

Digital:earth:at – Centre for Teaching and Learning Geography and Geoinformatics

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Abstract

School geography, teacher education and in-service teacher training face a rapidly changing world. Support for geography teachers is a very important topic, daily business at school leaves only little time and energy to go into depth of innovative teaching methods and technologies. In a survey realized in Salzburg in 2008, the needs and interests of teachers and pupils were located in order to install the most effective forms of support. The author will give a short insight to the results in this paper.

Furthermore, this paper intends to present the Salzburg Centre for Teaching and Learning Geography and Geoinformatics (www.digitalearth.at). Supported by the Austrian Federal Ministry for Education, Arts and Culture, Salzburg University's Centre for Geoinformatics, the Geography Department of Salzburg College of Education and the GIScience Institute of the Austrian Academy of Science have joined and are setting up a new – in a first step regional – centre of excellence. Through various tracks, support for geography teachers and learners is going to be provided and a communication platform is being installed. As a partner in national and international projects and networks, e.g. the HERODOT network, results and experiences will continuously be shared with the geographic community in Europe and beyond.

Keywords: Geography teacher education, teacher training, digitalearth.at, school geography, GIS Day, GI in school.

Geography Education today

What is geography education? When does it start? Does it start? What are key strategies in order to enhance spatial thinking and a „geographic view“?

According to the AAG,

“ Geography is the science of place and space. Geographers ask where things are located on the surface of the earth, why they are located where they are, how places differ from one another, and how people interact with the environment.” (AAG, 2009)

Geography as a school subject is defined differently regarding its contents, methods and outcomes. National curricula follow a variety of paradigms, methods and focus on different contents. Let us step back and have a glance at the beginning of an individual's spatial experiences: Parents can observe that Geographic learning starts before school education. Spatial relationships play an important role even for babies. They soon know, where they are „at home“, where they usually sleep and where they usually get food – a qualification of places can very soon be multiply sensed (smelled, heard, seen). As soon as they get mobile, infants start to explore “space” and increase their environment continuously. Curiosity drives

them to discover new places, see how they look and feel like, see what happens there and what happened if they go to a certain place. Spatial relationships are thus discovered very soon in an individual's life. Social development and the exploration of spatial interrelations go hand in hand.

School geography takes this pre-conditions and often explores the children's surroundings from the near to the far. In terms of contents, this seems to tie exactly with their interest. So: if every child is interested in spatial relationships, why is interest in geography as a school subject rated as "medium" in the average (see fig. 1)? Teachers sometimes do not succeed in keeping the pupils' natural curiosity focussed on spatial phenomena. I hypothesize that this is mainly because learners do not feel personally involved in learning topics. Social and personal involvement and/or activity are preconditions to reach learners and make them participate in the learning process. If learners are not personally affected by a topic, active learning methods may make them involved. Learning theories are talking about constructivist and active learning (Maresch, 2005) Thus, geography teaching methods and contents need to move from a teacher-centred, topography-oriented summary of facts to pupil-centred, active learning processes oriented on spatial interrelations.

This transition of learning processes is effectuated very slowly. Due to personal, educational and financial reasons, teaching takes only slow evolution. Only very innovative and dedicated teachers, the "early birds", use information and communication technologies in their geography teaching. Different media require different teaching methods. After a period of technology-centeredness, learning with geoinformation is being integrated into a wider pedagogical debate (JEKEL et al, 2008). Practical experiences with new learning environments are being gathered and scientifically evaluated. In many cases, theory lags behind practice.

According to the Benchmark Statement on GIS in Secondary School Education (Donert, 2008), geography education prepares school leavers who:

- can actively participate in public decision making,
- understand the basic purpose of GIS to real world problems, and
- can use GI interfaces in order to investigate, reflect and communicate spatial phenomena.

This is a great educational mandate. Universities, teacher educators and teacher training institutions are asked to provide teachers with adequate skills, materials and working conditions.

Science has to be taught corresponding to the latest developments in research and technology. Teachers are requested to bring new technologies into classroom. Geoinformation technologies are well suited for active learning processes. Everyday applications are increasingly spatial, often students use them intuitively without reflecting that they are just "doing geography". Nevertheless, one has to be aware that the use of innovative technology does not mean better teaching. Teaching methods have to be adapted to the changing technological environment. Geoinformation science goes beyond software programs to produce maps. Interactive, Web 2.0 applications and geographic services invite pupils to become active, to explore and produce their own knowledge. Teachers' role will be to actively support pupils' learning processes rather than transmitting knowledge to inactive bodies. Spatial concepts have to be explained and explored, learning strategies have to be taught and – finally – there is the big chance to make pupils the centre of the learning process.

