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ICT in Initial Teacher Training

Austria

Country report

Use of Information and Communication Technology in Initial Teacher Training

Case studies on the frameworks, the requirements and the
ways
of preparing student teachers in their ICT enhanced subject
teaching

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ICT Use in Initial Teacher Training
Country Report Austria
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1 Introduction

1.1. Context of the study

During the last decade many countries of the Organisation for Economic Co-operation and Development (OECD) have heavily invested in the implementation of information and communication technologies (ICT) in the educational sector. However, since 2007 the OECD's New Millennium Learners Project¹ has become aware of the increasing gap between the current use of technologies for teaching and learning in schools and the daily experiences that pupils have with technologies outside of school.

The forthcoming OECD study on "ICT Use in Initial Teacher Training" deals with the following questions: How are student teachers being prepared to use ICT in their future classrooms.? How can teacher training institutes better prepare their student teachers in the effective use of ICT in their subject teaching? What measures and activities are necessary at institutional or national educational policy levels?

The country report for Austria is part of the full OECD study report on "ICT Use in Initial Teacher Training," co-sponsored by the Swedish Knowledge Foundation² and carried out by the Centre for Educational Innovation and Research (CERI)³ in 2009. The comparative study aims at shedding light on how the teacher education institutions (in Austria: university colleges for teacher education and universities) prepare their student teachers in technology enhanced teaching. Participating countries in the study are: Austria, Chile, Denmark, Finland, France, the Netherlands, Norway, Sweden and the United Kingdom.

This country report should contribute the following to the general objectives of the study.

- Firstly it aims at providing a detailed picture of how technology is used in initial teacher training, from a comparative perspective, paying particular attention to the regulatory frameworks, the identification of best practices, but also to the reasons that can potentially explain why the use of technology is low in regular teacher training institutions.
- Secondly, it will analyse the practical views of the main stakeholders (teacher trainers, managers of teacher training institutions, policy makers, teacher unions, and student teachers) regarding the present use of technology in initial teacher training and their expectations for the future.
- Thirdly, it will issue a number of policy recommendations for teacher training institutions and government in this domain (OECD, 2009a: 2). The present report describes the outcomes of the Austrian case studies, highlights ways of competence building by extra curricular courses and specific institutional support, exemplifies practices of innovative teaching projects, and summarizes the opinions of Austrian stakeholders regarding the challenges with ICT use in initial teacher training.

The stakeholder opinions for the Austrian country report are derived from four case studies illustrating the problems and challenges in preparing student teachers for ICT enhanced teaching. The participating four Austrian teacher training institutions are located in different parts of Austria and represent different routes into teacher training. The following institutions participated in the study:

- The University College of Teacher Education Lower Austria (Case A)
- The University College of Teacher Education Vienna (Case B)
- The University of Salzburg (Case C)
- The University of Innsbruck (Case D)

¹ New Millennium Learners Project: http://www.oecd.org/document/10/0,3343,en_2649_35845581_38358154_1_1_1_1,00.html

² <http://www.kks.se>

³ http://www.oecd.org/document/13/0,3343,en_2649_35845581_41676365_1_1_1_1,00.html

New Millennium Learners Project: http://www.oecd.org/document/10/0,3343,en_2649_35845581_38358154_1_1_1_1,00.html
TALIS: http://www.oecd.org/document/0/0,3343,en_2649_39263231_38052160_1_1_1_1,00.html

Between October and December 2009 interviews were held with different stakeholders in the teacher training institutions regarding ICT use such as the student teachers, the teachers, the mentors, the deans and vice presidents for teaching and instruction at universities, the managers of IT-service centres and of centres for media education, and other pedagogical experts working in the field of initial teacher training.

One additional objective of the study was to research on subject-specific use of ICT in initial teacher training. Attention was paid to ICT integration in the following school subjects:

- Natural sciences (physics, geography, biology, computer science),
- Languages (English, Romanistic languages),
- Humanities (history, religion, psychology, arts etc.),

as taught in primary school, general secondary school, new middle school and academic secondary school.

1.2. Objectives

The Austrian country report addresses the following research questions which are tackled in the full OECD Report (2009a: 1):

1. *What are the national frameworks and requirements regarding the use of ICT in initial teacher training in teacher training institutions in OECD countries?*
2. *What are the institutional frameworks and requirements regarding the use of ICT in initial teacher training in teacher training institutions in OECD countries?*
3. *To what extent and in what ways is technology used in teacher training institutions in OECD countries?*
4. *In what ways are student teachers prepared to integrate technology in teaching in teacher training institutions in OECD countries?*
5. *If student teachers are not satisfactorily prepared, what are the main obstacles according to the stakeholders?*
6. *How is policy evaluated?*
7. *Does practice correspond to policy?*

Chapter two presents methodological aspects of the project such as the study methods, the criteria for the selection of case studies, and some basic terms used in the study.

Chapter three deals with the Austrian national framework influencing the work of the initial teacher training institutions, for example, the latest institutional reform of teacher education institutions for the Bologna Process, the demographic development of the teacher workforce, the national ICT policies and support activities in ICT techno-pedagogical competence building.

Chapter four describes the individual case studies,

- firstly addressing the *framework conditions* of the participating university colleges for teacher education and universities: the characteristics of the organisation and its study programme, the role of ICT in institutional policies, the ICT infrastructure and technical and didactical support, the requirements related to techno-pedagogical competences, and best practice examples in ICT enhanced teaching and,
- secondly, presenting *the opinions of the various stakeholders* involved: opinions about the relevance of ICT integration into subject specific teaching, observations of the current extent and ways of how ICT is (or should be) used in the teacher training institution and in field placements, and insights into factors hindering or enabling more ICT use in subject specific teacher training in the future.

Chapter five analyses the findings of the case studies transversally and identifies similarities or differences.

Chapter six summarises the current situation and perceived barriers, and formulates implications for possible future activities at personal, institutional and policy levels.

1.3. Acknowledgements

Salzburg Research would like to thank all participants of the case studies for dedicating their precious time to the focus groups, to individual face-to-face or phone interviews, and for having filled in the questionnaires and discussing the issues with the author.

The study could only be done with the encouraging commitment and support of the Deans of the Faculties, the managers of the IT-centres or the centres for media education, and all pedagogical experts in educational research and teacher training participating in interviews and discussions.

Finally, we would like to thank the OECD/CERI study team of the New Millennium Learners Project for the excellent co-operation and the Austrian Federal Ministry for Education, Arts and Culture for funding the study work.

2 Methodology

2.1. *Methods used in the study*

In order to find answers to the research questions (see section 1.2 above), the Austrian study uses an approach that combines the following methods and resources:

- 1) Desk research methods: website analysis and screening of relevant documents (e.g. national and institution policy and strategy documents).
- 2) Qualitative user research methods: structured interviews and focus groups; details on these methods are given in the section below.
- 3) Statistical data: Because of the tight work plan of the study, a quantitative survey on the ICT infrastructure and extent of ICT use as foreseen in the OECD study design (2009 revised version) could not be carried through. But relevant quantitative data are drawn from official national statistics, additional survey data of the Federal Ministry for Education, Arts and Culture and, in particular, a survey by the E-learning Steering Group that examined the e-learning infrastructure of all fourteen Austrian university colleges in 2008 (E-Learning Steuergruppe der Pädagogischen Hochschulen Österreich, 2008).

2.2. *Selection criteria and involvement of study cases*

In sampling and selecting relevant institutions and stakeholders of the Austrian teacher training institutions for the case studies, the author followed the recommendations of the OECD study guidelines (2009b:1) to include:

- Teacher training institutions which are publicly recognised as advanced or innovative for the use they make of technology for teaching and learning purposes in initial teacher training programmes.
- Teacher training institutions which are publicly recognised as quality providers of initial teacher training, irrespective of their use of technology.

The selected teacher training institutions, 2 universities and 2 university colleges of teacher education, are:

Overview on cases	Websites of teacher training institutes
Case A: University College of Teacher Education Lower Austria	http://www.ph-noe.ac.at/willkommen.html
Case B: University College of Teacher Education Vienna	http://www.phwien.ac.at/
Case C: University of Salzburg	http://www.uni-salzburg.at
Case D: University of Innsbruck	http://www.uibk.ac.at/index.html

A first selection criterion was that, because of the two main routes to a teacher certificate in Austria, universities and university colleges had to be included (details on the two routes are given in section 3.2 below). Their participation in the case study should allow for describing existing different ways of preparing student teachers in ICT use for teaching also taking into account subject specific didactics. Furthermore, the participating institutions have different forms of field placement which may affect the preparation for and, possibly, ensuing use of ICT in teaching.

Next, the general level of ICT use was considered, for example, all selected institutions have a longstanding tradition in using ICT for administrative purposes and for e-learning in general. Furthermore, they have participated in relevant European projects and/or won Austrian awards for educational e-content production (e.g. Lörnie Awards, Case A) or institutional teaching concepts (e.g. Medida Prix, Case C).

What concerns ICT techno-pedagogical competences, for example, Case A is the only teacher training institution that at present requires compulsory courses on pedagogical ICT competences, and has also introduced innovative elements such as e-portfolio work beyond pilot projects.

The institutions B, C and D introduced courses in techno-pedagogical competence building on a voluntary basis. In addition there are some compulsory elements, such as Case B requiring student teachers to create a “Teaching Portfolio” which should include a software evaluation and reflection on ICT enhanced teaching experiences.

The table below summarises important ICT use / e-learning characteristics of the four selected cases:

<i>ICT use / E-learning characteristics</i>	<i>University College Lower Austria</i>	<i>University College Vienna</i>	<i>University of Salzburg</i>	<i>University of Innsbruck</i>
	CASE A	CASE B	CASE C	CASE D
Teacher students enrolled 2009/2010*	400	1900	1.600	1.320
First year students 2009/2010	150	no information.	450	290
Existence of ICT support centres	x	x	x	x
Regular administrative ICT support	x	x	x	x
Regular didactical ICT support (on demand)	x	x	x	x
Obligatory curricular integration of techno-pedagogical competence building	x			
Non-obligatory curricular integration of techno-pedagogical competence building (optional courses with certificate)	x	x	x	x
Alternative assessment and online Feedback (e.g. E-Portfolios)	x			
Alternative assessment (e.g. paper based portfolio for teacher students)				x
ICT policies and e-learning strategy published online	x	x	x	x

Table: Characteristics of institutions covered by case studies (by author); *figures given by interview partners or press statements; Figures only are indicative: due to different structures it is not possible to compare the figures from Cases A and B and Cases C and D.

Number and type of interviews

In autumn 2009 a total of forty-eight participants took part in focus groups and individual interviews. In all cases the Dean of Teaching (4), the Head of Department IT support services (4), the Head of Media Education Support Centres (4), and two pedagogical co-ordinators for ICT in initial teaching studies (Case C and Case D) were personally interviewed (30-50 minutes; skype recording).

At the institutions focus groups were organised:

- School subject related teacher focus groups in Cases A, B, C and D (natural science, language, humanities); in case B also EPICT mentors took part;
- Student teacher focus groups in Case A and Case B (first year students and final year students).

All institutions also filled in written questionnaires concerning their ICT infrastructure.

Gender distribution of participants

The study aimed at a good balance of women and men among participants that, however, could only to a very limited degree be controlled by the author, e.g. the focus group participants were brought together by the institutions themselves. The distribution of participants here was some 55% female and 45% male with regard to the interviews, in Case B and Case D the dean and vice presidents for teaching are female; the media education support centre in Case D is managed by a woman; all other IT service support centres are managed by male informatics experts.

Themes for the focus groups

The themes for the focus groups have been based on the questionnaires prepared by the OECD study group team (see Annex).

2.3. *Definition of terms*

The OECD study guidelines propose some important terms (OECD, 2009b) which we reproduce here, some with additional comments:

- *Information and communication technology (ICT)*: Contemporary information and communication technology, e.g. computers and different kinds of software, mobile phones, digital cameras, learning management systems (LMS) etc.

Comments: The OECD uses a broad perspective on what can be understood as “information and communication technology” or “technology integration” in education. In the Austrian case studies, attention was given to the fact that in the German language the terms “technology”, “tool” and “media” are sometimes used in the same context but with different meanings. Especially the term “media” must be used with care as it can mean almost anything useful in teaching (e.g. including simple means such as paper and pencil, presentation slides, working sheets, etc.). Therefore, throughout the study the term “information and communication technology” is used as suggested above but with a wider range of technologies including, but not limited to, networking facilities (e.g. LAN, WLAN), internet technologies and applications, including novel Web 2.0 platforms and services, content and learning management systems, e-learning/teaching environments, any fixed or mobile presentation and/or interaction devices.

- *Techno-pedagogical competence*: Competence to use technology for pedagogical reasons; competence to integrate technology in teaching.

Comments: In the Austrian e-learning discourse the ability to use ICT in a pedagogical/didactical setting is also often described as “media pedagogical competence” or “media didactical competence”.

- *Student teacher*: Person studying to become a certified teacher.
- *Field placements*: Where the student teachers do their practical work in classrooms, both for short periods during courses and for longer periods, before earning their degrees as long as they do not work independently.
- *E-tutor*: Person assisting teaching staff (e.g. professor) in handling the learning management platform.
- *IT service centre*: A department which is responsible for hosting and managing the technical IT infrastructure and networks of the teacher training institutions, also the internet infrastructure (e.g. administration of software/mail accounts of students, online administration systems, server of homepage, W-LAN; installation of university wide used content management systems).
- *Media education centre*: A department which is responsible for the administration of the learning management system(s) of the institution and for providing technical and didactical support in handling diverse applications (e.g. video conferencing systems), in producing multimedia content (e.g. videos) and in designing pedagogical e-learning settings (e.g. Weblogs, WIKIS). *Mentor or mentor teacher*: Mentors who are experienced teachers should supervise student teachers in their field practice.

Comments: The supervision of ICT use is but one of several tasks a mentor has (OECD Study group meeting, 12/2009). In Austria we also interviewed “EPICT mentors” who supervise students or colleagues in their ICT practise as required by the “European Pedagogical ICT Training Programme” (EPICT).

3 National Framework of Initial Teacher Training

This chapter points out characteristics of the national framework influencing the development of initial teacher training in Austria. The overview covers in brief:

- the basic institutional structure and reform for the Bologna Process,
- the different routes to a teaching certificate,
- the demographic development of teachers and students,
- the national ICT policies and future e-learning strategy,
- the capacity building in techno-pedagogical competence.

3.1. *Institutional structure and reform related to the Bologna Process*

Teacher education curricula in Austria are offered by universities and university colleges and the chosen route to a teaching certificate determines the possible future employment positions of a student (see section below). At present there are nine public and five private university colleges of teacher education and at eight universities and six universities of arts (located in all federal states).⁴

The most important structural change in the institutional structure of teacher education and training has been the recent formation of the university colleges (Mitterauer et.al, 2008): Based on the Federal Act on the Organisation of University Colleges of Teacher Education (Hochschulgesetz 2005, passed 2006), fifty-one teacher education and training institutions (pedagogical academies and institutes) were transformed into fourteen university colleges of teacher education (Pädagogische Hochschulen).

Before teacher education and continuing teacher training was offered by the Pädagogische Akademien, in-service and further training by the Pädagogische Institute. All these types of education and training are now concentrated at the university colleges of teacher education. In the spirit of the Bologna Process, the teacher education was upgraded to an academic level to be completed with the internationally recognised degree of Bachelor of Education.

At the universities the Bologna process can be called “work in progress”. University Law currently does not allow to change the “old” type of Diploma Degree Programme for Teaching into BA/MA (which is structured in two phases with a minimum duration of nine semester terms) until 2010. The study programme is a combination of two school subjects combining scientific education, general pedagogy subject, specific didactics, and field placement. After the graduation (Magister) student teachers have to pass a full year of practise in school organised by the federal school authorities⁵.

The transformation of “Diploma Degree Programmes” to “Bachelor Degree Programmes” is being worked on, but because of still in force administrative regulations (e.g. curricular commissions) this will take some more time (estimated by interview partners at until the year 2013).

3.2. *Different routes to a teaching certificate*

Students can choose between two different routes for becoming a teacher and the selection determines the possible future employment positions.

