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Short Paper
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Describe! Analyse! Act! Geomedia and Sustainability: Results from a European School Project

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Abstract

Digital geomedia empower students not only to describe features of their environment but also to help change it. Geoscience education may therefore help students claim their rights as citizens for a more sustainable future. This paper shows results from a European project financed through the Erasmus+ funding scheme. It is not designed to contribute to the scientific development within spatial education. Rather, it is meant to serve as a best practice example for teachers in Europe for how to connect different school subject areas within one project, in order to describe, analyse and help promote spatial citizenship, largely through the use of geomedia.

Keywords:

GIS, Geography, digital maps, sustainability, spatial citizenship

1 The European dimension of Erasmus+

Erasmus+ was designed as a funding scheme to support activities in the fields of education, training, youth and sport in Europe (https://eacea.ec.europa.eu/erasmus-plus_en). Schools applying for financial support are encouraged to cooperate with schools from other European countries.

In the project discussed here, for the Erasmus+ call for 2016–2018, the German Municipal Adolf-Weber-Gymnasium in Munich (AWG) sought cooperation with schools in Oulu, Finland (Oulun Lyseo), Sint-Niklaas, Belgium (OLVP), Loulé, Portugal (Escola Secundária de Loulé), and the First Language School in Varna, Bulgaria. The underlying idea was to cover the topic 'Living in a smart environment 2030 – Chances and challenges' ('LiSE') with schools from different parts of Europe: our partners were from the northeast (Finland), southeast (Bulgaria), southwest (Portugal), and centre (Belgium and Germany) of Europe. Our main objective was to cover the topic 'smart future', mainly by using geomedia applications, with

the support and participation of many different school departments (art, languages etc.), having learned from the results of our previous European project (see Barnikel & Plötz 2015).

2 Our project 'Living in a smart environment 2030 – Chances and challenges'

One crucial product were to be digital maps, the use of which we had already practised in earlier projects and courses (e.g. Plötz & Barnikel 2015). Goodchild's famous call for a fourth 'R' (2006), following the quip on Reading, Writing and Arithmetic, was to be a central demand within our work with students (the fourth 'R' being Spatial Literacy). Even though the challenges for schools in general when implementing modern cartography are well known (see Donert 2009 or Heiken & Peyke 2007), many positive results from school projects in different disciplines have already been published (e.g. Plötz 2015 or Ellbrunner, Barnikel & Vetter 2014).

The description of the situation in a given area (e.g. around a school or in a particular neighbourhood) can easily be made using GI systems and simple mapping tools (like ArcGISs online or Google MyMaps). These maps can illustrate opportunities and problems in certain areas, but they can also be a starting point for participating in changing the environment. (For first results of this undertaking, see Barnikel, Anttila-Muilu & Pereira 2017.)

The 'smart city' is part of the 'smart environment', integral to which is addressing challenges for the future. Technocratic visions of the future (so-called 'smart' visions) tend to rule out the improvement of social connections (Olsen 2016), which needs, of course, to be addressed within education. But all in all, the biggest challenges for the future are going to be climate change (McCann 2017) and answering the almost romantic question: 'What is the smart city in which we want to live going to be like?' (see Vanolo 2014 after McCann 2017). This question was by and large the nucleus around which we started our work. We concentrated not only on the technological aspect of being 'smart', but also on fields like schools, public transport, living conditions, migration and inclusion, since we also wanted to contribute to changing our environment for the better.

3 'Going Green' as the most important challenge for the future

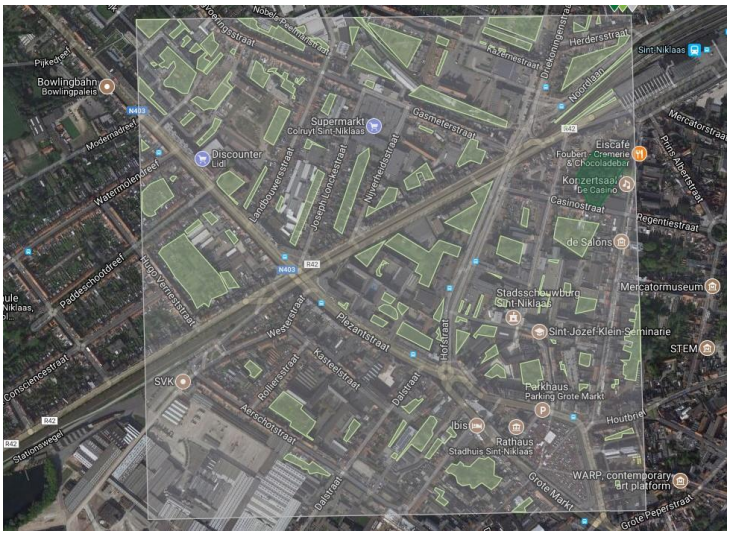

Figure 1: Early version of green spaces around the OLVP in Sint-Niklaas, Belgium (S. Berthels with Google MyMaps/Google Earth)

