/permalink/314>
- Neff, C. 2009b, Kopfrechnen – da wird geübt!, blog posting in German, <http://www.projektschule-goldau.ch/permalink/478>
- Neff, C. 2009c, Vertrag – gemeinsam erarbeitet, blog posting in German, <http://www.projektschule-goldau.ch/permalink/624>
- Neff, G. 2009d, iMotion – Trickfilme machen, blog posting in German, <http://www.projektschule-goldau.ch/permalink/736>
- Neff, C. 2009e, Kalender – Agenda für die ganze Klasse, blog posting in German, <http://www.projektschule-goldau.ch/permalink/473>
- Neff, C. 2010a, Diktat ohne Stress, blog posting in German, <http://www.projektschule-goldau.ch/permalink/857>
- Neff, G. 2010b, Kunst mit iPhone, blog posting in German, <http://www.projektschule-goldau.ch/permalink/978>
- OECD (Ed.) 2005. Are students ready for a technology-rich world? – What PISA Studies Tell us (Chapter 3, Table 3.1, p. 37). Paris: OECD. <http://beat.doebe.li/bibliothek/b02556.html>
- Schulmeister (2009) PLE zwischen Alltäglichem und Besonderem – Was konstituiert eigentlich eine LERNumgebung? Invited presentation at the conference Personal Learning Environments in der Schule, Goldau, 2009 <http://beat.doebe.li/bibliothek/t09401.html>