GIS in the classroom – challenges and chances for geography teachers in Germany
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Abstract
Substantial GIS skills belong to the essential employability criteria in a wide range of fields that deal with integrating, managing, analysing and presenting spatial data. For this reason, GIS has become part of various German curricula for high school geography education recently. In many cases the teachers’ skills do not keep step with those developments. The process of training teachers to use GIS in the classroom is accompanied by many challenges. The situation is made even more complex by a not yet concluded discussion about which role GIS should play in geography education. However, there are also several chances. GIS is a possibility – especially for young teachers – to hone their professional profile, but it is also said to bring an added value to classroom practice and thus is a topic for all geography teachers in the context of lifelong learning. Based on an identification of open questions and current problems of integrating GIS into teacher education and in-service-training, this paper will point out areas where clarification and further research projects are still needed.

Key Words:
GI, German teacher education, professional development, research needs

Introduction
Geography teacher education is to be seen as a pedagogical and didactical education which is paired with giving students a solid foundation of geographical knowledge and skills. The latter, necessarily, includes methods currently relevant in geography. GIS has become an important method used across geographical disciplines. Consequently, as a matter of course it also has to find a place in geography teacher training, independently from a possible relevance of GIS for classroom practice. Beyond that, the ongoing process of integrating GIS into school curricula demands its adequate consideration within teacher education and increases the professional development pressure for those already teaching in school. GIS in school is by its very nature a topic of lifelong learning. But the question in how far it is also an issue of employability, both indirectly through improved classroom practice and directly in course of the job finding procedure, is still largely unanswered. After outlining some of the challenges and chances of GIS in teacher education and in-service training, this paper will point out some areas where research is still needed.

Challenges of Integrating GIS
On the way to integrating GIS into German teacher education and in-service training there seem to be various challenges. The first challenge could be described with the word gallimaufry and refers to various interrelated aspects. In Germany, GIS in school is only a topic since about ten years (Cremer et al., 2004). Consequently, not only the technology itself is changing quickly but also the accompanying didactics is currently still in development. At the moment there is a high diversity of opinions about, for example, what is meant by the term GIS in the educational context, whether it has a place in school education at all and if yes from which grade on (cp. e.g De Lange, 2007; Schallhorn, 2004, Schäfer, 2007). Moreover, teachers are confronted with a high diversity of materials. Furthermore, the negative and positive effects of GIS use in the classroom are still largely unclear. Many of the various
proposed reasons for and advantages of GIS in school, for instance, have no or only little research evidence as a back-up. These aspects could not only be part of complicating the lifelong-learning-process for the teacher but also of dampening his motivation, especially when considering the great time constraint teachers are under and that GIS is only one out of many potential professional development demands for geography teachers.

Lack of awareness can be seen as another challenge. For instance, recent editions of general standard geography didactics textbooks differ regarding the evaluation of GIS use in school and the amount of links to further information (Haubrich, 2006; Rinschede, 2005; Schallhorn, 2004). On the teacher level it has been stated that a large amount of geography teachers have not yet come in contact with GIS (De Lange, 2006), especially as many neither had GIS as part of their studies nor are confronted with it in their curriculum. Not being aware of GIS leads to a small probability of for instance selecting the topic in a professional development course catalogue.

Moreover, challenges like lack of computer skills have to be taken into account. As a recent general survey has shown, 35 % of teachers considered that the teaching staff at their school does not have sufficient computer skills (European Commission, 2006). Without basic computer skills however the acquisition of GIS becomes much more difficult.

Various other challenges could be named, for instance unclear career advantage, degree of institutional support or motivation (Donert, 2007, European Commission, 2006, Henecka and Lipowsky, 2002; Schaefer and Terhart, 2006).

On the way to integrating GIS into German teacher education and in-service training there seem to be also various chances. In general, building and documenting one’s personal profile becomes increasingly important, seen for instance by the spread of portfolios which cover diverse areas such as languages or media competence (Council of Europe; Hauf-Tulodziecki). Moreover, also schools are encouraged to build their own school profile (Schaefer and Terhart, 2006, Radü, 2005). Thereby a trend is observable that the traditionally largely marked based and state controlled hiring procedure is slowly opened to more participation of the target school itself (Schaefer and Terhart, 2006).

Another chance, and maybe the most important one for teachers, is that GIS could enhance their classroom practice. GIS can not just help to integrate local or up-to-date data but also, if the promises hold, to foster a wide range of curriculum relevant competences, while using a tool that is important in geography and across fields (cp. e.g. Falk and Schleicher, 2005, Schäfer, 2007).

There are however a large number of areas where clarification and/ or research are still needed. This includes various aspects of the GIS in classroom landscape, for instance a clarification with regard to terms and research about whether GIS holds its promises. Thereby, the focus will probably be on competences relevant to the curriculum more than on content, although both aspects are important. Research suggests that teachers prefer a presentation of research results with an explicit link to their classroom practice (Williams and Coles, 2007). Consequently, curriculum links for the different state curricula have to be clarified, including tried material and step-by-step beginners’ guides which also encompass an overview over the current research situation. Research evidence and a compilation of material could not just offer decision help for reflective practitioners but also give valuable feedback to teacher education and teacher in-service-training providers for instance as to what works in every day classroom life, what skills the teachers need or what concerns have to be addressed.
Moreover, the communication of research evidence to the teachers gives rise to new questions. A recent UK-based study about the finding and using of research by teachers showed that many teachers have only a limited knowledge and use of available sources (Williams and Coles, 2007). Hence, more research is needed with regard to German geography teachers’ GI learning, dealing with issues such as awareness, use of materials and implementation of what they have read or learned for instance in course.

Many other research areas could be identified, for instance with regard to whether there is a connection of GIS skills and career development for both those who find a job as a teacher and those who do not, or to the influences of the Bologna process.

Conclusion
In sum it can be said that the German situation of GIS in classroom and teacher education is characterized by great diversity, change and open questions. In the state of Baden-Württemberg, GIS has become integrated so far both into the geography teacher education curricula for various school types (e.g. Kultusministerium, 2003) and into the school curriculum for Gymnasium (Ministerium für Kultus Jugend und Sport Baden-Württemberg, 2004). Besides offering GI courses both for teacher students and in-service-teachers, the University of Education Heidelberg also contributes to the research evidence. A project currently underway aims at examining the effects of GIS use on competence development.

References


