

# **ICT in Education in Austria. Challenges and Proper Use.**

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## **Abstract**

**Adapting to the challenges that come with the increasing amount of information on the internet and with using new devices, the educational system has to reorganize its structure in order to provide the education needed for future generations. This paper discusses the background of the challenges we face when it comes to using ICT in education and show a possible way to manage them successfully. On the background of data described in this paper, the types of devices and the strategical objectives in education in Austria offer practical solutions for changing or improving the educational system. The change of the roles of the teachers and the students will be discussed as well as the school administration and the infrastructure which is the basis of any new development. The use of e-learning platforms and co-operating on an European or international level enhance the quality of content. Removing technical and social barriers, the question of e-inclusion will play a very important role in order to integrate unprivileged people of certain regions. When it comes to enhancing individual chances on the labour market, job-related ICT competences should be taught as well, bearing the IDC-study, which is going to be mentioned in the paper, in mind.**

## **Introduction**

*„Education is what most people get, some teach and few have.“* (Wikiquote Bildung, 2010). With this quote Karl Kraus pointed out the main challenge we are still facing today in the 21<sup>st</sup> century. The following paper should provide more than a glimpse into the use of modern technologies in the education in Austria and tackle the question, why it is so important that pupils get to learn to use modern technologies for their success in the personal and professional life. Challenges within that process as well as the status quo of the situation in Austria concerning the use of ICT will be described later on.

## Background

Working for the European Network for Innovative Schools Austria - ENIS ([www.enis.at](http://www.enis.at)), a partner of the Federal Ministry of Education Austria, we get to administrate and manage quite a few EU projects in the area of math, science and technology in the education sector. Starting with the scientific background and adding the experience that comes automatically with working together with so many different people and various levels, the picture is getting bigger by adding the outcomes of the projects. The basic question we have to ask ourselves is, what it is, that makes the use of ICT in education so important.

Starting with a quote from Hans Weiler, a professor emeritus from the Stanford University, we can discuss the necessity of teaching digital skills in class.

*„Modern technologies provide access to information in an unlimited way, but also without any order. Therefore students will have to learn how to manage the information they get and put in into perspective.“* (Weiler in Schlüter & Strohschneider, 2009, p. 93). That basically means that all the information we need in our daily lives is free available but we need to put it in order. That is something that traditionally had been done by an encyclopaedia and school books provide a selective amount of that knowledge. That situation has changed radically within the last 20 years. Every information we need we can search for on the internet but at the same time, we cannot be assured that what we read is valuable to us or not. Not ordered, scientific knowledge as well as gossip are provided on the same level and the user himself has to extract what is important to him or not.

Bearing this development in mind, there are a few changes that could or should be done in the near future. First of all, one has to reassess the classical role of the teachers in class. Apart from the very important and challenging task of teaching the students knowledge and social skills that they need to grow into responsible adults, digital skills could be taught as well. It is not only about getting knowledge but also about putting it in order. Having the basic skill of knowing how to get certain content from the web and assessing it the right way, pupils more and more get to be self-organized in terms of a self-regulated learning. Secondly, there is the issue of e-inclusion. Not having enough digital skills, people tend to get excluded from social and economical opportunities. During the eSkills-Week 2010 ([eskills-week.ec.europa.eu](http://eskills-week.ec.europa.eu)) ENIS and the Federal Ministry of Education cooperated with 14 major companies. Getting them at one table and discussing what skills employees need to bring with them, one always gets the same answer: digital skills!

A study released by Microsoft and IDC pointed out, that in the following five years, only 10 per cent of the jobs in Europe are left for those employees, who have no digital skills (Kolding et al., 2009). Trying to make the changing over into the labour market for students as successful as possible, teaching IT competences and e-skills in school is fundamental. Bearing that in mind, the educational sector is facing a variety of challenges for getting young people ready for the 21<sup>st</sup> century and the next section of this paper is discussing the Austrian way to adapt to the challenges ahead, knowing that there is not a nostrum for that matter.

## **Data**

The following data is taken from a paper coming from the ministerial bureau and consequently, those numbers are checked by the Federal Ministry of Education (efit 21, 2010). Compared internationally among 40 OECD-countries and the EU, Austrian schools have a good infrastructure concerning broadband internet-access and PCs. Having an average of five students per computer, Austria is ranked eighth among the OECD-countries and is in second place in the EU. As far as integrating new teaching approaches is concerned, 50 per cent of all Austrian schools constantly use e-learning and/or web 2.0 tools in class. While 80 per cent of the federal schools and 13 per cent of the other ones benefit from learning platforms, another 10 per cent plan on using learning platforms in the near future.

While pupils tend to adapt themselves quickly to using new devices, it is a different story for teachers. Needing to change the way knowledge is brought to students, the teachers also have to change their materials. Involving a number of teachers in EU-projects managed by the MoE or ENIS, there are certain concerns put forward concerning curricula compatibility and the time that is needed to change materials. Facing a lot of challenges during the process of transition, ICT training programmes should provide the necessary help. Since the year 2000, about 50 per cent of the teachers and lecturers participated in ICT training programmes.