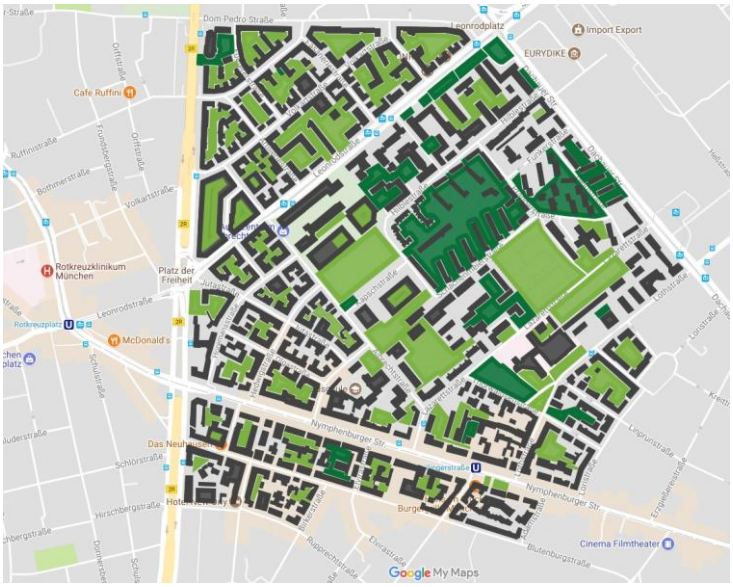

Figure 2: Green spaces around the AWG in Munich, Germany. (For colour coding, see text; compilation M. Kubitsch with Google MyMaps.)

Figures 1 and 2 show 'green spaces' around two of the participating schools. Dark green shows public green areas, to be used for recreation (parks, playgrounds etc.); light green is used for green spaces without recreational functions (e.g. flower beds, trees lining streets etc.); and grey

is used for public or private ground without plants (houses, streets, paths etc.). The underlying idea was that green spaces contribute to the individual's well-being, help reduce pollution, and support us in our need to relax (see Blessi & al. 2015). The mapping was done by the students themselves (Analyse!) after some collective fieldwork (Describe!) which showed them the desirability of participation (Act!).

Green spaces generally have one of two origins: established by city councils, or the history of the area. After basic cartography had been carried out, citizen–government interaction would be the next step towards taking action in greening urban spaces (see also Tapia-McClung 2016). No matter whether this greening is done in an orderly fashion and as part of learning how to create a sustainable environment (Blanchard & Cmiel 2012), or applied freestyle as e.g. guerilla gardening (Hardman & al. 2018), creating green spaces is neither difficult nor limited to decision-makers anymore: 'The smart city is fundamentally about redefining and reconfiguring relations within and between people, their community, government and the urban environment' (Ho 2017, p. 3103).

4 Participation as a basic need

Zeile & Resch (2018) state that current urban planning is still dominated by the same group of decision-makers, even though the public appears to be more involved now than in the past: 'In many cases, urban planning processes take place in offices and behind desks. They do not meet the needs of citizens and do not take digital forms of participation into account' (Zeile & Resch 2018, p. 345, following thoughts of Brenner & al. 2012). Gryl & al. (2017, p. 6) take this thought even further:

The aim of Spatial Citizenship is to enable every citizen to maturely appropriate public spaces and participate in spatial formation processes with the help of (digital) geomedia technologies while taking part in public spatial decision-making processes. Maturity, here, refers to the ability to act autonomously, to reflect critically upon given (e.g. social, policital, economic) structures and processes; it also refers to being capable of self-determination and, if necessary, to being able to act in opposition to existing, anti-democratic tendencies.

Within the diversity of interests in the classroom (curriculum, subject, students' individual needs…), political education is not always a priority, and in some cases it is not accorded any class-time, especially in natural sciences, at all. In many cases, because of the constraints of the classrom context, working with geomedia cannot go beyond the odd basic exercise and is not intended to fulfil requests for theoretical approaches made by theoreticians (as in Gryl & Naumann 2016); the projects themselves remain in the classroom and are not taken 'outside' into any real-life context. But if the use of geomedia in the classroom does actually go some way towards fulfilling these requests, there is a basis for true participation and the project may result in higher levels of spatialawareness. (One example of a basic classroom-based exercise within our project would be the planning of a new city quarter in Munich for roughly 30,000 inhabitants, using 'smart homes'; see Figure 3).