University College of Teacher Education

The university colleges of teacher education (Pädagogische Hochschule) are administered and funded by the Federal Ministry for Education, Arts and Culture. A university college offers study programmes leading to a certificate for teaching at primary schools (Volksschulen), lower secondary schools (Hauptschulen), special schools (Sonderschulen) and at pre-vocational schools (Polytechnische Schulen). Additionally it offers study programmes for acquiring teaching certificates at technical and vocational schools.

⁴ An overview is provided at <http://www.wegweiser.ac.at/studieren/?kat=10>

⁵ More information can be found at <http://www.uibk.ac.at/studienabteilung/de/glossar.html#Lehramt>

The study is divided into two phases: the first, introductory phase has two semester terms (60 ECTS), the second phase requires four semester terms (120 ECTS). Field placements are organised by the university college at nearby “Praxisschulen” (practise schools), typically located at the university college facilities. The placements are conducted in regular intervals from the first term onwards, duration from one week to three months, and count for 36 ECTS (see for example Case B⁶). The final assessment in the course of study is a Bachelor degree thesis. The students acquire a Bachelor of Education.

Traditional universities and university of arts

Traditional universities and university of arts have an autonomous status and they emphasise that their teacher education programmes are based in academic research in the subjects and subject-related didactics. The universities offer subject specific “Diploma Degree Programmes for Teaching Profession” (so-called “Lehramtsstudien”). They lead to a teaching certificate for academic secondary school or upper level type gymnasium, upper-level secondary technical and vocational college and Kindergarten Teacher College.

In order to receive the professional entitlement, student teachers need to successfully pass a full year of field placement (“Schulpraxisjahr”). The field placement is organised by the federal authority (“Landes-schulrat”) and starts rather late in the last terms of the study or after graduation. Before this period the students have only limited possibilities for acquiring practice in teaching.

3.3. Demographic development of teachers and students

Current statistics provide the following figures on the situation of teachers and student teachers in Austria for 2008/2009:⁷

	Teachers compulsory education (trained at university colleges)	Teachers in vocational training and social academies (trained at university colleges)	Teachers in AHS/BMS/BHS (trained at universities)	Total
Number of teacher training institutions	14		14	28
Number of teachers employed	71.514	9.112	42.522	123.148
Number of student teachers:				
Total student teachers in Austria 2008/2009	7.928 (6.297female / 1.631 male)		12.569 (8.226 female/ 4.343male)	20.497
First year students 2008/2009	2502		Not available.	-
Graduates 2006/2007	1650 Bachelor of Education (min. 3 years; 6 semester)		793 (218 male students) (Magister; Diplom Degree Study)	2443

Table: Number of teacher and teacher students in Austria for year 2008/2009. Source: Statistik Austria; online at http://www.statistik.at/web_de/statistiken/bildung_und_kultur/formales_bildungswesen/lehrpersonen/index.html

In 2008/2009, 20.497 students were enrolled in study programmes for teaching profession and some 2.502 are first year students at university colleges the majority being female (1959 female, 506 male). In 2006/2007, 1650 students graduated from university colleges. In the near future, teacher training in Austria will have to face a new situation because there will be a huge wave of retirement of teachers during 2012-2025. Almost 50% of the total number of employed teachers will retire during the next 15 years (approx-

⁶ See study programme overview and modules of the PH Vienna at:

http://www.phwien.ac.at/fileadmin/phvie/users/45/PDF/phw_press20090318_pflichtschulen.pdf

⁷ Sources: Bildung in Zahlen

http://www.statistik.at/web_de/dynamic/statistiken/bildung_und_kultur/publdetail?id=5&listid=5&detail=508 and

<http://www.bmukk.gv.at/schulen/lehr/labneu/fakten.xml>; Datawarehouse Hochschulbereich des Bundesministeriums für Wissenschaft und Forschung; http://eportal.bmbwk.gv.at/portal/page?_pageid=93,95229&_dad=portal&_schema=PORTAL&

mately 59.000 teachers). Because of this development the rate of enrolment of student teachers is steadily increasing.⁸

This unprecedented increase of students will challenge the ICT infrastructure provided for by teacher education institutions and it will also affect the required funding for additional personnel needed for ICT support (e.g. technical and pedagogical services; courses in media pedagogy). Moreover, in order to cope with the shortage of teachers and meet the rising demand in young teachers, teacher training institutes will not be able to follow a very restrictive “acquisition policy” of first-year students (e.g. impose entrance barriers with regard to initial ICT skills or media competence).

3.4. National ICT policies and future e-learning strategy

A: ICT policies by the Ministry for Education, Arts and Culture:

ICT infrastructure, software services and e-content pool

In the first phase of e-learning in Austrian schools (late 1990s) the Ministry for Education, Arts and Culture facilitated the purchase of technical infrastructure and related hard- and software equipment (e.g. provision of IT rooms in schools, notebook classes).

The next phase was characterised by funding the production of e-content for teaching and learning. A wide range of educational e-content development projects and databases were funded. Austrian schools and teachers now benefit from a vast pool of commercial and freely accessible material on central platforms (e.g. www.bildung.at or www.sbx.at) and platforms of regional e-learning content initiatives.

Furthermore, the Ministry for Education, Arts and Culture supported the installation and service of the open source learning management platform “Moodle” (BMUKK, 2009⁹) and, recently, funded the purchase of interactive whiteboards and supported accompanying research on related school pilots (Hilzensauer / Wieden-Bischof, 2009).

Networking and collaboration among e-learning lead users

For many years the Ministry of Education, Arts and Culture has supported networking and collaborative activities among the e-learning lead user, for example,

- eLSA – e-Learning in daily school practise: 135 schools focusing on e-learning in general and secondary school; the network awards certificates for innovative and regular use of ICT in schools (eLSA school, eLSA advanced schools)¹⁰;
- Network for innovative eLearning schools (vocational education): 24 schools offering e-learning activities for vocational and academic secondary schools all over Austria¹¹;
- ENIS – European Network of Innovative Schools: ENIS Austria encompasses 40 schools with intensive e-learning activities. They are part of the international ENIS network¹².

Competitions in IT and creative media production

A number of competitions are held during the school year motivating students and teachers to use ICT in a creative context (e.g. School Homepage Award, Löرنie Award for teaching material, Netdays Austria – Young Creativity Award, Cyberschool, Jugend Informatik Wettbewerb (JIW) of the Österreichische Computer Gesellschaft (OCG), Computer Contest Austria & Alpe Adria und Podcast Award International, eT-winning-Preis Österreich, national eTwinning-Qualitätssiegel, Show IT, Media Literacy Award.¹³

The Futur(e)Learning Strategy”

In 2007 the IT Steering Group of the Federal Ministry for Education, Arts and Culture formulated a “Futur(e)Learning Strategy” covering a wide range of e-learning stakeholders in Austria. For the lead users

⁸ http://www.bmukk.gv.at/schulen/bw/ueberblick/phstat_studart_0809.xml

⁹ <http://www.bmukk.gv.at/schulen/futurelearning/itdienstleistungen.xml>

¹⁰ http://www.bmukk.gv.at/schulen/it/ikt_projekte/elsa.xml

¹¹ http://www.bmukk.gv.at/schulen/futurelearning/nll_netzwerk.xml

¹² http://www.bmukk.gv.at/schulen/futurelearning/nll_enis.xml

¹³ A more detailed overview is available at <http://www.bmukk.gv.at/schulen/futurelearning/wettbewerbe.xml>

among them it provides orientation on the future role of ICT in learning and education. It sketches a set of activities which will be supported by the ministry in the future leading to sustainable and continuous use of ICT in Austrian schools and training institutes. The strategy concentrates on three issues:

- Focus 1: Support of new forms of learning by central services
- Focus 2: Modern teacher training at all levels
- Focus 3: Development of innovative pilot projects testing new IT tools and developments in practise

The strategy takes account of the changing world of e-learning induced by new developments of the internet, such as the Web 2.0 applications, allowing not only to read, but also to easily create (and more easily share) online teaching material will change the role of teachers. Also will the intensive use of social networking and communication beyond classrooms influence the teaching process? One keyword in the Future(e)learning strategy is “e-individualisation”, described as “individualised, personalised learning in heterogeneous learning groups with the support of ICT” (Schrack/Narosy, 2009; Dorninger/Schrack, 2008).

Extract from the FutureLearning strategy paper (October 2007)

New forms of learning and new learning arrangement

FutureLearning is deals with new forms of learning and learning arrangements which move into another direction, away from a classical frontal education situations. By using non directive learning arrangement it should be possible to gain results from group-, partner, or single works. Those results are then structured to build a new learning environment (..).

Teachers training

New concepts for teachers training like a didactic, online-academy, eBuddy/eTutor concept, real time platforms (like Macromedia Breeze) or development processes of the teaching staff has to be renewed and developed. In this area there already exists a lot of experience. A close co-operation with the pedagogical university is necessary; especially if there are classes with ECTS (European Credit Transfer System) points (e.g. the class “new media in education/eLearning”). It is planned to increase the European approach “EP ICT” (European pedagogical ICT licence) drastically. Also it is necessary to increase the usage of other forms material developed by public administration in schools (e.g. Museum online or co-operations with the Federal Chancellor, development of learning material -E-Government practically).

Here the target is to offer nation-wide online-courses for teacher training and knowledge management systems for teachers. A good example (for a working system) is the eLISA academy. A second aim is the development of a good eLearning didactic which makes it possible to use content and learning platform efficiently in education and afternoon mentoring. Successful didactical classes should be performed as classes with a certificate (..).

Educational offers for employed persons It is the target to equip, if possible, all approx. 30 locations of schools and departments for employed persons with pedagogic and technical fittings in order to offer studies under gentle social requirements (e.g. not more than three evenings attendance at the school location, personal coaching, teaching monitoring, preparation for exams etc.). Within the scope of the focus of the bmukk (“education for employed persons”) and supported by the European social fund educational offers will be continuously extended.

(Source: Federal Ministry of Education, Arts and Culture (2007). FutureLearning – the successful next development of the eFit initiative. IT-Steering Group, short description 2, translated by B. Rasz, http://www.bmukk.gv.at/medienpool/17141/konzept_en_kurz.pdf).

B. The policies for ICT in universities and teacher education by the Austrian Federal Ministry of Science and Research:

Since March 2007 Austria has a Ministry for Science and Research. Before that the ICT/e-learning strategies and activities of the universities were coordinated in the former joint “Bundesministerin für Bildung, Wissenschaft und Kultur”. In the years 2000-2003 an initiative was started, called “New Media in Teaching at universities and applied universities” („Neue Medien in der Lehre an Universitäten und Fachhochschulen“). This programme funded the co-operation of all Austrian universities in an association, called “Forum Neue Medien Austria”. At present the network of the association encompasses 21 Austrian universities and 16 applied universities. This association has been working on general ICT policies and e-

learning issues, especially issues of quality management, legal questions in e-learning, eLearning and career development and e-content development (see documentations at: <http://www.fnm-austria.at>). In 2005 the ministry developed a framework paper for an e-learning strategy and funded projects of universities which aimed at developing their individual institutional “e-Learning/e-Teaching strategy”, nine universities and a cluster of applied universities used this opportunity for strategic development.¹⁴

In 2002 the Austrian universities became more autonomous and were obliged to implement the Bologna Process (Universities Act). Therefore e-learning policies are not co-ordinated by the Federal Ministry of Science and Research and no national ICT policy specifically targeting the Diploma Programmes for Teacher Professions can be observed.

C. Recent National ICT Policy development – “Internet Declaration”:

In February 2010, the Austrian national government issued the “Internet Declaration”¹⁵, a document describing the most important issues in the field of ICT and internet influencing the Austrian economy, society, culture and education in the near future. The report is the result of an open discussion process among different stakeholders (e.g. Austrian ICT companies, research organisations, social policy institutions etc.). The Internet Declaration summarises ideas promoting the use of ICTs and internet and aims to improve the Austrian position in the international ICT rankings (Rundfunk und Telekom Regulierungs-GmbH, 2010:25).

Education is also targeted (see chapter 8.1. and 9.1. Lebensbereich „Bildung und Generationen“) and the presented ideas deal with improving Austria’s position in e-literacy, safe ICT use by the young generation, open access to e-content, teacher training, e-inclusion and ICT applications for learning (ibid 2010:82). As regards ICT for initial teacher training, the Declaration recommends the introduction of a minimum standard of ICT infrastructure for all teacher training institutions and to improve the didactical use of ICT in teacher training, for example, through e-coaches for teachers, e-schools for professional teacher training, introduction of e-didactics as obligatory course in initial teacher training, novel e-learning software.

3.5. Capacity building in techno-pedagogical competence

Initial ICT skills and media competences of students

The Austrian teacher training institutions, universities and university colleges, do not require any certificate or entrance exam on technical ICT skills (e.g. European Computer Driving Licence), rather, the expectation is that today’s student generation on average have rather good technical ICT skills (although, teacher trainers sometimes perceive that this is not necessarily the case).

In 2001 the Federal Ministry for Education, Arts and Culture issued a directive on “media education” as integrative principle in teaching to be followed by school teachers.¹⁶ The directive focuses on the development of active and critical media competences of students. The directive defines “media education” as an integrative principle, which means that it is not a separate subject; rather each teacher is asked to consider the need of developing media competence in his/her subjects. It is also understood that project-based teaching and learning is particularly appropriate for implementing the principle. The directive of course mentions the increasing importance of new media and the internet in society. Indeed, the perceived need to prepare students for this development has been one of the motivations of the directive. But its intention is not to provide guidelines on how to use ICT in teaching.¹⁷

The European Pedagogical ICT Licence in Austria

The European Pedagogical ICT Licence (EPICT) has been developed in order to introduce a Europe-wide quality standard for the pedagogical integration of information, media and communication technologies in education (www.epict.org).

¹⁴ <http://www.fnm-austria.at/projekte/fnmstrategieprojekt/strategie/Dateiablage/view/StrategieDezember2006.pdf>

¹⁵ <http://www.internetoffensive.at/index.php?id=1343>

¹⁶ <http://www.bmukk.gv.at/medienpool/5796/medienerziehung.pdf>

¹⁷ Erlass des Bundesministeriums für Bildung, Wissenschaft und Kultur GZ 48.223/14 -Präs.10/01, Rundschreiben Nr.64/01, 2001.

From 2006 to 2007 an Austrian “EPICT Feasibility-Project”, initiated by the Federal Ministry for Education, Arts and Culture, piloted, tested and evaluated the course concept, modules and content with regard to their fit with the Austrian needs in ICT-related teacher training (www.epict.at). After the successful evaluation of a number of pilots, in 2008 the “EPICT Implementation-Project” started an initial offer of EPICT courses at fourteen university colleges with about 200 participants (3/4 professional teachers, 1/4 student teachers). In 2009 all university colleges had a minimum two EPICT co-ordinators at the institution.¹⁸

Until end of 2010 the rather ambitious target of the project coordinator are 2000 participants, 500 of which student teachers. A full rollout of EPICT licences to all teachers and students of the Austrian teacher training institutions would require the establishment of a national agency that takes care of standards, service provision and quality control. Also the capacity building of EPICT mentors would require considerable further investment (e.g. mentor fees per student).¹⁹

A recent communication of the Austrian Federal Ministry of Education, Arts and Culture to the university colleges addressed focus areas of further education and training from 2010 to 2013 (BMUKK 2009). The communication defines “pedagogical, didactical use of IT (especially EPICT)” as one of several “innovative, integrative principles”. Taking account of the principle will be demanded in all areas of further education and training and supported by specific initiatives.

In the communication, it is also mentioned that schools such as the eLSA (eLearning im Schulalltag) and eLearning Cluster schools (together some 270 schools) have been prime targets of EPICT courses. Also all “Neue Mittelschulen” (67 in the first wave started in the school year 2008/2009, 177 more in the second wave 2009/2010) have been offered the opportunity to implement EPICT courses. The recently started “eLSA-advanced” project, involving eleven secondary academic schools, has among its goals that such a school has EPICT certified teachers, trains at least one EPICT team per school year, and aims at having 50% of all teachers EPICT certified.

How does EPICT work?

The European Pedagogical ICT Licence can be acquired after successful completion of a minimum of eight modules of which four are compulsory and four can be chosen out of ten optional modules. The obligatory modules focus on understanding the pedagogical role of ICT in teaching, acquiring basic ICT skills, searching and communicating with internet tools, creating and sharing content, and understanding the requirements of bringing innovation to schools (cf. EPICT syllabus²⁰).