Another interesting development is observed when it comes to autonomy in the area of curricula. More than 90 per cent of Austria's general secondary schools, academic secondary schools and vocational schools make use of their autonomy and put the focus on ICT to greater part (60 per cent). This number reflects an increasing demand that schools try to cover, especially by implementing the European Computer Driving Licence (ECDL). 210.000 pupils annually complete modular ECDL exams and 20.000 ECDL are getting completed every year, which shows the effort made in that area. Considering the life-long-learning aspect of the debate, adult education must not be forgotten. In 44 per cent of all non-formal educational activities in adult education, the computer or the internet is being used on a regular basis, both internet and the computer in 29 per cent of the cases. Due to the strong involvement in international activities - such as the OECD programme 'New Millennium Learners', Austria gained a good reputation. Also, about a quarter of Austrian schools participate in international partnerships with the focus of quality management, communication and e-learning.

## **Types of Devices**

The use of ICT in education provides new opportunities for both the teachers and the students to interact on different levels. As mentioned earlier, new forms of educating students in class could also shift the traditional teacher-centred approach to a student-centred approach. Doing that, pupils get to organize their knowledge with more autonomy and towards a more self-regulated learning approach. Fundamental for this process is the actual feel to manipulate data on one's own.

ICT devices in education are deployed on various levels and locations. One has to distinguish between the use in class, at home, by the teacher, by the students or by the parents and therefore provide different opportunities in terms of connecting those devices. Starting from the teachers' perspective and their ways to interact with students during class, the first device mentioned here is the interactive whiteboard IWB, which more and more schools start using. Working on an interactive whiteboard instead of the classical blackboard, offer new opportunities to experience the content taught in class by manipulating it in real time on the board itself and by saving it on a computer or any other devices that is connected to the IWB. The user can write, drag and drop, create presentations that are pedagogical useful, watch videos and basically manipulate the content every way he or she wants to. For further information, take a look at the „Guidelines for Effective School/Classroom Use of Interactive Whiteboards“ by the Interactive Whiteboard Working Group of the European Schoolnet (IWB-Working Group Guidelines, 2010). Storing lessons done on the IWB on a computer, have the advantage of being transparent in terms of lesson plans and content. The teacher and the students now have reliable data about what they have done during lessons and therefore avoid misunderstandings as far as grading or content is concerned.

The second very obvious device which is used not only in education, is the the notebook or the netbook. Being to heavy to carry and not having enough battery power on most models, the notebook more and more got replaced by the netbook despite not providing the same amount of quality like a notebook. Looking at the aspect that netbooks have to be purchased by the families (these are costs that are not covered by the MoE), it is quite an accomplishment that more than a quarter of all federal schools at least have one class fully equiped with netbooks or notebooks (Zauchner & Baumgartner, 2008, p. 23). Acknowledging the advantage of the usage of netbooks in class, this number is increasing. Especially in combination with the interactive whiteboard, when content is not only shown and presented on the computer via a traditional keynote but also on the IWB, students can benefit largely by using a portable device that is connected with the teacher's device and the IWB. To provide an appropriate connection within the classroom, investments in the infrastructure have to be made as far as LCD projectors, wireless internet access, support staff and e-learning platforms are concerned. To answer the many critics of ICT in education right away, one has to point out that the use of netbooks or other devices is not considered to replace traditional types of education, but to learn from and broaden them. Also, one has to consider that looking at a netbooks display for too long, could be hurtful for the eyes of young people. As always, the appropriate mix should be the way to go.

Clearly, ICT in education does not stop at interactive whiteboards, internet access and netbooks. Especially when it comes to natural science, new devices offer a great way to understand the nature in its essence. There are a number of small devices, which we are surrounded with in our daily living, that can be used during clas. For example, the Wii remote control could be used during physics class to demonstrate acceleration. Trying to find ways to integrate smartphones in schools instead of banning them, they could also be used for exchanging content, using the GPS in the

geography class or using them during physics classes. Also, in combination with the camera on the back of these phones and a QR-code reading software, information about a specific content could be experienced in new ways.

Finally, using an interactive learning platform, students, teachers and parents can access to content done for or in school and upload new ones. Providing this transparency, the stakeholders get more involved in what is happening in school and react more quickly. In conclusion, using ICT in education is not only about using new technologies and get to know them, but also about interacting in new ways on various levels, which increases the social factor.

### **Austria's Strategy**

This part will be discussing strategical concepts in order to face the challenges which come with an increasing use of ICT in the educational sector. Bearing in mind that the available information on the net is increasing exponentially and given that new devices will be introduced every year, one has to put strategical concepts for the future, which allow to react more or less instantly to changing conditions.

The efit 21-agenda formulated six major objectives for the next years (efit 21, 2010).