Rapidly changing GI, ICT and pedagogic approaches challenge and often overcharge teachers. Digital:earth:at, the Salzburg Centre of Excellence for Teaching and Learning Geography and Geoinformatics intends to bridge the gap between (virtual) reality and school education.

digital:earth:at

Salzburg University's Centre for Geoinformatics has joined with the Geography department of the College of Education in Salzburg and GIScience Institute of the Austrian Academy of Sciences in order to establish a regional centre for geography learning. Supported by the Austrian Federal Ministry for Education, Arts and Culture they are creating an information and communication platform for geography teachers. Literal affinity to the well known vision of a former US Vice President

“Digital Earth is a visionary concept, popularized by former US Vice President Al Gore, for the virtual and 3-D representation of the Earth that is spatially referenced and interconnected with digital knowledge archives from around the planet with vast amounts of scientific, natural, and cultural information to describe and understand the Earth, its systems, and human activities.”

(ISDE5, http://www.isde5.org/about_digitalearth.htm , accessed 13/03/2009)

is intentional. Digital:earth:at wants to contribute to the vision of earth citizens, linked through the Internet, being able to freely access a virtual world of information and knowledge resources.

Digital:earth:at aims at developing a comprehensive concept for effective teacher support. A multi-level approach has been selected in order to meet the demands of different groups involved in geography teaching and learning. The process of teaching geography is influenced by several factors, besides internal and external teaching conditions, technological developments seriously affect learning processes. As a result, activities and support for teachers and pupils is great, but scientific assessment and discussion of the changing learning processes remains indispensable. Digital:earth:at integrates scientific discussion with practical experiences and increasing technological possibilities. Web 2.0 is not only being integrated in school lessons but also in the information and discussion process within digital:earth:at, a highly interactive initiative from whatever perspective.

Currently, the network's website is being launched and network activities are planned. The cooperation intends to:

- Set up a communication platform for pupils, students, teachers, scientists (www.digitalearth.at)
- Initiate and realize initial and vocational trainings for teachers-to-be and in-service teachers
- Create and exchange learning materials for geography teachers and pupils
- Organize events for school-classes (e.g. GIS Day)
- Organize conferences on Learning with Geoinformation
- Collaborate with other networks and organisations on a national and international stage (e.g. HERODOT.net)
- Create awareness-raising materials and organize events
- Disseminate information on digital:earth:at

These activities should help to reach the following goals:

- Stimulate professional exchange
- Foster the scientific debate on learning with geoinformation
- Encourage industries, universities and public service institutions to cooperate with schools in order to bring school geography in contact with “real life geography”
- Create a modern pedagogy for learning with geoinformation
- Develop projects on different geographic scales, involving all Digital:earth:at target groups and international partners

Digital:earth:at provides activities for different target groups, it brings together the wide community of geographers. Teachers, teacher educators and teacher trainers, scientists (geographers, GIScientists, educationalists), practitioners (GI-companies, GI-related public services, geodata providers) and pupils will benefit from the initiative’s activities. Each of these groups is invited to participate actively in a joint process of learning geography and to bring in constructive contributions to the development of an adequate, modern geography teaching concept.

GIS Day Survey 2008

Salzburg University’s Centre for Geoinformatics has organized GIS Day events since the late 1990s. GIS Day is a worldwide event to raise public awareness for GIS. In Salzburg, workshops and presentations have been organized for school classes coming from Salzburg, Upper Austria and close-by Bavaria.

On the occasion of GIS Day 2008, a survey was undertaken in order to gain insight into the state-of-the art of school geography and the teacher’s needs in an intentionally regional context. Teachers were asked about

- their opinion concerning GIS Day 2008
- computer and GIS use in their geography lessons
- their interest in GIS- teacher training

pupils were asked to indicate

- their interest in geography
- the use of computers and GIS in their geography lessons
- their understanding of GIS after GIS Day 2008.

Selected results of the GIS Day survey are presented in the following. These have been directly applied to the digital:earth:at initiative in order to assess current challenges and needs.

1) Interest in geography

The pupils’ interest in the subject revealed that there are significant differences between male and female learners, additionally boys could rather be attracted by GIS Day activities than their female colleagues. Whereas 49% of male participants indicated high or very high interest in geography, only 27% of the girls are (very) interested. On the other hand, 18% (boys) and 21% (girls) stated low or no interest.

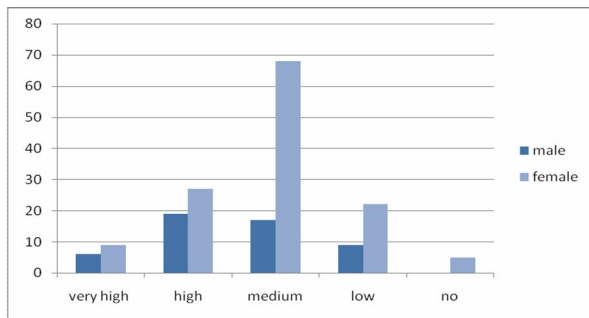


Figure 1: Pupils' interest in geography

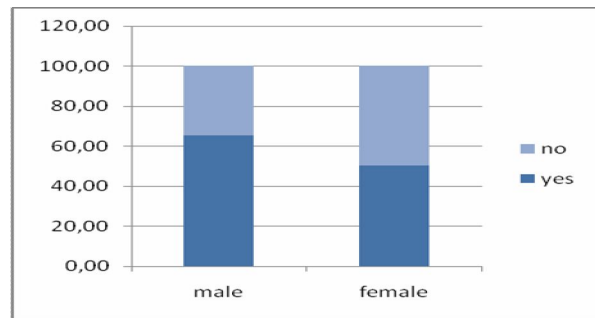


Figure 2: Enhanced interest (in %) in geography after GIS Day

Figure 2 shows that GIS Day enhanced boys' interest in geography in more than 60%, girls' interest could be raised for 50%. In total, 54% of participants confirmed that GIS Day raised their interest in geography.