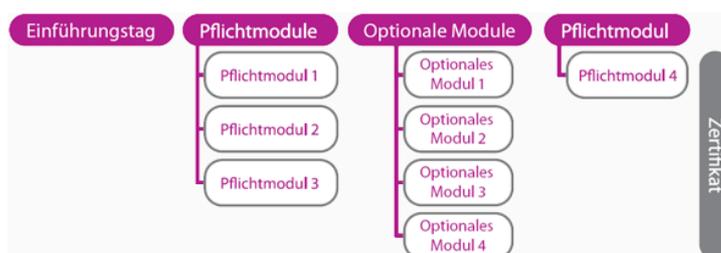


Figure: EPICT course structure; Source: www.epict.at

Key characteristics of an EPICT course are that assignments are related to a specific subject, placed in a practical working context, and have to be worked out jointly by a team of two or three participants. Each team receives (online) feedback by a certified EPICT mentor on a regular basis.

E-Learning Certificate

In general the competence building in e-learning at the universities takes place very autonomously. However, the following universities are jointly offering an “E-Learning Certificate: The Universities of Innsbruck, Salzburg, Linz, Graz und Klagenfurt; the University of Business Administration Vienna, the Medical University Graz, the University of Arts in Linz, the Universities of Applied Science of Upper Austria,

¹⁸ See the list of EPICT co-ordinators at <http://www.epict.at/mod/resource/view.php?id=217>

¹⁹ Source: interview with EPICT expert, November 2009

²⁰ EPICT Syllabus Condensed version, pp. 3-5, <http://www.epict.org/files/EPICTsyllabus.pdf> [accessed 2009-12-05]

Salzburg and Vorarlberg and Kufstein, the University College Tyrol, the Education Service Tyrol and the Management Center Innsbruck. The course programme has three modules which are offered at two different levels (Beginner/Advanced Participant):

- Module I – Media didactics in teaching at university: Use of media in teaching, Installation and use of eLearning-courses in LMS systems, Collaborative e-learning;
- Module II – Media production: e.g. Digital photography, E-learning and Law, E-Learning/Web 2.0;
- Module III – Media organisation: E-moderation, Scientific work with Zoster, Moodle Basics.

Participants can apply for an E-Learning Certificate if they have completed all three modules at a minimum of two course providers within 18 months. The certificate course is understood as a professional development instrument and is offered free of charge.²¹

²¹ More information about course programme at: <http://www.zertifikat-elearning.at>

4 Case studies

4.1. CASE A: University College of Teacher Education Lower Austria

Characteristics of the institution

The University College of Teacher Education Lower Austria (Pädagogische Hochschule Niederösterreich, PH NÖ) was founded in October 2007 as “joint venture” of six previously independent educational training institutions: Pädagogisches Institut (PI) des Bundes für Niederösterreich, Abteilung für allgemein bildende Pflichtschulen (APS), Abteilung für allgemein bildende höhere Schulen (AHS), Abteilung für berufsbildende mittlere und höhere Schulen (BBS), Abteilung für Berufsschulen (BS) and Pädagogische Akademie (PA) des Bundes.

In 2009/2010 in total 400 student teachers were enrolled, 150 of which first-year students. The management reports that the drop-out rate is rather low, less than 10%. In 2008 the university college employed some 220 staff (35 administrative staff, 180 teacher trainers). It operates at three locations (Baden, Hollabrunn and Melk), however, the initial student training is mainly provided in Baden. The university college offers also professional training programme to teacher trainers in Lower Austria (21.000 teachers). (Rauscher, 2009: 23)

The university college manages six bachelor studies (Bachelor of Education) for acquiring the teaching certificate for either primary school, secondary school, special needs school, vocational school pedagogy and others. Furthermore it offers five post-graduate programmes of study related to special fields in education and one master’s course of study.²²

Role of ICT in the university college (institutional ICT policy, website)

In the interviews the management described their aim as an integrated ICT approach within the institution. This can also be concluded from the official strategic documents (e.g. statute, annual report 2008) and from screening the homepage. The statute states: “*ICT plays a vital role and the management aims at a sustainable use of current IT and media*” (PH NÖ Statute, 2008:6, translated by author). The annual report 2008 of the university college states: “*New multimedia and internet technologies will be used to improve the quality of learning by easing the access to resources and services and improving the experience and cooperation among teaching experts and colleagues*”. (Rauscher, 2009: 21; translated by author)

The department D4 IT-Technology, E-Learning, Blended learning describes the integration of ICT in pedagogical processes and administration as follows (webpage):

- *We integrate ICT in pedagogical processes and administration!*
- *We develop didactical concepts for the use of technology and media in education and implement them with interested partners.*
- *Our department connects practise and science and we take part in national and international projects aiming at professionalisation of teachers in all IT related tasks.*
- *We develop new teaching and lecture designs in initial and professional training in the Blended Learning mode.*
- *We support the interactive use of the internet in schools with training services and activities in e-learning clusters.*²³

The performance agreement between the university college and the Federal Ministry for Education, Arts and Culture includes concrete measurable objectives about how the capacity building in technopedagogical competence should proceed in the years 2008/2009 – 2010/2011. The use of e-learning con-

²² <http://www.ph-noe.ac.at/ausbildung/ausbildung-information.html>

²³ Cf. <http://www.ph-noe.ac.at/department4.html> (translated by author)

tent should increase from a 10% use rate in teaching in 2008 to 50% in 2009, and to 95% in 2010. (Ziel- und Leistungsplan der Pädagogischen Hochschule Niederösterreich, 2008)

ICT infrastructure (resources, access and function)

- *ICT infrastructure and internet access*

The university college provides four IT rooms in their main location in Baden and three IT rooms in their other locations. It can rely on two additional IT rooms in their partner schools. Each IT room is equipped with eight PC stations and a printer. On the PCs student teachers can work with the full range of MS Office programmes (the contract partner is the local authority).

The library offers also PCs that are accessible during office hours. Additionally students can use fourteen “PC islands” located in the halls of the university college. They are freely accessible with the student login number. The university college offers a protected WLAN area throughout the college, both in lecture halls, in class rooms and open halls.

- *Availability:*

PC rooms and library are available five days a week during office hours (Monday-Thursday, 8.00-16:00; Friday only until 13:00). It is possible to use the printers in the IT rooms without payment.

- *Software for study enrolment and course administration*

The information system “PH-Online-PH-NOE” is used for enrolment, course organisation and administration both by student teachers, teachers and administration. All data is saved in a central database and accessible via internet browser (Netscape, Internet-Explorer) in real-time, generated from the database. General data is accessible by anonymous users (e.g. course data), students and employees have a secured login.

- *ICT equipment for teaching (typical class room)*

The typical classroom is equipped with a teacher PC, DVD recorder, beamer, overhead projector, and smart boards with integrated beamer and scanner (purchased in 2009). Mobile devices (television, digital camera, etc.) can be booked at the department D4.

- *E-Learning platform*

The e-learning platform “Moodle” is used for communication between teacher trainers and students. The university college has an own platform instance on which individual class courses are hosted.²⁴ The platform allows for managing student assignments, teaching material, digital presentations and if needed open collaborative spaces. There is also a section for up- and downloading of pod-casts.²⁵ Teachers and students have university e-mail accounts and assignments can also be sent via e-mail.

Technical and didactical support

The university college has organised its infrastructural and didactical support for ICT in one department, called: “Department 4: IT - Informationstechnologien, Blended Learning, E-Office.” The department is the central information service centre for all areas of administration and teaching within the college and supports the initial and professional IT training. The tasks involve support for “blended learning, distance learning, web design, office management, e-based administration, e-based public relation, e-library; Web services for students, informatics, ICT in subjects”.²⁶ The centre employs five to six persons permanently and ten flexible staff for training purposes. The team proposes and evaluates pedagogical uses of ICT in teaching and provides the required infrastructure and service; results are disseminated also in professional training.

Requirements related to ICT techno-pedagogical competences

The university college in Lower Austria is the only teacher training institution among the four case studies that has fully integrated the acquisition of ICT skills and media didactical competences into the curriculum. It also requires compulsory participation in ICT and media pedagogical courses. In the first semester, stu-

²⁴ <http://moodle.ph-noe.ac.at/>; <http://moodle.ph-noe.ac.at/phnoe-wiki/index.php5/Hauptseite>

²⁵ <http://moodle.ph-noe.ac.at/podcast/>

²⁶ Task description at <http://www.ph-noe.ac.at/department4.html>

dent teachers are required to take a general introductory course (introduction to learning management platform in the orientation phase STEP; 0.5 ECTS). In the fifth semester, students are required to take media didactical courses in their first or second subject. They are acquainted with an overview on educational technology and have to do practical study work on the internal learning platform (2.5 ECTS credits each).

For teacher trainers ICT use in teaching is not mandatory. However, supervisors of bachelor thesis are required to take a professional training course in ICT use (free of charge). The university college participates in the Austrian EPICT initiative and offers courses for EPICT mentors. Teachers at practise schools are invited once a year for training (one day) and ICT can be chosen as a training subject.

The curriculum, developed autonomously at the university college, defines the following learning outcomes for ICT use in teaching:

- Students should know about the use of school adequate media.
- Students are able to create own learning material and use learning software.
- Students have basic knowledge on how to acquire and analyse data and present results by means of the PC.
- Students are able to use hard- and software for preparing their lessons and for sensible use in the classroom.
- Students know about the potential of the PC as prosthetic media for enhanced communication and acquisition of writing and reading skills (special pedagogy).
- Students have pedagogical ICT competences orientated on the European Pedagogical ICT License.
- Students can use ICT as fourth cultural technology with respect to the subject and the pupils.
- Students can use ICT for creativity in primary school.
- Evaluation method and development: students learn to reflect the use of current media from a special subject didactical point of view.

(Source: Questionnaire, section “study programme”, December 2009; translation by author).

Quality assurance policies (evaluation of courses)

The university college is audited by the national quality assurance agency (AQA). The university runs a department for evaluation that is in charge of regular evaluations, including the area of ICT. The ICT use is also assessed by students that participate in relevant courses. (Source: Questionnaire, December 2009)

Best Practise Examples of ICT integration in teaching

The university college develops own projects or takes part in European co-operation projects with a focus on innovative use of ICT in teaching. Examples are²⁷

- Natural Sciences (IMST projects), use of “Geogebra”;
- Regional didactical centre for Maths and Informatics (<http://rfdz.ph-noe.ac.at/>): A project dealing with different media in maths (“Medienvielfalt im Mathematikunterricht”), including the development of material with specific learning paths according to individual learning capability from compulsory education to end of high school (<http://rfdz.ph-noe.ac.at/index.php?id=71>);
- Project MAXIMA (<http://www.austromath.at/daten/maxima/index.htm>);
- EU project MOSEP: More Self-esteem with my ePortfolio;
- National project WOKI (“Wortschatzkiste”): Blended learning setting for primary students to improve reading competence. This project received the national award for the most innovative learning material of the year 2008 (Learnie Award 2008, <http://www.wortschatzkiste.at>).

²⁷ More information is available at: <http://www.ph-noe.ac.at/projekte.html>

Observation on ICT use by students

The use of ICT in their studies was discussed in two focus groups with eight fifth semester student teachers heading for the teaching certificate for general secondary school and special needs school. Their subjects included: German, English, music, geography, Catholic and Islamic religion and nutrition science / home economics.

- *Role of ICT in teaching; media biography of student group (5th semesters; age between 22-23)*

Among the participants were two ICT lead users (one male, one female). Both take their private ICT equipment to field placements and prepare the teaching with private software. All students were experienced with using ICT in their field placements and showed a critical approach in assessing the added value of ICT in class (e.g. discussion about use of physical maps or Google maps in geography). Some used software-based communication devices (e.g. “Stepper”) in special needs schools.

Each student in the focus groups owned a personal notebook and all but one possesses an I-Pod. Two thirds of them have an account on a social network platform (Facebook or StudiVZ) and use it regularly (minimum once a week, usually more often). All students admitted to feel confident in using ICT for their studies (e.g. take part in private student support mailing lists, exchanging study and teaching material). They had already taken the obligatory introductory course in ICT skills and the special courses in subject related ICT/media didactics.

- *Use of ICT during studies*

The student teachers use the university college system “PH online” for administrative purposes. For organising presentations and communication with the teacher trainers they use the learning management platform “Moodle” regularly (e.g. download of studying material; upload of presentations and assignments in word docs). E-mail (either university or private account) is used for communication with teacher trainers for receiving feedback (e.g. consultation on bachelor thesis).

The students reported that in almost all lectures the teachers use presentation software (PowerPoint) or specific software. They reported the use of interactive ICT only in subjects such as geography (at the institution exists a large content pool from an active teacher), German (pod casts, blogging, assignments via Moodle) and English (Internet listening, E-Portfolios with software “Mahara”). Students heard about the availability of smart boards in the university college, but had no active experience with such boards. In the course on media didactics they were also shown how to produce e-content (esp. quizzes with the software programme Hot Potatoes).

- *Integration of ICT use in field placements*

Students reported that they rarely get concrete ideas from subject specific teachers how to develop an ICT enhanced teaching scenario. They had received information where to look for material (e.g. list of links related to the subject), but felt left alone in applying and reflecting on it. When questions were arising, student teachers more often asked colleagues than a mentor teacher. Each student could report a school practise experience, in which he or she had already used ICT, however, primarily as “starter” into the lecture or as motivational support (e.g. a YouTube video or a game). E-learning sequences had to be done in IT rooms in the partner schools, because schools do not provide internet access in classes or notebooks for all, hence not all pupils would be able to take part.

The university college and the schools offer a “media suitcase”, but even a lead user student teacher had given up on that because it took too much time to organise and install. Students are clearly in favour of the “Plug and Go” philosophy (e.g. use a USB stick or internet platform for managing information). The frequency of ICT use in field placement was reported as once or twice a month.

“50 minute units in class are not enough for ICT use”, says a student teacher, 5th semester, Case A.

- *Support in using technology*

Students felt well-supported by the institution with respect to technology and appreciated the rich information about the spectrum of ICT tools likely to be used in teaching. They are informed about where to get e-content or media packages from (e.g. university library or central media centre Lower Austria). A common complaint was the lack of information on “subject specific use of ICT”.

“We know the tools, but do not know how to use it with the children”, says a student teacher, 5th semester, Case A.

- *Availability of ICT in field placement*

Student teachers reported that it is standard in partner schools to offer a teacher computer and a projector in each class room. They have a PC or personal notebook and almost never use the public IT rooms in partner schools or the university college. In field placement they are hesitant to use an IT room because often there are restrictions on printing and they want their pupils to take lesson results home (e.g. for homework or presenting to parents).

- *Confidence in using ICT*

Students felt confident about using the ICT infrastructure in their teaching institution, but they are not really dependant on it anymore. They have low confidence in the presentation equipment in practise schools. In order to reduce the uncertainty with available equipment in the schools, they prepare their media already at home and ensure minimal “media work” in class.

Observation on ICT use by teachers

The use of ICT by the teacher trainers was discussed in two focus groups with eight teachers, their subject being English, history, German, nutrition science, media competence, maths, informatics, music, geography. The participants in the focus groups were e-learning lead users, all of them familiar with testing of advanced educational technology (e.g. smart boards, e-portfolio virtual school). The participants regard it as their responsibility to assess the ability of new tools for use by their student teachers.

- *The role of ICT in teaching*

Teacher trainers argued that they would propose to teach with ICT only if it makes sense didactically. However, no clear common criteria for sensible use had been defined among different faculties.

- *Educational goals and targeted competences*

Teacher trainers want their students to become acquainted with a variety of different media. The learning outcome should be competence to choose a tool or software based on didactical reasoning and not only because the school has purchased it. Furthermore, they argue that they propose ICT use in teaching, because it can save time during face-to-face-lectures and make feedback more individualised (e.g. media didactics in German is done 2/3 online and 1/3 face-to-face). Teacher trainers would like their students to be able to assess the ICT pre-knowledge of their pupils needed for effective ICT use (e.g. ICT skill demands for pupils in primary school and secondary school are different). Students are expected to use different content creation programmes and handle the documentation, archiving and communication functions of a learning management system. Students are also trained to write academic papers and to carry through evaluations by means of online enquiries or by means of statistical software programmes (e.g. SPSS). Common understanding was that student teachers should learn how to produce teaching material (e.g. a computer-based working sheet or a short video).