One, to enhance the quality of teaching and learning systematically, focusing on the quality of using and sharing content. This could and will be done in several ways. On the one hand by investing in the infrastructure to enable a better connection between teachers, students, school principals and parents. On the other hand, increasing the quality of the content itself could be done by participating in European projects on e-learning, for example projects initiated by the European Schoolnet ([www.eun.org](http://www.eun.org)), and by co-operating with a lot of other schools and teachers in Austria in order to exchange and share experiences and good practices. Central services like learning platforms and content portals for new types of learning could come in handy when developing new approaches in school and adult education. Examples in Austria are the netbook-project for competence-based learning starting in elementary schools and the individualization of learning and teaching by integrating e-learning platform with moodle being the most popular one.

Two, to teach digital competences by raising the awareness of the necessity of digital skills for pupils and adults in a first step. Appropriate teachers training and the inclusion of further training in order to keep up to date with the current pedagogical and technical standards for the use in class should be the foundation of a successful education. Remembering that over 50 per cent of all teachers and lecturers in Austria participated in ICT training programmes since the year 2000 and bearing in mind that those trainings are optional, this number already is a step in that direction. However, the goal is to increase that number. Good examples in this case are the EPICT, an IT-certificate for teachers training, and the virtual pedagogical academia. The increasing number of the New Middle School in Austria offers a welcomed opportunity to enhance digital skills in class.

The third objective that is the result of the adaption of the educational system to the use of ICT, is to enhance the success on the labour market. Looking at the results of the IDC-study (Kolding et al.,

2009) mentioned earlier in this paper, teaching basic qualifications and job-related e-skills pupils need for the transition into the labour market later on, is a challenge the educational system has to face. This could be done by setting benchmarks and standardizing methods when it comes to teaching ICT in school in order to find basic qualifications in every student. About 60 IT-programmes, 3 to 5 years, and various industrial certificates could become part of a complete educational concept. Making jobs for information technology more appealing, especially girls and young women need an adapted ICT learning environment to remove traditional barriers between the genders when it comes to ICT. Good examples in that area are the school pilot IT and gender (in human relations orientated vocational schools), educational standards for practical computer science and industrial certificates and the ECDL.

Four, to enhance to efficiency in a sustainable way and to modernize the organisation structure. Using ICT in the educational and the cultural administration should lead to having a powerful infrastructure and services and applications for target groups. Modern applications on all levels of the educational administration as well as electronical E-Government and administration applications featuring multifunctional services should lead to a modern infrastructure and the development of central services like a broadband connection. Examples are the edu.card, edu.net broadband connections, a federal state teachers-controlling-database, statistic-datawarehouse and the ELAK in subordinated department.

The fifth strategic objective is a very important one in terms of the society itself: to integrate the society! Traditionally not having access to certain services or opportunities, ICT provide an opportunity for everyone to access the potential that lies in it. Making the potential accessible to everyone, e-inclusion, by removing all barriers concerning the use of ICT, the social integration should be improved. The focal points are media skills, security and internet access. Media pedagogy must include a critical and reflecting handling of media, like described at the very beginning of this paper. Also, including the use of ICT and media by juveniles, like Facebook or Twitter, in the pedagogical approaches, could lead to a better understanding of actions taken in the virtual space. Teaching media literacy in both adult and school education, should improve the participation in the society. A good example is the edu.gov - E-Government in class.

The sixth goal is to boost art and culture via new media. Using ICT in that area, arts and crafts should be presented and also taught independent from their location. Future generations could get in touch with art in a modern way and without any barriers. Following that strategy, this should enhance Austria's location of culture and creativity. The enhancement of content by the digitalization and the easy access to the digitalized cultural heritage are the most important aspects. Using the web 2.0 applications, the debate about medial art could be enhanced. The examples here are the culture pool and the digitalization of the portfolio of museums, galleries and archives.

## **Conclusion**

Having pointed out the background of the necessity of using ICT in education, it is important to mention, that every country has different surrounding conditions and therefore need different ways to react to challenges that come with modern technologies in our daily lives. Such conditions are different systems of administration, different results in the PISA-survey or different school types. As a consequence, there is not a single formula that can be used by all countries but learning from experiences others have made and exchanging them could lead to a better educational system in each country. Using ICT in that area, allow students, teachers, school principals, politicians and parents to interact in a faster way. The basic competence of searching information and putting it in perspective, is the core of what ICT in education is about. Therefore shifts on several levels are about to happen. Modern education is not about teaching factual knowledge but also procedural knowledge especially when it comes to using ICT. Changing the traditional image of education, there is also a shift concerning the teachers' and the students' roles within the process of teaching. Students are becoming more and more independent and the teacher is more like a coach during that process. In order to provide a good education, a multilevel approach during class by including several types of learning materials and strategies is needed to meet the challenges ahead.

The described data and the types of devices in this paper change every year. Austria's strategy to meet the challenges described could offer an example on how to set goals and surrounding conditions for a modern education that will include ICT in order to educate students capable of attaining new content, putting it in perspective and therefore putting themselves in relation to their environment and using ICT in a very natural way to enhance their chances on the job market later in life.

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