2) The use of computers and GIS in today's geography classes

While 7 out of 8 teachers indicated to use computers in geography teaching, only 55% of the pupils did so. GIS use in class was confirmed by 3 out of 8 teachers but only by 13% of pupils. The type of program was described as web-based applications like Google Earth.

Teachers agreed that GIS Day was absolutely fulfilling their expectations, active learning stations (organized as hands-on workshops) were rated best by teachers and pupils.



Figure 3: GIS Day: The City of Salzburg from the bird's eye view. Hands-on workshop. (Source: Z_GIS, Centre for Geoinformatics, Salzburg University)

Conclusion: GIS Day could enhance pupils' interest in geography in more than 50%. Only a low percentage of pupils is actively using geo-ICT in geography lessons. In order to enhance technology use, teachers must receive adequate training and methodological input.

3) What do Teachers need?

New teaching methods need innovative teachers willing to adapt their way of working with students. Rockenfeller (2008) states that teachers prefer improved trainings in methodological-didactical areas to technological equipments in schools. Especially teachers

who irregularly use digital media in class feel not sufficiently instructed and able to deal with special software. These teachers may be in-service or teachers-to-be, both need high quality education considering new methods, new technologies and new teaching materials and applications. Sometimes, universities and colleges of education are overcharged and fail to keep track with innovative developments. Teacher training is the most efficient way to bring new pedagogies into class, information on the internet is important but not enough. In the GIS Day survey teachers were asked about their needs. The result was that they preferred innovative project work together with their students as a training method in order to raise their competences. The internet and teacher trainings were rated equally on a lower level.

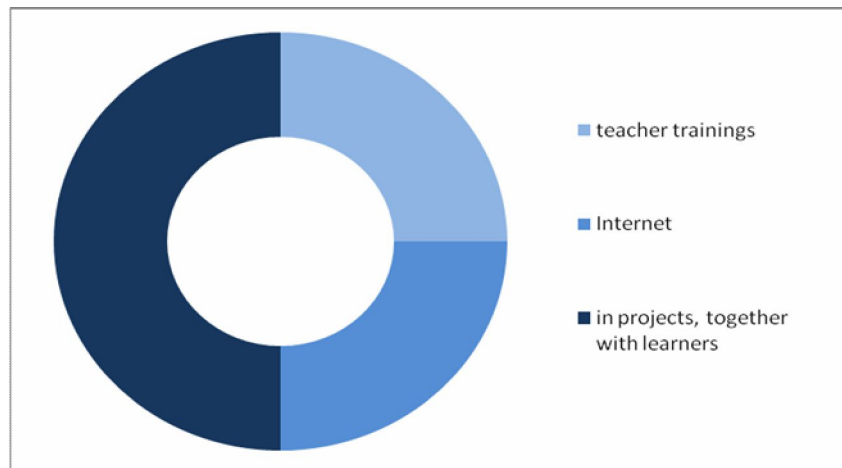


Figure 4: Teacher training methods preferred by teachers

The survey focused the use of digital media in geography. The majority of the teachers can though be considered as “new style” teachers, they have realized that the teacher’s role is no longer to present or being a knowledge base, but to moderate active learning processes. Learning is regarded as a common process, contents and so-called soft-skills are developed together with technological skills that are indispensable for future success of today’s pupils. Peer learning and teacher support are central elements of active learning settings, creativity and mutual appreciation grow in relation to open but well-structured learning environments. Technology-training is certainly important, teachers will nevertheless soon find out that they cannot exploit the full potential of digital media in traditional, teacher centred learning processes.

Conclusion

At the moment, digital:earth:at has to be considered as a growing information and communication platform for the geographic education community. Teachers, teacher educators and teacher trainers, geographic information scientists and experts share their knowledge about geography education. Needs and expertises are being brought together, mutual learning about teaching methods and technological requirements is expected to increase quality of geography teaching. Events and information services complete the range of activities offered by the initiative. International networking is considered as important to general educational and didactical approaches applied in innovative geography teaching.

Digital:earth:at is just at the start of a journey: interactive media including geographic information services (the “geoWeb 2.0”) are increasingly integrated in everyday’s life and play an important role in lifelong learning. Learning processes, materials and strategies will continuously have to be adapted to changing technologies and societies.

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