“Movie should be used not only for fun”, says a teacher trainer, Case A.

“Preparation of class e.g. internet search should be done before class and saves time in class for more sensitive issues”, says a teacher trainer, Case A.

- *ICT facilities and didactical support by institution*

Teacher trainers in the focus groups were highly satisfied with the support unit (D4) of the university college. They appreciated the personal and quick help that they get from the staff for technical services. Didactical support and advice is primarily being exchanged among colleagues of the same discipline and networks.

- *Integration of ICT in their lectures with student teachers*

The teacher trainers reported that more than 150 courses are installed on the learning management platform (Moodle). This intensive use in most subjects during the study programme should help student teachers to lose the fear of using such systems in their practise. That is why all of the teacher trainers emphasise the

importance of online tutoring during “supervised self-study phases” (via LMS or per e-mail). Some of the teachers reported that they use the learning management platform for assignments (timely restricted), others send everything per mail. Teachers reported that portfolio assessment is becoming a common assessment strategy. An e-portfolio is used only by lead users among the teacher team; they use the software Mahara, which is located at the server pilot project of the Danube University.

“Students only use things in their teaching if they have seen it before working with us”, says a teacher trainer, Case A.

- *Barriers*

In general, teacher trainers observed a low level of self-confidence in the use of ICT in teaching by students. Therefore they proposed low level ICT use and e-learning projects. Teachers reported that the students in higher classes more often own their electronic equipment personally and that the willingness to use ICT in class correlates to the computer ownership. In the first student semesters teacher trainers rarely see students with laptops in their lectures.

Teachers claimed having limited time in the curriculum to introduce current technology developments and tools. Since the study programmes are already tight, they experienced difficulties in proposing extra work with e-learning projects. They also complained about having little time for professional development and testing of tools and would like to get more ICT training themselves (e.g. one ICT day per semester).

Enablers

Teacher trainers would like to have more information on best practise examples of e-learning didactics in their subject. They were against ICT skills tests as entrance requirement, however, they would favour a support system for levelling out the heterogeneous ICT skills of students during the first term (e.g. ECDL certificate by the end of second semester).

Lessons Learned

The management views the “three step approach” followed by the university college as a successful strategy to increase the ICT use in initial teacher training. The university college requires ICT use in three different phases of the study programme:

- Phase 1 – Use of ICT for administration purposes (PH Online): self-assessment test on the LMS about the level of media competence; support of trainers from Department 4. (ECDL level)
- Phase 2 – Media didactics in subject courses: since 2007 everybody is obliged to go through training in first subject and 2nd subject.
- Phase 3 – ICT in school practise: The university college plans to integrate the EPICT concept of team teaching into its curriculum (practical ICT in field placement supervised by certified EPICT mentors).

As a critical success factor for sustainable ICT use the management stressed the importance of a good cooperation of the university college with partner schools. This is relevant especially with respect to offering the same ICT infrastructure and tools to teachers and students (e.g. smart boards in both institutions). Another important success factor was seen in the extension of professional training in ICT (e.g. “ICT as a special topic in a late summer school”). The introduction of new equipment would need more accompanying research in order to have confirmed best practise examples. The management advocated for more research into the impact of technology on teaching and learning outcomes. This would help to convince the “late majority” in e-learning.

In future it will be important to establish a more homogeneous level of technical and didactical competences among the whole teaching staff in order to avoid a widening gap among teacher trainers (e-learning forerunners vs. e-learning latecomers). Finally, there is a continuous need for funding of ICT infrastructure and tools. A mix of bottom-up strategy, i.e. teacher trainers suggest the purchase of tools/software etc., and top-down strategy, i.e. the IT service centre proposes standards for ICT use within university college, is recommended.

4.2. CASE B: University College of Teacher Education Vienna

Characteristics of the institution

The University College of Teacher Education Vienna (Pädagogische Hochschule Wien) is the largest university college in Austria. It combines several institutes and its number of students has mounted to a total of 1.900 in 2009. It employs 336 permanent teacher trainers, 4.000 flexible lecturers and 84 administrative staff. The number of teachers offered professional training is 35.000 (23.000 from Vienna; rest from all over Austria). The university college co-operates with approximately fifty partner schools in the region. (PH Vienna, 2009: 9)

The university college offers eight different bachelor studies leading to the teaching certificate for either primary school, secondary school or special needs school organised by the Institute for General Initial Teacher Training (Institut für Ausbildung Allgemeine Pflichtschulen / APS) or for vocational schools and others organised by the Institute for Vocational Teacher Training (Institut für Ausbildung Berufsausbildung / IBB). Furthermore it offers five post-graduate courses related to special fields in education and one Mastercourse, all leading to the academic degree of "Bachelor of Education" (BEde).²⁸

Role of ICT in the university college (institutional ICT policy, website)

The annual report 2008 of the university college presents their plans and achievements. Many activities are described such as the development of courses for media in education, participation on pilot-courses for EPICT (students) and inclusion of EPICT in the curricula and field placements. It reports also about intensive participation in e-learning pilot projects with students (e.g. campusradio, e-portfolio, tryscience etc.). (Pädagogische Hochschule Wien, 2008: 42)

ICT infrastructure (resources, access and function)

- *Software for study enrolment and course administration*

The university college has introduced the information system "PH Online", which is based on the CAMPUSonline system developed by the Technical University Graz. All data is saved in a central database and accessible via internet browser (Netscape, Internet-Explorer) in real-time, generated from the database. General data is accessible by anonymous users (e.g. course data); students and employees have a secured login.²⁹

- *Internet access*

The university offers single internet access points (WLAN), but not in all main lecture rooms.

- *ICT for teaching:*

Additionally to the PH-Online system, the university college hosts the learning management platform Moodle and has an own instance at: <http://moodle.phwien.ac.at>. The typical classroom is equipped with a teacher computer (PC), internet access, beamer and overhead projector. A show classroom is also equipped with a smart board and networked laser printer. Mobile devices (television, digital camera, etc.) can be booked at the media education centre.

- *ICT infrastructure for student teachers in IT rooms and library*

The university college offers seven IT rooms each having between 10 and 16 PCs, a printer and a beamer for supervised ICT use if the rooms are used for classes. Teachers need to book the rooms via an internal software system in advance. The spatial design is "traditional" having one teacher desk with PC in the front and the other PCs lined up. Students can use 120 fixed computers in the library during office hours (Monday -Thursday 9:00-18:00, Friday only until 16:00). During holidays the PCs can be used only between 9:00 and 12:00. It is possible to download documents on a USB stick and make printouts with a pre-paid card.

²⁸ <http://www.phwien.ac.at/ausbildung/ausbildungsangebot-63/bachelor-of-education-145.html?L=0courses>,

²⁹ See: <https://www.ph-online.ac.at/ph-wien/webnav.ini>.

Technical and didactical support

The university college has organised the technical and didactical support in two different departments:

- the central IT service centre (Zentraler Informatikdienst)³⁰, and
- the centre for media education (Zentrum für Medienbildung)³¹.

The IT centre is responsible for general ICT services (especially PH Online), network functions and the functionalities of the homepage of the college. The centre for media education is a branch of the Institute of School Development, Innovation and Research. It supports the media didactical and pedagogical work, explores innovative uses of new media, and advises teacher trainers and student teachers on developing media pedagogical scenarios. The centre also hosts a Blog service for use during field placements and the “pod campus”.³² The most important recent development is the opening of the “multiMedialab (ML)” which offers technical equipment and expertise for media production in combination with Web 2.0 applications and tools.³³

Requirements related to ICT techno-pedagogical competences

The university college follows the principle of integrating ICT competences within each subject specific didactical course. Student teachers do not have to take any specific ICT related course. In the first phase of the study (Studieneingangsphase) they get trained how to use the online administration system and the learning management system. Then it lies in the responsibility of the individual teacher trainers and mentors to propose appropriate general or subject-specific uses of ICT. The university college takes part in the Austrian EPICT initiative and offer EPICT certificate courses at the institution in a blended learning mode.³⁴

Best Practise Examples of innovative teaching with ICT

The university college worked on many e-learning projects³⁵:

- Implementation of the Online AV-Archives : podc@mpus,
- EPICT pilot project,
- EU Projekt E.IN.S.T.E.I.N,
- Digital Storytelling in the primary school,
- Networking of media didactics for print media with subject didactics.

³⁰ <https://www.ph-online.ac.at/ph-wien/wborg.display?CORG=18825>

³¹ <http://www.phwien.ac.at/forschung-7/zentrum-fuer-medienbildun-89.html?L=1>

³² <http://podcampus.phwien.ac.at/?id=680>

³³ <http://podcampus.phwien.ac.at/medialab/about/>

³⁴ More details on EPICT: <http://www.phwien.ac.at/forschung-7/zentrum-fuer-medienbildun-89/projekte-677/epict-679.html?L=1>

³⁵ For detailed description see <http://www.phwien.ac.at/forschung-7/zentrum-fuer-medienbildun-89/projekte-677.html?L=1>

4.3. CASE C: The University of Salzburg

Characteristics of institution

The Paris Lodron University of Salzburg is the largest educational institution in the Salzburg region. The university has four faculties (Theology, Law, Cultural and Social Sciences, and Natural Sciences) and employs about 2.700 people in research, teaching and administration. In the study year 2009/2010, some 14.000 students are enrolled.

The university offers 17 studies leading to a teaching license in general secondary and academic secondary school. Subjects offered are: maths, physics, informatics, biology, psychology and philosophy, catholic religion, history, geography and economics, civic education, English, French, German, Greek, Italian, Latin, Russian, Spanish and sports. In the study year 2008/2009 the total number of students enrolled for studying towards the teaching license in one or two of these subjects was 1.600, 450 of which beginners.

Role of ICT in the university college (institutional ICT policy, website)

Policy Statement of the Paris Lodron University Salzburg on their initiative „Flexibles Lernen“:

“Die Integration und Implementierung innovativer Lehr-/Lernmethoden und neuer medien-didaktischer Konzepte haben innerhalb der Lehrentwicklung an der Paris Lodron-Universität Salzburg (PLUS) zentralen Stellenwert. Sie werden als wesentlicher Beitrag für eine Qualitätsverbesserung verschiedener Aspekte der Lehre und darüber hinaus als Beitrag zum österreichischen bzw. europäischen Bildungsgesamtkonzept gesehen”, writes the Vice President for Teaching (Universität Salzburg, 2005:1).

The structured management and support of e-learning activities started in early 2001 with the project “Flexible Learning”. The overall objective of the project was to develop and implement new and flexible learning and teaching methods within the university. The project led to the establishment of the Centre for Flexible Learning (Zentrale Servicestelle für Flexibles Lernen) which developed further the organisational, technical and service oriented framework for ICT use in teaching.

From 2005 to 2006, a strategy project, funded by the Ministry for Education, Arts and Culture, developed and implemented an ICT policy/e-learning strategy aimed at promoting ICT use in the teaching processes on a broad scale. (Universität Salzburg, 2006) The concept of this strategy won the Medida Prix 2005, especially for its technical, didactical and culturally inclusive aspects.³⁶

The university aims at integrating e-learning in its internal quality management system, distinguishing between the e-learning framework (ICT infrastructure, services and courses) and the teaching processes that build on the framework (Schober/Wageneder 2007).³⁷

ICT infrastructure (resources, access and function)

- *ICT infrastructure for students*

The university offers 13 IT rooms with more than 200 PCs. Most of the IT rooms are reserved for lecturing; some IT pool rooms are free for students to use, according to the rules set by the responsible department.³⁸ One student computer room (40 stations) is open from 8:00-21:30 six days a week (Saturday 9:00-15:00). Printing is possible with student cards or pre-paid copy cards.

- *Software for study enrolment and course administration*

For the purpose of administration (enrolment, course organisation and administration), the university has implemented the same base system as Case A and Case B (CAMPUSonline), here called “PLUSonline”.

- *Internet access:* The university offers single internet-access points (WLAN), but not in all lecture rooms.

³⁶ http://www.uni-salzburg.at/portal/page?_pageid=145,156009&_dad=portal&_schema=PORTAL

³⁷ <http://www.fnm-austria.at/projekte/fnmstrategieprojekt/qualitaet/Fallbeispiele/>

³⁸ see list here http://www.uni-salzburg.at/portal/page?_pageid=565,1328014&_dad=portal&_schema=PORTAL

- *ICT for teaching (software and typical class room)*

For e-learning activities the university uses the learning management system “Blackboard”. This platform can be accessed directly or via the PlusOnline system³⁹ and offers virtual space for providing teaching material and collaborating with students. According to the head of the Zentrale Servicestelle für Flexibles Lernen und Neue Medien, at present some 70% of all lectures (2009/2010 in total 1.400) are accompanied via Blackboard. The university supports direct and flexible video conference recording of the lectures (Polycom, multipoint) on demand. A typical lecture room used for instruction of student teachers includes a teacher PC (software MS Office) and standard projection technology, a printer is usually not available. Recently, the university started piloting the use of smart boards.

Technical and didactical support

The university has two departments that provide support in ICT use: the IT-Service Centre (ITS) and the Zentrale Servicestelle für Flexibles Lernen und Neue Medien (ZFL).

The IT-Service Centre (ITS)⁴⁰ is responsible for the ICT infrastructure (PCs, networks), communication (e-mail, phones), and applications (PLUSOnline, other administrative software systems, research databases, etc.) of the whole university.

The Zentrale Servicestelle für Flexibles Lernen und Neue Medien (ZFL)⁴¹ has two departments, Flexible Learning and Audio Visual Studio. The ZFL takes care of the user and course management of the e-learning system Blackboard (helpdesk) and is responsible for internal course evaluation and technical monitoring. The ZFL also organises and gives courses in media education and supports the development of didactical e-learning scenarios. The Audio Visual Studio supports the production of multimedia teaching material and its use in teaching.

An interesting aspect is the organisational position of the ZFL. Whereas the IT Service Centre is structured as a typical support unit, the ZFL is positioned directly within the university management under the Vice President for teaching and instruction.

Requirements related to ICT techno-pedagogical competences

At the University of Salzburg student teachers are not required formally to take courses in ICT skills or techno-pedagogical competences, and use of ICT in teaching is up to the individual lecturer. However, some recent activities are preparing the route towards a broader use of ICT in Diploma Degree Studies for teaching.

In 2009 the university issued an adapted curriculum for the Diploma Degree Studies in teaching at the humanistic faculty.⁴² It states that “the knowledge and use of new media is an *integral principle* in all phases of the studies (also in the general pedagogical and school practise”.⁴³ Over the last three years the university has also developed a co-operation with partner schools on e-learning in the field of natural science.⁴⁴

The Zentrale Servicestelle für Flexibles Lernen offers a “Media Education Certificate”, which is valid as optional seminar in each Diploma Degree Study for Teaching. This certificate includes two modules: the basic module covers general media pedagogy and media didactics, tool know how, and media production (valid 12 ECTS); the more subject-specific module covers specific didactics with e-learning, information and internet competence, and production of teaching material (valid 12 ECTS).

For academic university staff the internal training academy of the university also offers some non-compulsory courses with a focus on ICT use.

³⁹ <https://elearn.sbg.ac.at>

⁴⁰ Link: <http://www.uni-salzburg.at/its>

⁴¹ <http://www.uni-salzburg.at/portal/zfl>

⁴² Geändertes Curriculum für das Lehramt an der Kultur- und Gesellschaftswissenschaftlichen Fakultät der Paris Lodron-Universität Salzburg

⁴³ University Salzburg Mitteilungsblatt, 2009:7; translated by author.

⁴⁴ http://www.uni-salzburg.at/portal/page?_pageid=188,140024&_dad=portal&_schema=PORTAL

Quality assurance policies (evaluation of courses)

Since the 2004/2005 university courses are evaluated by students (paper and online questionnaire). Additionally the university has implemented activities to ensure a high quality in teaching, e.g. target agreements with lecturers, prize for most innovative teaching, a “day of academic teaching”, graduate enquiry.⁴⁵

Best Practice Examples for innovative ICT integration in teaching

The University of Salzburg supported projects in different subjects, some examples are described here:

- Mathematics: A highly acknowledged project focuses on dynamic software for maths (Geometry, Algebra and Analysis) developed by Prof. Markus Hohenwarter (the software is free for download at: <http://www.geogebra.org/cms/>).
- Natural Science: The Institute for Didactics in Natural Science regularly develops concepts and produces multimedia teaching material for topics such as environmental education, living organisms, human biology, and biology education of youngsters (e.g. „Bio für Kids und Teens“ for use in teaching at: <http://www.biologiedidaktik.at>; participation in the project Nature Learn: www.nature-learn.at).
- Languages: The Institute for Romanistic offers 340 learning modules for teaching Italian at schools, which have been developed by student teachers (www.italianoascuola.at). It has 1200 registered users all over the world and receives feedback from practitioners for further development of the material. The platform was awarded a European prize for innovative language projects in 2006
- Media pedagogy: The university offers eStudy Skills courses.