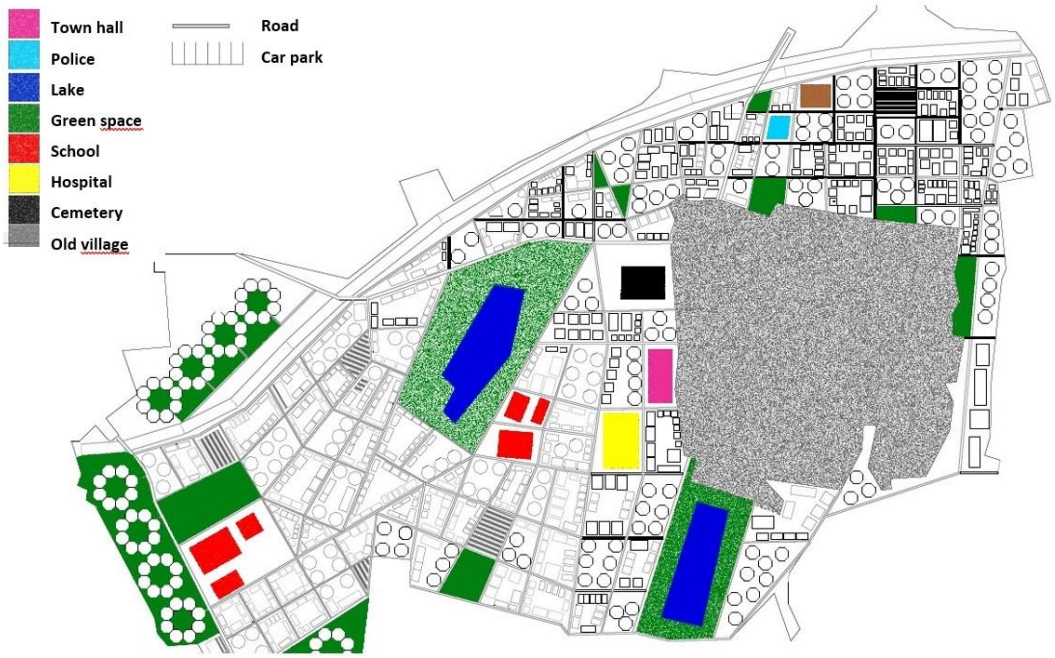

Figure 3: Plan for Feldmoching, a new city quarter in the north of Munich (P. Mayer using Vectorworks)

5 Participation within the LiSE project

Figure 4: Selfie with the Lord Mayor of Munich, Dieter Reiter, handing over the Charta of Varna (B. Mäder)

During the project meeting in Varna, Bulgaria, students designed workshops in which they discussed demands for the future, to be put forward to the mayors of their cities (Figure 4). These demands were grouped into six fields: 1) Social Equality; 2) Leisure, recreation and

health; 3) Education; 4) Public transportation; 5) Energy and environment, and 6) Politics. The two-page list of demands was named (after Magna Charta) the 'Charta of Varna' (https://t1p.de/wib7). Further issues were discussed with a member of the European Parliament in Varna in 2017, and with five politicians from German parties during a panel discussion in Munich in 2018 in front of all senior classes of the AWG. In this way, by confronting decision-makers with their requests, the students took the vital step from description to participation in the political context as mature citizens. The students were also asked to officially participate in city planning on two occasions. First, they took part in a workshop on future means of public transportation, initiated by the City Council of Munich. They also took part in a city planning project from scratch: near the school, a large area is to be completely rebuilt, after the demolition of old barracks, and is to become a creative quarter for the City of Munich. In a network meeting, the new inhabitants and users of the area got to know each other and the AWG was invited. Our students were the only teenagers on the scene and the planners were very interested in their ideas (Figure 5). Both city-planning projects are on-going.

Figure 5: Planning a new city quarter where once barracks stood (R. Plötz)

6 Do-It-Yourself: Planting Trees

European cities keep on growing, and the physical and mental impacts on the health of citizens is obvious. The assertion that clean air and a natural environment are good for wellbeing can be regarded as common sense, and there is plenty of scientific evidence to back this up. The impact of stress on wellbeing and health as result of a non-natural environment needs no further explaining, and its impact is greater on those who are more vulnerable.

Growing awareness of the impact of air pollution is resulting in a wave of civil activism all over Europe. Belgium can serve as an example with 'De luchtzaak' (*the air affair*), which tries to raise awareness by focusing in particular on the air quality around schools. Results of a

satellite survey show that Flanders is a highly polluted area in which schools are especially vulnerable because they are primarily located in areas with dense traffic. The scale of the problem became clearer when the results of the largest-ever crowdfunded survey on air pollution in Belgium were communicated in September 2018. (The survey was carried out by 20,000 civilians during the month of May 2018, https://curieuzeneuzen.be/). Also in 2018, Harald Welzer, a German social psychologist, wrote in the German edition of *National Geographic* that the only way to mitigate climate change thoroughly was to plant trees all over the globe (Welzer 2018). It is in this context of grassroots organizations, guerilla movements and the obvious that our students come in as current stakeholders and future decision makers.