Observation on ICT use by teachers

The findings on ICT use by teacher trainers are derived from

- a focus group with teacher trainers (two female, two male teachers were present); in addition, three teachers filled in the questionnaire); subjects covered: informatics, geography, language, media pedagogy);
- interviews with the head of the Institute for Didactics of Natural Science and the co-ordinator for ICT&Teaching (“Lehramtskoordinator”).

Because of semester restrictions no student group could be organised.

- *Technology integration and role of ICT*

The participants of the focus group and the interview partners can be called e-learning lead users, all of them have received e-learning awards or longstanding e-learning experience. The teacher trainers showed a positive attitude towards more ICT use in teaching, however stressed the need for a “differentiated” approach. The participants observed that integration of ICT is welcomed at the university and understood as something that should be included in the framework of teacher education and further development. However, they admit that there are still many colleagues that are difficult to motivate or need more professional training in acquiring ICT competences.

“Teacher as unique source of knowledge has timed out. ICT is needed today for knowledge acquisition, networking and information exchange”, says a teacher trainer.

“Black box technology should become a white box for everybody in teaching”, says a teacher trainer.

“I would welcome technology integration in the classroom, because it makes lessons more interesting and exciting. But I know from my time at school, that this doesn’t happen very often. There exist many software games for different subjects which are very funny to use and that have a good effect on learning”, says a student teacher mentor.

⁴⁵ http://www.uni-salzburg.at/portal/page?_pageid=747,398312&_dad=portal&_schema=PORTAL

- *Educational goals and targeted competences*

The teacher trainers expect that students should learn when and how a blended learning scenario is useful and in which pedagogical situation the subject-specific teaching material can be mediated better with digital content.

- *Support for teacher trainers*

The teacher trainers acknowledged very much the university's technical support, especially the hot-line service for the Blackboard courses (ZFL), and the possibility to purchase and pre-install subject-specific software (IT Service Centre). One concern was that improvements in ICT infrastructure are done equally in new and old university buildings.

- *ICT integration / use in teaching the students*

Teacher trainers reported to use most of the technologies and tools that the university has made available. The learning management system Blackboard is important for courses with students, but not a solution for working with schools (no accounts can be given to pupils at schools) or other collaboration partners (e.g. in English for E-twinning). The language teacher therefore uses a private Moodle platform.

The teacher trainers see a very subject-specific use of ICT:

- Natural Science:

Teacher trainers reported that in the field of natural science the use of computers is standard practice because of high importance of measurements and processing of data. Special presentation and simulation software is installed on the PCs of teachers and students and used rather often. The "showcase" virtual classroom is equipped with notebooks for the students and open source software. It offers authoring tools for interactive exercises, mind mapping software, software for audiovisual content, and integrates internet based content (e.g. YouTube videos). The next step in the ICT use for teaching in the natural sciences is understood to be a higher level of co-operative and personalised learning.

- Languages:

In language teaching the aim is to integrate with ICT the "target country of foreign language", e.g. via multimedia material (mainly audio), online information search and individual exchanges, collaborative writing skills (e.g. Wiki-based), and networking with international classes (eTandem, online discussion forum skype, mail). A leading example is the e-learning platform www.italianoAscuola.at; interestingly, the curriculum in Romanistic studies requires a special course in ICT in languages.

- *Barriers to ICT use*

The teacher trainers identified a number of barriers for a higher level of ICT use:

- Among university teachers: A definition of common standards of ICT competences is missing, and the current levels of skills are rather unbalanced. Professional training in ICT is not mandatory, hence colleagues are difficult to motivate for acquiring technopedagogical competences. Too many colleagues still feel insecure with technology: "*What if the technology does not work, having a plan B is double work*", said a teacher trainer.
- Student teachers: With regard to the student teachers, the main reason was seen in that the obligatory study programme leaves little time for students to participate in relevant additional courses.
- Not convincing results of pilot projects: Teacher trainers were dissatisfied with so-called "transfer research" in e-learning. For example, teachers at schools have heard about critical issues demonstrated by pilot use of notebooks in classes ("notebook classes") and rumours about "failures" are influencing the motivation of using ICT also in initial teacher training.
- Co-operation with partner schools: The teacher trainers observed that the use of ICT is also influenced by how well the co-operation with partner schools works, and thought that there may be some difficulties because of the distribution of competences between local authorities (Landesschulrat) and universities.

- *Enablers of ICT use*

The teacher trainers suggested that the use of ICT in teaching in the university and in partner schools could be increased if there were:

- incentives for university teachers who participate in professional development offers in ICT use and show that they employ newly acquired skills in their teaching,
- more initiatives and funding for subject-specific digital teaching material in disciplines other than natural sciences,
- a change in curricula with more time dedicated to ICT/media pedagogical competences and subject-specific e-learning (24 ECTS for media didactics was seen as too little),
- more funding of co-operative practise projects with schools,
- a better (compulsory) training of mentor teachers in field placement,
- more feedback from experiences with ICT use in field placements to the university institutes.

Lessons Learned

The representatives of the management-level (dean, head of department) stated that the prize for the most innovative strategic concept in university e-learning (2005) was an important driver. However, ICT strategies must be developed with great care as improvements in teaching and learning outcomes are the goals not more technology.

Related lessons learned are:

- more research on the impact of ICT on teaching and learning outcomes would be needed for the further development of the initial strategy,
- while technology is not the goal, the level of funding for the maintenance and improvements of the IT infrastructure, tools and services, must be increased,
- there has been a strong focus on producing and providing digital content, which may not be the most successful way of promoting pedagogical integration of ICT in teaching,
- incentives for more qualifications in ICT use should be discussed, because this could drive actual use and increase professional opportunities,
- according to university culture promoting voluntary, self-directed use certainly is more successful than any measures of enforcement.

4.4. CASE D: The University of Innsbruck

Characteristics of institution

The University of Innsbruck has a tradition of 340 years of academic research and teaching. At present its academic portfolio comprises 15 faculties (Architecture, Biology, Catholic Theology, Chemistry and Pharmacy, Civil Engineering, Economics and Statistics, Education, Geo- and Atmospheric Sciences, Humanities [2], Law, Mathematics, Computer Science and Physics, Psychology, Sport Science and Management), the Innsbruck University School of Management and the School of Political Science and Sociology. The university offers 72 studies and for student teachers there are 20 Diploma Studies leading to a teaching certificate. At the end of 2009 the university had 25.670 students enrolled (35.342 enrolled study programmes). 1320 students are heading for a teaching certificate. The number of first-year students for a teaching certificate was 290.⁴⁶

Role of ICT in the university college (institutional ICT policy/website)

Since 2005 the university bundles its many ongoing e-learning activities in a strategic concept (*E-Teaching Strategie*).⁴⁷ The core of the strategy is

- to make study programmes more flexible, to professionalize teaching competences,
- to develop-material and distance learning courses, and
- to offer professional training for academic teachers in new media.

The strategy project helped to ensure a common commitment to invest in required technological infrastructure, personnel for didactical support in ICT enhanced teaching and learning, and multimedia content development. In the development plan of the university for 2005-2009, ICT and new media are addressed under the heading “profile development in teaching”. (Gantner, 2005)

The University of Innsbruck displays its overall vision, leading thoughts and strategic goals on the top-level of their homepage, however, ICT does not play a prominent explicit role in them.⁴⁸ But students can find a full range of information of how to use e-learning for studying: <http://www.uibk.ac.at/elearning/>.

ICT infrastructure (resources, access and function)

- *ICT infrastructure for students*

The university offers students IT-rooms, multimedia rooms, and so-called “INNET-Bars”. The IT rooms have 20-25 PCs, located in rows, and are mainly reserved for lectures. If the rooms are not occupied by scheduled courses they can be used by students. The multimedia rooms are to be used only for the specific purposes of multimedia creation such as processing of audio and video data and producing data carriers (CD-ROMs, DVD). The INNET-Bars can be used for web searching, e-mailing, etc.⁴⁹ Teachers can book a “flying classroom”, that is a set of 12 laptops with internet and standard software.

The university also offers devices and software for students with special need such as workstations for wheelchair-bound students, screen readers, Braille-keyboard and screen loupes.

- *Internet access*

Since 2008 the university aims at full coverage of the university with WLAN and access points. Internet is available for students also in the reading rooms of the library. The university is partner of “eduroam” (Education Roaming), an international project “that allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop” (www.eduroam.org).

- *Portal for course enrolment, management, and results*

⁴⁶ Figures from the University Innsbruck at: <http://www.uibk.ac.at/universitaet/portrait/zahlen.html>

⁴⁷ <http://www.uibk.ac.at/elearning/strategie/index.html>

⁴⁸ <http://www.uibk.ac.at/universitaet/portrait/leitgedanken.html>; <http://www.uibk.ac.at/universitaet/portrait/ziele.html>

⁴⁹ An overview of available rooms and equipment is provided at: <http://www.uibk.ac.at/zid/raeume/raeume.html>

For the purposes of course enrolment and management LFU:online”, a system developed and maintained by the University of Innsbruck, is in use. The portal focuses on the students and allows them to register to courses, check their results, and access official notifications that are sent to their “post box”.⁵⁰

- *ICT (software) for teaching and collaboration*

The university offers the full range of functionalities of the e-learning system “Blackboard” on their “E-Campus” portal.⁵¹ In addition it offers also a Confluence Wiki, screen recording software, multimedia PCs, Videoconferencing rooms and equipment, Streaming media – streaming server technologies, AV equipment rental, assessment server, counseling in instructional design and technology and training and support services (see <http://www.uibk.ac.at/elearning/services/index.html>).

Technical and didactical support

The technical and didactical support at the university is concentrated in one service department (Central Information Technology Services / ZID), that has several units which take care for User service, Data base and information system, Communication systems, and Application development of the university administration. Also part of the ZID is the unit “New Media and Learning Technology”.⁵² This unit has a staff of 10 that manage the eCampus (Blackboard), the streaming server of the university (Real Helix Server), and the multimedia and audiovisual infrastructure and tools. The unit also support academic staff in producing multimedia content. Selected projects in the field of ICT based learning carried out by the teaching staff of the University of Innsbruck are funded and supported by the department (see at: <http://www.uibk.ac.at/elearning/eprojekte/index.html>).

In the department for teaching and students (“Vizerektorat für Lehre und Studierende”)⁵³ a special coordinator for the Diploma Degree Studies in Teaching and ICT was installed. The core task of the coordinator is to support the co-operation between the pedagogical departments with the ZID or the department for New Media and Learning Technology.

The Institute of Educational Science provides a Moodle server and a Mediawiki (“BiWiWiki”) as a complementary service for its teaching staff and students.

Requirements related to ICT techno-pedagogical competences

There are no curricular requirements as regards the ICT use in the Diploma Degree Studies. It is up to the professors and lectures to demand student teachers to use the E-campus or e-learning material. The coordinator for the Diploma Degree Studies in Teaching and ICT emphasised two elements with which the university wants to promote the development of media didactical competence of the students.

1) Teacher Portfolio with section ICT/new media evaluation: “ILS Gesamtportfolio”

Each student that wants to acquire a teaching license has to work out a teacher portfolio which is part of the final exam of the subject specific Diploma Degree Study. The teacher portfolio encompasses four pre-defined sections: a personal case study documenting the professional development, a list of annotated literature, a research project, and experience with ICT/new media. In the latter section, the student teachers have to provide an overview of subject-specific e-learning software (e.g. CD rooms) and provide a list of relevant internet-based teaching material. Examples of both types of e-learning material must be analysed according to media critical dimensions and effectiveness. (ILS 2006/2007)

2) E-Learning certificate

Student teachers are allowed to acquire the “E-Learning Certificate” that is offered by university in co-operation with several other Austrian universities.⁵⁴ The certificate at the University of Innsbruck encompasses three course levels:

1. Basic knowledge IT users (Crash Course; 0,5 ECTS),
2. Training for eTutoring (1 ECTS) at the Department for Media Education,

⁵⁰ https://orawww.uibk.ac.at/public_prod/owa/lfuonline.help?id_in=82

⁵¹ https://e-campus.uibk.ac.at/portal/_cpsindex.html

⁵² <http://www.uibk.ac.at/zid/abteilungen/lt/>

⁵³ <http://www.uibk.ac.at/fakten/leitung/lehre/>

⁵⁴ <http://www.zertifikat-elearning.at>

3.A-C) A. Media based didactics (1,5 ECTS Certificate eLearning); B. Media organisation (1,5 ECTS Certificate eLearning), C. Media production (1,5 ECTS optional module).

The Certificate is issued by the Vice Rector for Teaching and Students, and is reported to enhance the chances for a teaching position offered by the regional authorities. Students who have accomplished courses 1 and 2 (Crash Course and Training for eTutoring) are allowed to work as eTutors at the University supporting lecturers in ICT based learning matters.

Best practice examples of ICT integration in teaching

Since 2006 the centre for media education organises, funds and supports (technical and didactical consulting) the development of innovative teaching projects and multimedia production. In 2008, 43 projects were realised that received funding between 500 Euro and 10.000 Euro.⁵⁵ The funding is part of an incentive strategy by the Vice President for Teaching and Instruction. To share experiences in e-learning didactics the centre also runs an “E-Learning didactic Wiki”.⁵⁶

Observations on ICT use by teachers and teaching trainer coordinator`

“There is no particular ICT training included in the biology teacher education curriculum although students need to be proficient in various software programs to fulfil given tasks (e.g. do scientific calculating, prepare statistics and graph, write Seminar, Bac, and Master thesis , do presentations etc), choosing a particular ICT course is optional”, says a teacher trainer in biology, Case D.

Five individual interviews and filled in questionnaires allow for summarising the perspectives and experiences of study managers and teachers on the use of ICT by teaching staff and students. The summary includes the views of teacher trainers in the field of natural science (biology and geography), the Head of the Centre for New Media and Learning Technology (course teaching in media didactics and production), the Co-ordinator of the diploma study for teaching at the Vice Rectorate for Teaching and Students, and the Vice Director of the Institute for Teacher Education and School Research (expert in school practise).

- *Role of ICT, educational goals and competences*

Teacher trainers and pedagogy experts share a common understanding that ICT is to be understood as tool and its use is context dependent. The views on the aims of media education are diverse: Teacher trainers demanded more technical and functional skills (e.g. basics on how to use a learning platforms and tools). The pedagogy experts stressed the importance of developing life-long learning and reflection competences (e.g. using portfolio methods and software). Overall, student teachers should learn that ICT use is only a supportive tool in class (*“PC games or the internet is not a class babysitter”*), and that it is necessary to make students and pupils aware of dangers when using the internet. What regards the development of basic ICT skills of student teachers, in geography it is expected that they are able to write structured and concise texts, do calculations, give presentations, work with digital images and use digital cartography (e.g. Atlas of Tyrol).

“Technology is either a device to support teaching techniques (presentations, using PC’s to exchange or gather data, process data etc.) or a teaching technique (using selected software to engage students in content related tasks etc)”, says a teacher trainer in natural science, Case D.

- *Technical and didactical support of teachers*

Teacher trainers in the field of geography and biology find that the institutes are well equipped and that they are supporting teachers more than the cross-sectional e-learning offers of the university can do. But well promoted basic informatics courses could help to motivate ICT beginners among the teachers. Teacher trainers that already use eCampus (Blackboard) can call the help desk of the centre for new media and learning technology on any problems with the learning management system. Teachers that want to de-

⁵⁵ Over 200 innovative projects are documented at: <http://www.uibk.ac.at/elearning/eprojekte/index.html>

⁵⁶ <http://wiki.uibk.ac.at/confluence/display/didaktik/Home>

velop innovative projects or products can rather easily receive some funding from the Vice Rector for Teaching and Instruction.

- *Use of ICT for teaching*

Teacher trainers at the different institutes use standard software such as Microsoft and open source products, graphics software, calculation programmes, etc. In the natural sciences teaching with specific software (e.g. GIS systems) was regarded as very important, whereas the production of videos was seen as overrated. Teachers in the natural sciences provide assignments with ICT and for communication with and among students online discussion forums are already introduced (e.g. in biology). The head of media education expressed concerns about the value of whiteboards in schools at least in their current form. Such boards would still need improvement to allow for user friendly and very intuitive use (e.g. similar to recent generations of handheld tools).

- *Barriers*

The e-learning experts regard the use of some relevant tools as still to difficult. For example, setting up a Wiki for an educational project is not easy enough to do for an average teacher.

The teacher trainers emphasised that they have little time for developing multimedia material for their teaching. What concerns digital teaching material for the student teachers in field placement, the material provided by educational publishers and made available through "SchulbuchExtra" (SBX, www.sbx.at) is constructed following traditional models of teaching and mostly not open for modifications.

The teacher trainers argued also against compulsory ICT courses for students, because students are already overloaded with other courses and would not develop pedagogical media competences in such a setting.

- *Enablers*

Interview partners considered that a certain level of ICT skills or use of ICT in teaching should be part of the teacher trainer contract.

Incentives for more ICT use in teaching were understood to be necessary, but it was common agreement that direct financial rewards would not be appropriate. Rather, certificates which are also relevant for the academic career could be helpful. Activities and awards, such as the „E-Learning Preis“ for excellent e-learning projects and teaching are also considered as helpful⁵⁷.

The pedagogical experts emphasised the positive effects of the networking activities with the local university college in the fields of natural science and humanities. Also a project such as “Lernen Online (LeOn)”, which provides digital teaching and learning material to schools “on demand”, was mentioned as exemplary for driving availability of e-content.

Lessons Learned

- The representatives of the management level (head of departments) stated that incentives are very important for motivating more university teachers to work with ICT tools and e-content. Such incentives could be a prize for “best e-lecture” or easy to acquire funding for subject-specific e-learning projects.
- The experts emphasised that such incentives have several positive effects:
 - the advanced users receive the recognition they deserve,
 - the beginners see that the university appreciates and supports e-teaching activities and become interested (e.g. to not fall behind colleagues),
 - the outcomes provide a benchmark, e.g. what is seen as a good e-lecture?, what is seen as an innovative project?
 - the outcomes of the incentives are available to others, to learn from (e.g. a stock of documented e-lectures, not only the top-ranked ones) and/or or build upon (e.g. project results such as teaching concepts, e-content, experiences), and
- The knowledge building of the student teachers in field placements can be supported with innovative ICT tools, e.g. electronic teacher portfolios (e-portfolios) including documentation and reflection about the school practise, teaching experiences, etc.

⁵⁷http://www.uibk.ac.at/fakten/leitung/lehre/die_lehre-seite/lehre_plus/lehreplus.html;
<http://www.uibk.ac.at/ipoint/spotlight/597615.html>

- The intensive regional networking between the different stakeholders in initial teacher training (university, university college, partner schools, school authority, and e-learning networks has yielded first tangible results, and impulses and commitment to take the next steps.

5 Transversal case study findings

This chapter summarises the main findings of the case studies, taking also into account survey results of other studies on teacher training in Austria.

5.1. Institutional frameworks and policies

The importance of ICT for academic teaching and learning has been well recognised officially by the Austrian teacher training institutions. Since 2000 the universities that participate in the association for new media (Forum Neue Medien in der Lehre Austria – FNMA), 21 universities and 16 universities of applied sciences, have developed e-learning strategies (Zwiauwer et al., 2007).

Indeed, a great effort has been made within the FNMA initiative to implement country-wide e-learning quality strategies, to jointly build e-learning content pools (e.g. Austrian Open Content Policy), to promote related career incentives, to solve legal issues in e-learning, and to monitor technology development and propose technical specifications for university ICT systems. (Zwiauwer et al., 2007: 9)

With regard to the Austrian university colleges, in 2008 57% of the colleges reported to have a formally stated and institutionalised e-learning concept. The importance of ICT in teaching was supported by over two thirds of all deans of the university colleges (69%); only a minority (8%) did not expect or support a strong use of ICT (E-learning Steering Group, 2008: 3; 6).⁵⁸

The four teacher training institutes of the case studies have formulated ICT strategies *as part of their broader vision and objectives*, which are presented on the top level of their websites (in sections such as “Vision and Leading Thoughts”). Case A has also published an ICT strategy for teaching, which is available from the homepage of their IT service centre (Department 4: IT-Informationstechnologien, Blended Learning, E-Office).

CASE	Institutional ICT/E-learning strategy	Year	Published on institution website
Case A	Part of the target agreement with the national ministry	2007	Yes
Case B	Part of the target agreement with the national ministry	2007	No
Case C	Institutional e-learning strategy document	2005	Yes
Case D	Institutional e-learning strategy document	2005	Yes

Table: Institutional ICT/E-Learning strategy documentation

The sections on ICT of the institutional strategy documents deal with

- the vision of an enhanced and enriched teaching by using ICT (however, emphasising that they still are face-to-face institutions and do not want to substitute presence teaching);
- the objective of becoming a more flexible teaching institution;
- the objective of developing e-content and digital teaching material;
- the need to develop professional teaching competences either as in-house activity or personnel development service.

However, as regards the importance of acquiring competences in the pedagogical use of ICT as part of becoming a professional teacher no explicit statements could be identified.

Conclusions: Austrian teacher training institutes have been very active in developing institutional e-learning strategies. The visions and objectives usually are incorporated in the overall institutional strategies. What has received little attention so far is the importance of the pedagogical dimension of the ICT use in teaching, in particular, the prerequisite for professional teachers to acquire relevant competences integrating pedagogical and technical skills, i.e. techno-pedagogical competences.

⁵⁸ In Spring 2008, the E-learning Steering Group of the newly founded university colleges of teacher education interviewed e-learning coordinators of all fourteen Austrian university colleges (two per each institution). The results were presented internally to the e-learning steering group.

5.2. Requirements as related to techno-pedagogical competences

The use of ICT by students in initial teacher education is generally required in all Austrian teacher training institutions. As was observed in a survey by the Eurydice network on education systems and policies, use of ICT is regarded as a *general compulsory component* of the Austrian curricula of initial teacher education, or forms part of the *minimum qualification standards* required from all future teachers at the end of initial education, whether they are intending to work in primary, lower or upper secondary education (Eurydice, 2004: 43).

Nowadays students in initial teacher education clearly cannot do without some basic ICT skills, since they have to enrol via an online information system (e.g. “PH online”, “PLUSOnline”, “LFU:Online”), must search and download study material, give digital presentations in seminars, etc.

However, at the universities and university colleges students do not have to present a certificate or pass a specific ICT skills test (e.g. European Computer Driving Licence) as entrance requirement. Case A and Case B have imposed some entrance barriers by means of self-assessment tests and ability checks in personal interviews. Yet assessments of ICT skills or of the attitude towards ICT use are not considered.

CASE	Compulsory ICT use requirements / entrance exams	Obligatory courses related to pedagogical ICT use	Optional courses related to pedagogical ICT use
Case A	No	Yes	Yes
Case B	No	No	Yes
Case C	No	No	Yes
Case D	No	Yes	Yes

Table: Institutional requirements of ICT use in initial teacher training

All cases provide in their student starter courses (“Studieneingangsphase”/STEP) a course ensuring that students are able to use the ICT-based university information and organisation system (e.g. instructions on how to upload and download study material from the learning management platform). The average time spent for this training is minimal and covered with 0.5 ECTS (see Case A).

Case A requires students also to pass two compulsory courses on techno-pedagogical use of ICT in the first and second main subject (first and fifth semester). Case D reports on requiring students to evaluate an e-learning software in their specific subject as part of the compulsory teacher portfolio.

No institution reports about compulsory use of ICT during field placements/school practise by the students or mentor teachers.

Conclusions: The Austrian teacher training institutions require from students functional and administrative ICT skills, but acquisition of techno-pedagogical skills is not a standard requirement. Furthermore, there is no requirement of using ICT in teaching during field placements / school practise. This means that decisions about the pedagogical ICT use in initial teacher training remain to a large part up to the teacher trainers, student teachers and mentor teacher of schools that provide field placements.

5.3. ICT infrastructure and applications (resources, access, and availability)

ICT infrastructure of universities and university colleges

All Austrian universities and university colleges are equipped with an online information system for organising the enrolment of students and administration of study courses. In most cases the “CAMPUSonline Informationsmanagementsystem” is in use, which since 1998 has been developed and extended with additional functionality by the Central Informatics Service of the Technical University in Graz.⁵⁹ The institutions can adapt the system interface according to their corporate identity, but the students are offered the same functionalities and, hence, do not meet major usability problems in case of changing study locations. Case D uses another system developed by their university.

⁵⁹ <http://de.wikipedia.org/wiki/CAMPUSonline>



Table: Entrance page to PH online of the university college of teacher education
<https://www.ph-online.ac.at/ph-noe/webnav.ini>

All universities use a learning management system (LMS) to support communication between teachers and students. Through the university libraries also a wide range of online content search and access services (e.g. Aleph, Primo, etc.) are provided.

The table below shows which LMS are used by the university colleges. The most widely used system is the open source system “Moodle”, which is supported by the Ministry for Education, Arts and Culture (the so called “edumoodle”). Traditional universities typically use other learning management systems (e.g. Cases C and D use Blackboard). Some institutions also offer more than one LMS.

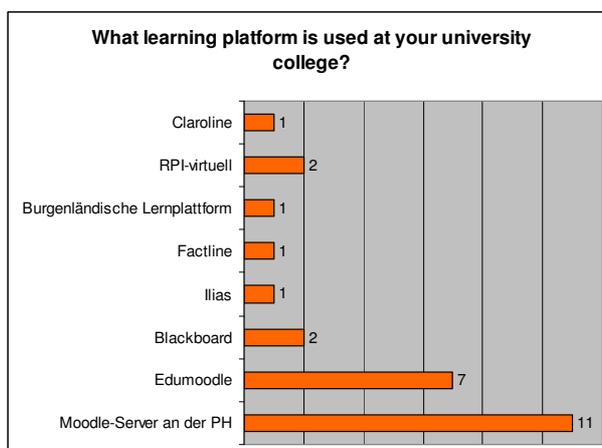


Table: Learning management systems used by university colleges.
 Source: E-learning steering group, 2008:3

The management and teachers of universities and university colleges in general expressed their satisfaction with the IT facilities offered by the institution. The management of all four cases expect that the funding for ICT infrastructure will not decline. In view of rising numbers of students, increasing demand of users as well as changes in technologies budgets cannot be cut.

According to the IT coordinators, the lecture room looks pretty much the same in all teacher training institutions. Typically it is equipped with a presentation computer (MAC/PC), internet access, and digital projector/beamer in addition to the traditional overhead projector. All cases report about special “show classrooms” or “IT simulation labs” which are used for specific teacher training courses. The simulation labs are mainly used for natural science subjects (see Case C). A show classroom usually offers an interactive whiteboard and laser networked printer. Required additional equipment (e.g. digital camera, TV, etc.) can

be booked either in the media education centre or audiovisual centre. (Source: IT infrastructure questionnaires)

Internet availability – differences in openness

64% of all Austrian university colleges offer WLAN in their university spaces, although only 7% in a not restricted way what concern Internet access. 29% of the colleges are planning to introduce a free WLAN area. Case A and case D are colleges that favour an open approach. Case C is planning to implement open internet access everywhere in their new buildings (project “Unipark Neu”).

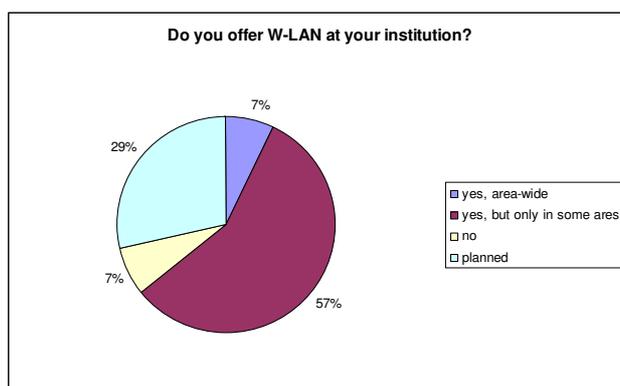


Table: Implementation of WLAN in university colleges
Source: E-learning steering group, 2008:11

Access to PCs by student teachers

In the case studies all institutions mentioned the offer of free computer use to their students either in special IT rooms or “PC islands/INET bars” in student halls or in the library; the total number of available PCs correlates with the size of the institution. A reservation is not required, and the institutions also provide help desk and printing service during office hours.

CASE	IT-rooms for free student use	IT rooms for use with teachers	PC islands in the institution	PCs in the library
Case A	Yes	Yes	Yes	Yes
Case B	Yes	Yes	No	Yes
Case C	Yes	Yes	No	Yes
Case D	Yes	Yes	Yes	Yes

Table: ICT infrastructure in teacher training institutions

The students report that they prefer using their own computer and that borrowing procedures for additional equipment (e.g. digital camera) are too complicated.

IT coordinators report that rather than servicing many free computer places for students they would need money for more personnel, servicing the ICT infrastructure, renewing of software licenses, etc.

Conclusions: The management and teachers of universities and university colleges in general are rather satisfied with the IT facilities (computers, internet access, learning management system, presentation and other equipment), though there are some reservations about availability and reliability. The ICT user environments are also rather standardised. There is a mismatch of LMS between university colleges, universities and schools. Many institutions already offer WLAN, some including open internet access, and many more are planning to introduce such an approach.

5.4. Technical and didactical support

The responsibility for e-learning (including the support of ICT for teaching) in initial teacher training is organised very heterogeneously. As the table below shows, in university colleges e-learning can be organised in a department within an institute, as an individual institute, directly under the auspices of the Vice President for teaching and instruction or within the central IT service centre.

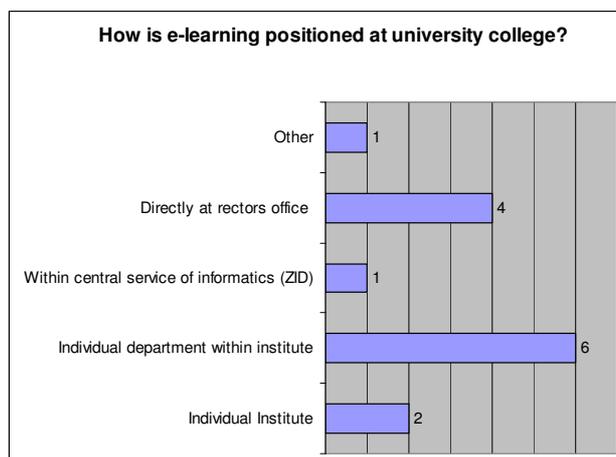


Table: Positioning of e-learning support within university colleges of teacher education.
Source: E-learning steering group, 2008:4

Participants in the case studies confirm this heterogeneous picture with regard to the media education centres. These centres can be organised within a department that is part of the central informatics service (Cases A, D), within the centre for innovation and research (Case B), or as extra department under the auspices of the Vice President (Case C). Cases C and D provide extra personnel resources taking care of ICT integration in teacher training studies (“Lehramtskoordinatoren”).

The technical and administrative support of the learning management system is usually provided by the e-learning coordinator or media education centre, employing staff from the university or externally hired personnel (27% in case of Tyrol and Burgenland).

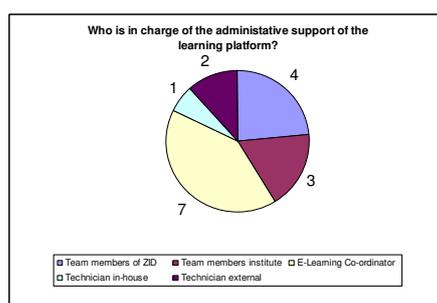


Table: Administrative support of e-learning in university colleges of teacher education.
E-learning steering group, 2008:8

Teacher trainers who participated in a focus group expressed a high level of satisfaction with the e-learning support, whereas student teachers do not feel as clients of the media education centres.