A school's environmental and health policies can provide learning opportunities for students and chances for them to participate, helping the school to place its focus on young people's health and wellbeing. Student participation will most probably start on an observational level, or at the planning level (Describe!). Last but not least, student participation in environmental school policy can also be an essential part in democratic education, as long as it is firmly rooted in the curriculum (Act!). Such involvement fosters plenty of learning opportunities to help build and strengthen modern democracy, which by nature is not only political but also civic. In bypassing certain strict guidelines relating to the curriculum and educational policies, exchange programmes or international school projects like the Erasmus+ programme can contribute by offering a platform for unusual activities and thinking 'outside the box'.

As a result of the surveys about green spaces around the schools and the data presented by governments and non-governmental organisations on air pollution and climate change, the members of the LiSE project decided to take action and encourage students to plant trees in their respective environments, usually in the schools' surroundings (Figures 6 & 7). While the schools in Loulé and Munich have so far contributed just one tree to their respective school gardens, the schools in Oulu and Varna were able to plant several trees in their community, and the school in Sint-Niklaas managed to secure funding for 1,200 trees in the vicinity. As a follow-up of our project, the Portuguese students have helped plant 5,000 trees in the voluntary campaign 'Operação Montanha Verde/Green Mountain Operation' in Portugal.

Figure 6: Planting a LiSE tree in Loulé, Portugal (D. Fernandes)

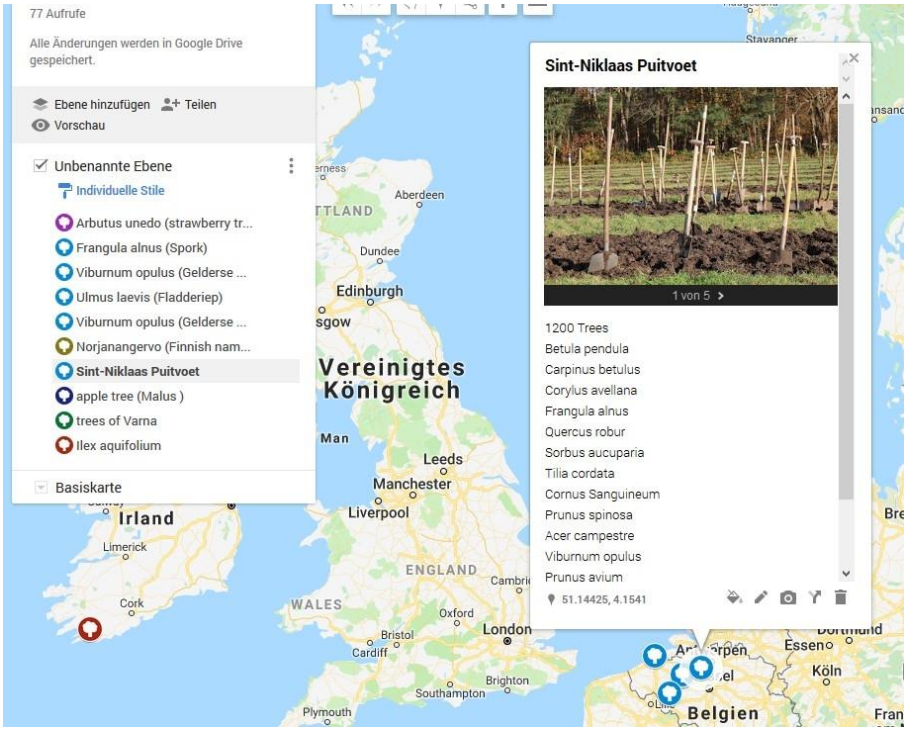

Figure 7: Tree Map as an ongoing project (compilation M. Kubitsch with Google MyMaps)

7 Conclusion

The project comprised various important aspects of geography education:

- Learning different digital mapping techniques (e.g. working with Google MyMaps and Vectorworks) while looking at green spaces around schools, food origin and waste, barrier-free public spaces in cities, origins of clothing, and designing new residential areas (Describe!)
- Learning spatial and sustainable thinking at different scales: these included green areas around schools, forests in each participating country and in Europe, accompanied by tree-planting, solar cooking, food and clothes awareness projects (Analyse!)
- Learning how to put geomedia to use when transforming analyses into political and societal action. (Act!)

However, the most important overall achievement of the project was to promote spatial and sustainable thinking among students and teachers in general. The project was surprisingly successful with, for example, the art and language teachers who took part in the project: they started to find 'hidden geographies' in their own subjects, too.

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