Some statements of teacher trainers suggest that there may be some rivalry among the different departments that are responsible for the technical and/or didactical support of e-learning and ICT use in initial teacher training, e.g. media education centres and subject departments. One pedagogical expert expressed a concern that the centre for media education follows a different “pedagogical strategy” than the teacher education department.

Conclusions: The responsibility for e-learning and support of ICT use in initial teacher training is organised very heterogeneously. Nevertheless the teacher trainers seem to be rather satisfied with the level of technical support. Yet, the student teachers do not feel as clients of the media education centres. There may also be some “rivalry” between pedagogical institutes and media education centres which could have some influence on the ways ICT is used in initial teacher training.

5.5. Student teachers' perspectives on ICT use in the curriculum

In the Austrian university colleges e-learning is understood to be a part of the curriculum, 75% of all university colleges claim to partly integrate e-learning components in teaching.

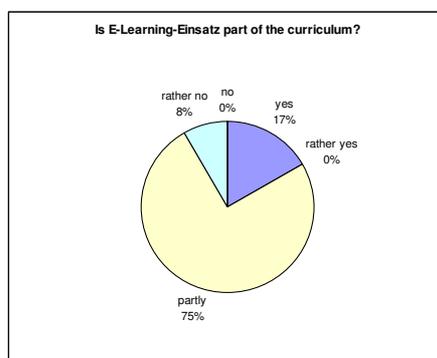


Table: Inclusion of e-learning in the curriculum.
E-learning steering group, 2008:13

A recent survey of 3.240 Austrian student teachers shows that more than half of them are very satisfied with the technical infrastructure offered by the university colleges or university (57% colleges, 54% universities). But the survey also found that many are not content with the “range of e-learning offers” (36% colleges, 50% universities) and with the training for individualised teaching (33% colleges; 8% universities). (IFES, 2009: 10)

An older survey at the university colleges of teacher education in Upper Austria showed that student teachers (n=227) have a positive attitude towards the Internet and ICT-supported learning in general, however, only a smaller part wants to learn with ICT (only 12% of students very positive, 26% slightly positive). (Traxler, 2005: 70) The majority of surveyed student teachers used intensively both the computer (68% 5-7 times per week) and the Internet (55% 5-7 times per week)

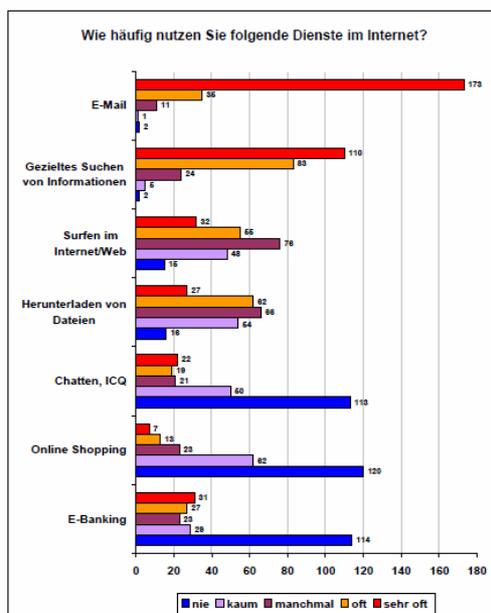


Abbildung 34: Nutzungshäufigkeit von Internetdiensten bei Studierenden (n = 227)

Table: Intensity of usage of internetservice bei student teachers Traxler (2005:74).

A more recent study on “Web 2.0 use” among German students (n=4.400) may be representative also for the increasing use of the Internet and a number of novel Internet services in Austria: 73% of the surveyed German students used the Internet daily (1-3 hours, 23% more than 4-6 hours). 60% used the online encyclopaedia Wikipedia, 51% social community services, 36% instant messaging and chat services, and 16% video services such as YouTube. Weblogs are used daily by 6% of all students. (HIS study, 2008: 5-6)

Student participants in a focus group of our study reported that they often use the computer and Internet at home or in the hall of residence, some also on the move, for personal purposes, employing services such as mentioned above. In comparison, the use of laptops by student teachers during classes is rather seldom (either because of lack of ownership, restrictions of use, lack of internet or other purposes).

Student teachers use the university information system for organising their studies, e.g. download of learning material, upload of assignments, etc. They are also encouraged to use the learning management systems in phases of self-organised studies.

The pedagogical use of ICT is limited to specific subjects in which teacher trainers present content or use specific software related to the subject (e.g. geography and languages). 5th semester students remember only rare lectures in which e-learning material was used, and if so, the material was not prepared by the teacher trainers but by educational publishers.

The student teachers report that the most widely used devices in the classroom by students are PC and beamer for a presentation (e.g. PowerPoint slides), which is an almost daily practice. In university colleges homework is expected to be handed in on the learning management platform (Moodle), but is also sometimes mailed to the teacher trainers. Feedback by teachers is given partly online, partly in the classroom or in personal face-to-face discussion.

Conclusions: Most teacher trainers today are not role models for advanced ICT use in teaching. The most widely used ICT in the classroom are PC and beamer for presenting content such as PowerPoint slides or Web pages. More advanced uses of ICT in the classroom are limited to subjects for which specific software is available. The LMS is a key component in the exchange of digital material between teacher trainers and students. Novel internet applications (“Web 2.0”), which are frequently used by students, are not present. Many student teachers both in universities and university colleges are not convinced about the offered range of e-learning or training for individualised teaching or do not know enough about the services.

5.6. Preparation for pedagogical ICT use

The Austrian universities and university colleges offer different programmes to teacher trainers and student teachers which are intended as preparation for the pedagogical use of ICT in teaching. The universities provide optional courses such as the E-learning Certificate (Case D: E-Learning Kompaktausbildung; eTutor) or the Media Certificate for Student Teachers (Case C: Medienpass für Lehramt; eTutor). The university colleges also provide a range of optional course offers such as eTutor, eBuddy, Didactic Pass and EP ICT courses.

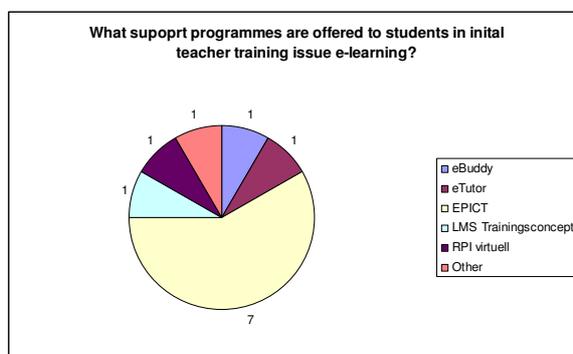


Table: Optional courses of university colleges for preparing pedagogical ICT use in initial teacher trainings
Source: E-learning steering group, 2008:16

In general these are non-compulsory offers, i.e. reach only teacher trainers and student teachers who are already interested in using ICT for teaching. However, individual university colleges have implemented some compulsory elements, e.g. one university college requires students to pass compulsory courses on pedagogical ICT use in the first and in the second main subject.

CASE	Preparation of pedagogical ICT use students	Requirement
Case A	yes	Optional and compulsory courses
Case B	yes	Optional courses
Case C	yes	Optional courses
Case D	yes	Optional courses

Table: Preparation of pedagogical ICT use

With regard to the university colleges, the roll-out of EPICT certificate courses started in 2008 and in 2009 a course was already offered at 14 university colleges with participation of 200 teachers (50 of which student teachers). Until end of 2010 the rather ambitious target of the project coordinator are 2000 participants (500 of which student teachers).

A recent communication of the Austrian Federal Ministry for Education, Arts and Culture to the university colleges addressed focus areas of further education and training from 2010 to 2013. (BMUKK 2009) The communication defines “pedagogical, didactical use of IT (especially EPICT)” as one of several “innovative, integrative principles”. Taking account of the principle will be demanded in all areas of further education and training and supported by specific initiatives.

Conclusions: University colleges and universities offer different courses for acquiring techno- pedagogical competences. University colleges offer a range of courses such as eTutor, eBuddy, Didactic Pass and EPICT courses, the universities courses such as the E-learning Certificate or the Media Certificate for Student Teachers. A rough distinction may be that university colleges aim to provide a more general and practical approach, whereas universities focus more on subject-oriented and media production skills. Importantly, these are non-compulsory offers, i.e. reach only teacher trainers and student teachers who are already interested in using ICT for teaching.

5.7. Pedagogical use of ICT during field placements / school practise

Are student teachers going to use technology once they get into the classroom?

“Some want to use it, but the school system in Austria is sometimes not open for young teachers and their ideas (“shock of practice”). They try it sometimes and then they often say: ‘I haven’t good technology in the classroom and not much time. And my mentoring teachers don’t want this. They want to read the schoolbooks’. This is not good for innovation and motivation of young teachers.” A teacher trainer (Case C)

According to the case study results, no teacher training institution requires use of ICT during field placements by the student teachers or mentor teachers, and reporting on such use is not available.

Whether or not ICT are used for teaching during field placements is up to the individual student teachers. But mentor teachers often do not appreciate and support ICT use by student teachers, thereby discouraging use from the beginning, or providing only little guidance on good practice.

Furthermore, student teachers often feel that they first must be secure in teaching without advanced media, although they may use some digital content as “teaser”, e.g. a YouTube video as a starter for discussion. Most student teachers in field placements prefer to use their own computer, software and equipment in order to avoid complicated borrowing and possible mishandling of school equipment in the classroom.

Conclusions: At present use of ICT by student teachers in their teaching during field placements is not required and not monitored. The lack of co-operation and feedback mechanisms between universities and partner schools in this matter makes innovative pedagogical use of ICT during field placements / school practise of student teachers very unlikely.

6 Summary of present situation and barriers, and recommendations

Based on the study results we summarise the present use of ICT in teaching and provide recommendations on how to overcome existing barriers to high-quality training for such teaching. The sections below address the different levels of personal activity (teacher trainers and student teachers), institutional framework, and support from the policy level, firstly summarising the present situation and barriers and, secondly, providing recommendations for these levels.

6.1. *Personal level – Teacher trainers*

Summary of present situation and barriers

Competence for using ICT in teaching

- At present most teacher trainers are not yet role models for teaching with ICT.
- Traditional forms of teaching are still dominant, coupled with considerable scepticism of many regarding the potential of ICT to improve teaching and learning outcomes.
- Interested teacher trainers perceive a lack of own pedagogical training for using ICT in teaching.
- Because of time constraints many teacher trainers find it difficult to acquire necessary skills and to explore the use of ICT in classroom settings.
- Assessment of teacher competences does not involve the use of ICT in teaching and, hence, personal incentives for a more intensive usage are missing.

Current forms of ICT use in teaching

- The most widely used ICT in the classroom are a PC and beamer for presenting content such as Powerpoint slides or Web pages.
- More advanced uses of ICT are limited to project-based work or subjects for which specific software and data are available.
- Homework and learning material is often provided by teachers on the learning management platform and students upload their assignments.
- Students are also encouraged to use the platform for self-directed learning (“Selbststudium”).

Technical infrastructure, teaching resources, and best practices

- Teacher trainers in both universities and university colleges are rather satisfied with the available technical infrastructure (computers, internet access, learning management system, presentation and other equipment), though there are some reservations about availability and reliability.
- Teacher trainers in university colleges are also rather satisfied with available digital teaching material; but some still seem to lack information about available material.
- Open sharing of teaching material by university teachers is not common practice despite some ongoing “open access” initiatives (e.g. by the Forum Neue Medien Austria and individual universities).
- Most importantly, there is a perceived lack of best practice examples of didactically sound teaching with ICT.

Recommendations to teacher trainers

1. Aspire to become a role model in didactically sound use of ICT in teaching.
2. Participate in dedicated courses (e.g. EPICT or E-Learning Certificate courses) to acquire relevant expertise, and also promote participation in such courses to colleagues.
3. Explore the use of ICT in teaching, starting with some project-based work with students.

4. Exchange experiences from using ICT in teaching, in particular, about feasible best practice and evidence of improvement in teaching and learning outcomes.
5. Demand that expertise in didactically sound use of ICT in teaching is acknowledged, e.g. when recruiting new teacher trainers and in the promotion of in-service teachers.

Related recommendations to teacher training institutions and policy level

1. Foster a positive attitude among teacher trainers towards ICT use in teaching.
2. Promote further the use of available digital teaching and learning material (e.g. www.bildung.at).
3. Promote sharing of teaching material within university initiatives for open access to academic content.
4. Make teachers aware of available best practice and evidence of improvement in teaching and learning outcomes.
5. Make it easy for teacher trainers to participate in dedicated course offers (e.g. EPICT or E-Learning Certificate courses).
6. Ensure availability of supportive certified personnel (e.g. EPICT mentors) and state-of-the-art technical infrastructure and support.

6.2. Personal level – Student teachers

Summary of present situation and barriers

Competence for using ICT in teaching

- Universities and university colleges do not require any certificate (e.g. European Computer Driving Licence) or entrance exams regarding ICT skills of student teachers.
- Student teachers on average have rather good technical ICT skills and use computers and the Internet for personal as well as learning purposes.
- Yet, teacher trainers perceive different levels of students' ICT skills, and too high expectations by some teachers may lead to frustration if actual skills are not assessed and balanced.

Current forms of training in ICT use for teaching

- Current practices of teachers, which student teachers may adopt, are summarised in the section on teacher trainers above. Clearly, most teacher trainers today are not role models for advanced and didactically sound ICT use in teaching.
- Many student teachers are also not convinced about the current training for individualised teaching or the range of e-learning offers at both universities and university colleges (cf. IFES 2009 survey).
- Dedicated course offers for ICT use in teaching often focus on learning about tools rather than how to integrate ICT in own teaching practices.
- Because of a rather strict and already overloaded curriculum, student teachers find it difficult to attend optional courses on ICT use.

Field placement / school practise

- Experienced teacher trainers have doubts about the openness of the school system for an innovative, ICT-savvy younger generation of teachers (“shock of practise”).
- Ideas for, and organisation of, didactical use of ICT during field placements typically are up to the student teachers.
- Yet students often feel that they first must be secure in teaching without advanced media, although they may use some digital content as “teaser”, e.g. a YouTube video as a starter for discussion.

- Mentor teachers often do not appreciate and support ICT use by student teachers, thereby discouraging use from the beginning, or providing only little guidance on good practice.

Technical infrastructure, teaching resources, and best practices

- Student teachers are rather satisfied with the technical infrastructure offered by universities and university colleges. (IFES 2009 survey)
- There is some perceived mismatch of ICT infrastructure and software (e.g. LMS) between teacher training institutions, practise schools, and software and equipment used privately by student teachers.
- Most student teachers in field placement prefer to use their private computer, software and equipment in order to avoid complicated borrowing and possible mishandling of school equipment in the classroom.

Recommendations to student teachers

1. Aspire to become a role model in didactically sound use of ICT in teaching.
2. Participate in optional courses to acquire relevant expertise, and also promote participation in such courses to fellow student teachers.
3. Ask teacher trainers about available best practice and evidence of improvement in teaching and learning outcomes.
4. Prepare using ICT during field placement and ask mentor teacher for support and guidance.
5. Document and share experiences from using ICT in teaching (e.g. through a Weblog or ePortfolio on the field placement).

Related recommendations to teacher training institutions and policy level

1. Do not demand a certificate (e.g. European Computer Driving Licence) or exam on ICT skills for entering teacher training, but remove possible deficits in ICT skills early on in the curriculum.
2. Emphasise that student teachers should acquire competence in didactically sound use of ICT for teaching.
3. Make it easy for student teachers to participate in optional courses for ICT use (e.g. EPICT or E-Learning Certificate courses); also allow student teachers easy access to online content platforms such as Schoolbook extra/SBX.
4. Ensure availability of supportive certified personnel (e.g. EPICT mentors) and state-of-the-art technical infrastructure and support.
5. Make student teachers aware of available best practice and evidence of improvement in teaching and learning outcomes.
6. Promote and support the planning by student teachers of e-learning sequences in their field placements.
7. Promote a positive attitude among mentor teachers in schools towards ICT use in teaching.
8. Offer training or other support to mentor teachers in ICT enhanced teaching.
9. Demonstrate relevance of certified expertise in ICT use when recruiting new teacher trainers.

6.3. *Institutional level*

Summary of present situation and barriers

Development of competences for using ICT in teaching

- The importance of ICT and e-learning is officially acknowledged by most Austrian teacher training institutions.
- However, there are no established country-wide standards of what is regarded as ICT or media competences and, hence, no comparative evaluation is available.
- There is also a perceived lack of consistency in institutional policies and leadership regarding ICT use in teaching and, hence, some divergence between discourse and actual practice.
- Responsibilities for media education, e-learning, and technical and didactical support for ICT use in teacher training are organised very heterogeneously, which seems unfavourable if the goal is to achieve a consolidation of the training and related service offers.
- Pedagogical e-learning experts also perceive a lack of discussion and consolidation between general and subject specific didactics and media pedagogy with respect to ICT usage.

Current forms of training in ICT use for teaching

- Each teacher training institution offers a course or certificate programme for teacher trainers and student teachers (e.g. eTutor, eBuddy, Didactic Pass, EPICT, E-learning Certificate or Medienpass Lehramt).
- In general these are non-compulsory offers, i.e. reach only teacher trainers and student teachers who are already interested in using ICT for teaching.
- However, individual university colleges and universities have implemented some compulsory elements (e.g. one university college requires students to pass compulsory courses on pedagogical ICT use in the first and in the second main subject).

Field placement / school practise

- No teacher training institution requires use of ICT during field placements by the student teachers or mentor teachers, and reporting on such use is not available.
- Co-operation and feedback mechanisms between universities and partner schools that offer field placements are lacking, which makes innovation through an exchange between research and practice unlikely.

Technical infrastructure, teaching resources, and best practices

- In general the management and teachers of universities and university colleges are rather satisfied with the available technical infrastructure (computers, internet access, learning management system, presentation and other equipment), though there are some reservations about availability.
- There is a mismatch with regard to learning management systems between teacher training institutions and schools (universities use Blackboard, Fronter or a home-grown LMS, university colleges and schools mainly work with Moodle)
- Many institutions already offer W-LAN, some including open internet access, and many more are planning to introduce such an approach.
- Teacher trainers in university colleges are rather satisfied with available digital teaching material (e.g. www.bildung.at; www.sbx.at); but some still seem to lack information about available material.
- Open sharing of teaching material by university teachers is not common practice despite some initiatives that promote open access policies and joint e-learning content pools (e.g. the Forum Neue Medien Austria and individual universities).
- Most importantly, there is a perceived lack of best practice examples of didactically sound teaching with ICT.

Recommendations to teacher training institutions

1. Develop an explicit, systematic and as specific as possible strategy for teacher training in the use of ICT for teaching.
2. Foster a positive attitude among teacher trainers towards ICT use in teaching.
3. Demonstrate the added value of ICT enhanced teaching and provide evidence of this value in terms of improved teaching and learning outcomes.
4. Emphasise the pedagogical and didactical competences in the use of ICT for teaching, specific systems and tools are of secondary importance and will change rather quickly.
5. Make acquisition and certification of such competences a prerequisite for becoming a professional teacher.
6. Make it easy for teacher trainers and student teachers to participate in dedicated course offers (e.g. EPICT or E-Learning Certificate courses).
7. Ensure availability of supportive certified personnel (e.g. EPICT mentors) and state-of-the-art technical infrastructure and support.
8. Align responsibilities in the related areas of media education, e-learning offers, and technical and didactical support for ICT use in teacher training.
9. Favour e-learning environments that support group-based, collaborative practices, and allow for making use of a variety of tools and information sources, including Web 2.0 tools and services.
10. Foster collaboration, reflection and sharing of best practices among teacher trainers and student teachers in the use of ICT in teaching. Also promote sharing of teaching material within university policies of open access to academic content.
11. The use of ICT by student teachers in field placements requires some promotion, support, and quality assessment. A more intensive co-operation with partner schools, support to mentor teachers and feedback mechanism need to be implemented.
12. Demonstrate relevance of certified expertise in ICT use when recruiting teacher trainers and in the promotion of in-service teachers.

6.4. Policy level

Summary of present situation and barriers

- The relevant ministries, that are the Ministry for Education, Arts and Culture and the Ministry for Science and Research, and regional educational agencies (with respect to some obligations of the university colleges) do not demand the implementation of a mandatory certificate or compulsory courses on ICT use in teaching.
- As far as universities are concerned this would anyway be difficult because of their autonomous status. Therefore the policy level here primarily supports joint initiatives such as the Forum Neue Medien Austria.
- However, the policy level clearly aims at a higher degree of standardisation in the training for ICT enhanced teaching.
- One likely candidate of such standardisation in university colleges is the European Pedagogical ICT Licence – EPICT (with adaptation of course content to Austrian needs, where necessary). Because EPICT is an acknowledged international certificate, and the emphasis of the EPICT course method on cooperation, feedback and mentoring may contribute to reducing the predominantly single-teacher approach in Austrian educational institutions.

- What concerns teacher training by universities, the E-Learning Certificate, jointly developed by universities within the Forum Neue Medien Austria, can provide a valuable point of reference. However, the media didactics module would need to be emphasised and adapted specifically for ICT enhanced teaching in schools. Such a development would benefit from an evaluation of the current usage of the course programme.
- It is understood that EPICT, the E-Learning Certificate and similar courses can only provide a sound basis of ICT use in teaching, whereas additional subject specific ICT didactics are a matter for curricular commissions of the different subject discipline.
- What concerns the university colleges, rather than enforcing standardisation, the Ministry for Education, Arts and Culture aims to establish facts through offering EPICT courses to as many interested schools and teachers as possible.
- The roll-out of EPICT certificate courses started in 2008. In 2009 courses were already offered at 14 university colleges with participation of 200 teachers (50 of which student teachers).
- A recent communication of the Austrian Federal Ministry for Education, Arts and Culture to the university colleges addressed focus areas of further education and training from 2010 to 2013. (BMUKK 2009) The communication defines “pedagogical, didactical use of IT (especially EPICT)” as one of several “innovative, integrative principles”. Taking account of the principle will be demanded in all areas of further education and training and supported by specific initiatives.
- In the communication, it is also mentioned that schools such as the eLSA (eLearning im Schulalltag) and eLearning Cluster schools (together some 270 schools) have been prime targets of EPICT courses. Also all “Neue Mittelschulen” (67 in the first wave started in the school year 2008/2009, 177 more in the second wave 2009/2010) have been offered the opportunity to implement EPICT courses.
- The “Futur(e)Learning Strategy” (2007) of the IT Steering Group of the Austrian Ministry for Education, Arts and Culture includes among its three focus points one on “modern teacher training at all levels”. Such training should promote forms of teaching that are non-directive and support the individual student (“e-individualisation”). It is also understood that the rapid development of the participative “Web 2.0”, user-generated content, social software and networking needs to be taken into account in ICT-related teacher training.
- At present a group of experts from universities and university colleges, invited by both the Ministry for Education, Arts and Culture and the Ministry for Science and Research, is working on suggestions on a new framework for teacher training programmes. (BMUKK/BMWF 2009) A major goal of this framework is harmonization of the different routes of teacher education. First results of the expert working group will be presented in mid 2010. The broad scope of this initiative suggests that training on ICT use in teaching may be addressed in the framework, yet only at a very general level.

Recommendations to the policy level

1. Develop a national strategic plan, encompassing universities, university colleges and schools, for teacher training in the didactically sound use of ICT in teaching.
2. Demand clear institutional policies for, and leadership in, the use of ICT for teaching.
3. Promote a stronger alignment of responsibilities in the related areas of media education, e-learning offers, and technical and didactical support for ICT use in teacher training.
4. Provide benchmarks and comparative evaluation of institutional practices in the use of ICT for teaching.
5. Help ensure availability of dedicated course offers (e.g. EPICT, E-Learning Certificate or other) and making it easy for teacher trainers and student teachers to participate.
6. Support a more intensive co-operation between teacher training institutions and partner schools to allow student teachers in field placement develop practical expertise in the use ICT in teaching.

7. Demand that expertise in the use of ICT for teaching is properly valued when recruiting new teacher trainers and in the promotion of in-service teachers.
8. Fund research on the added value of ICT enhanced teaching and evidence of this value in terms of improved teaching and learning outcomes. In particular fund the collection, assessment and sharing of best practices in the use of ICT in subject-specific teaching.
9. Support the implementation of state-of-the-art technical infrastructure and support, favouring collaborative teaching and learning environments that allow for making use of a variety of tools and information sources, including Web 2.0 tools and services.
10. Monitor the development of the ICT infrastructure and use of software tools in teaching both at university colleges and schools in order to allow reducing a possible mismatch.
11. Continue to make teachers and students aware of available digital teaching and learning material (e.g. www.bildung.at), and support the sharing of teaching material within university policies of open access to academic content.

7 Annex: OECD questionnaires

Interview guide: Responsible in teacher training (headmaster, program manager,...)

1. Can you tell us about the aims of technology integration in your teacher training programs and how they are evaluated?
 - a. Are there national evaluations?
 - b. Local evaluations?
2. How is the ICT training organised at your institution?
 - a. Separate department?
 - b. Integrated in all courses?
 - c. Support available?
3. How do teacher trainers learn how to use technology?
 - a. What technology integration professional development opportunities have been offered?
 - b. What kind of support is available?
4. Can you tell us about some of the ways teacher trainers are using technology within your teacher training programs?
 - a. What are some interesting projects teachers are completing?
 - b. How are teachers required to use technology at your teacher training institution?
5. Is there any special kind of support you have found extra useful?
6. Are there any improvements you would like to see?
 - a. What could be the obstacles
 - b. Have you planned any interventions
 - c. What mistakes did you do that you have learnt from?

Interview guide – groups: Teacher trainers

1. How would you define technology integration in the classroom?
 - a) Clarify different kinds of technology, hardware, software, different kinds of use.
2. How would you define the role of ICT in education?
 - a) Do you think that technology should be used on a daily basis, for example?
3. How do you prepare your elementary and secondary student teachers to integrate technology in their future classrooms?
 - a) Is there a difference in preparing primary and secondary teachers respectively?
 - b) What educational technology courses are your elementary and secondary student teachers required to take?
 - c) What other requirements in terms of technology exist for student teachers?
 - d) How have you integrated technology throughout the teacher education curriculum?
 - e) How do you see technology fitting into the teacher education program?
 - f) How exposed do you think student teachers are getting to technology outside of the required courses?
 - g) How do you see student teachers using technology in their classrooms in other contexts (e.g., methods classes, field experiences, etc...)
 - h) Where can student teachers go if they have a question about educational technology or technology resources?
 - i) How do you use technology in your classroom? Why?
 - j) Do any of your assignments have technology requirements?
 - k) What competencies do the students leave with?
 - l) How are teachers in the field using technology within your specific area?
4. What support do you receive in terms of technology and pedagogical use of ICT?
 - a) How has the teacher training institution supported you in terms of technology integration?
 - b) How has the teacher training institution supported you with technology?
5. What are some of the most creative approaches you've seen in terms of teaching student teachers to use technology in their future classrooms?
 - a) What is the most successful way to teach student teachers how to integrate technology?
6. What difficulties have you encountered while teaching student teachers how to use technology?
 - a) Are student teachers using these practices once they get into the classroom? Why or why not?
7. Do you think your institution supports pedagogical ICT use?

Interview guide – groups: Student teachers

1. How would you define technology integration in the classroom?
 - a. Clarify different kinds of technology, hardware, software, different kinds of use.
2. How were you prepared to integrate technology in your future classroom?
 - a. What educational technology courses were you required to take?
 - Were there any other technology requirements during your teacher education program?
 - b. How have you integrated technology throughout the teacher education curriculum?
 - c. In your other courses, is technology integration encouraged? Why or why not?
 - Did any assignments in the methods courses require you to use technology?
 - Did you ever get any information about technology from a field experience, student teaching experience, or teacher?
 - Were you ever exposed to a new technology tool or idea in a methods course or field experience?
 - d. How do you see technology fitting into the teacher education program?
 - e. Can you tell me about a time when you integrated technology into a lesson plan?
 - f. How do you learn about using technology in different contexts?
 - g. If you have a question about using technology in the classroom, where would be the first place you would go for help?
3. How have you incorporated technology into your classroom teaching practice?
 - a. Do you use technology or come up with technology integration ideas on your own within your assignments?
 - b. Do any of your assignments have technology requirements?
 - c. Can you show us some examples of student created materials using technology?
 - d. What competencies do the pupils leave with?
 - e. How are teachers in the field using technology within your specific area?
4. What uses of technology do you find relevant and meaningful?
 - a. What uses of technology have you seen teachers use in the classroom?
 - b. What uses of technology have you been impressed with or come away thinking “I would like to try that in my future classroom?”
5. What uses of technology were least relevant and meaningful?
 - a. What uses of technology have introduced to that you'll never use in your classroom? Why do you think that?
 - b. Are there any uses of technology you find valuable that you don't think you'll be able to use? Why?
6. How are you supported in using technology?
 - a. How has your teacher training institution supported you in terms of technology integration?
 - b. How has your teacher training institution supported you with technology?
 - c. What difficulties have you encountered with technology while in your teacher education program?

Interview guide – phone: Mentor teachers

1. How would you define technology integration in the classroom?
 - a. Clarify different kinds of technology, hardware, software, different kinds of use.
2. What uses of technology do you find relevant and meaningful?
 - a. What uses of technology have you been impressed with or come away thinking “I would like to try that in my classroom?”
3. What uses of technology were least relevant and meaningful?
 - a. What uses of technology have you been introduced to that you'll never use in your classroom? Why do you think that?
 - b. Are there any uses of technology you find valuable that you don't think you'll be able to use? Why?
4. How do you prepare your elementary or secondary student teachers to integrate technology in their future classrooms?
 - a. How have you integrated technology in your teaching?
 - b. How do you see technology fitting into the teacher education program?
 - c. Where can student teachers go if they have a question about educational technology or technology resources?
5. What knowledge do your students come into your classes with in terms of educational technology?
 - a. Do they use technology or come up with technology integration ideas on their own within your assignments?
 - b. Can you give some examples of student created materials using technology?
 - c. What competencies do the students leave with?
6. What support do you receive in terms of technology?
 - a. How has your school supported you in terms of technology integration?
 - b. How has your school supported you with technology?
 - c. What difficulties have you encountered with technology while supervising student teachers?
 - d. Are student teachers using technology practices once they get into the classroom? Why or why not?
7. What are some of the most creative approaches you've seen in terms of supervising student teachers to use technology in their future classrooms?
 - a. What is the most successful way to guide student teachers how to use technology?
8. What difficulties have you encountered while teaching pre-service teachers how to use technology?
 - a. Are pre-service teachers using these practices once they get into the classroom? Why or why not?
9. In what environment are your student teachers typically learning about technologies?
 - a. Please describe how you use technology during a “typical” day in your class? (For example, how long are you able to use the technology, where do you use this technology, what are student generally expected to do?)
10. Do you think your school supports pedagogical ICT use?

Technology Resources Checklist

Teacher Education Program Building Name:

Grade Levels:

Number of Students:

Location of School:

What Technology did you typically see in the teacher education classroom (classrooms that are not computer labs or media centers - what does a typical classroom look like in this building)?

Item	Type	Number (in a typical classroom)	Age (approx.)	Other comments
Telephone				
Television				
Teacher Computer	MAC/PC			Internet Access: Yes/No Computer Programs:
Student Computer(s)	MAC/PC			Internet Access: Yes/No Computer Programs Available:
CD-Rom Burner (could be part of computer)				
DVD-Rom Burner (could be part of computer)				
VCR Player				
DVD Player				
Laser Disc Player				
Printer				Color/InkJet/Laser: Color Networked:
Projection System				
Scanner				
Digital Camera				
Digital Camcorder				
Interactive whiteboard				
Overhead projector				
Other:				

Computer Lab & Space Questions

1. What kinds of lab areas were available for the faculty and pre-service teachers to use?
2. Was there a computer lab (or labs)? Where was it located?
3. How does a teacher education faculty member get access to the lab?
4. How available is the lab?
5. Where there other types of technology available in other locations? For example, were there resources the teacher could borrow from another center? What kind of resources were they?
6. How was the typical classroom physically arranged? How is the technology arranged in relation to student and teacher desks? You may describe it or draw it below.
7. How was the lab space physically arranged? You may describe it or draw it below?
8. What evidence do you see of technology being used in the classroom and school? Do you see any student projects? Describe these below.
9. What kind of technology is available in the classroom or elsewhere in the school that might help accommodate a student with special needs?

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