

# Modern GEOspatial Curriculum Development based on Business – Teacher Dialogue

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**Key words:** Capacity building, Curricula, Education, Young surveyor, GI Minor, GEOSkills Plus, GeoDesign.

## SUMMARY

In order to fill the gap between the needs of the labour market in terms of qualified GEO personnel, and the lack of interest in GEOspatial skills amongst students, it is necessary to start a profound dialogue between teachers and the professional field. Teachers not only have to make sure that the learning aims of their GEOspatial curricula meet academic standards; these aims should also be aligned with the current needs of the labour market. With the support of the labour market, teachers can improve reaching out to students, and persuade them to deepen their GEOspatial skills to broaden their future career opportunities. In this paper, we present two new initiatives to intensify the dialogue between teachers and businesses: the National GI minor programme and the GEOSkills Plus project. The National GI minor in the Netherlands developed from a grass root initiative that fully took off once the GEO stakeholders were onboard. The experiences from the Netherlands were up-scaled to the European level to analyze and discuss the conditions required to address the mismatches in Europe.

### *GI MINOR Programme of the Netherlands*

In 2012 the National Minor programme in the Netherlands started with their first intake of 32 BSc students. After years of preparations and consultancies with the professional field, a joint curriculum was developed by a consortium of 5 universities, for 3rd year Bachelor students, open to students of all universities in and outside the Netherlands. A Research Project at one of the GEO businesses is an obligatory part of the minor, attracting many students to the programme. At the same time, professionals strengthen their ties to the research community of the universities.

### *European GEOSkills Plus project*

To upscale the Dutch experiences in improving the GEOspatial skills of students, and raising the number of students, the dialogue was expanded to the European level. Within the GEOSkills Plus project (2013-2015), we propose a pyramid model, uniting the private sector, public sector, professional associations and the education sector, as foundation for cooperation to bridge the gap and raise awareness to improve the GEOspatial skills of students.

In this article, we will elaborate on the workings of the GI Minor initiative and the cooperation model linked to the establishment of the programme. Best practices on enhancing the business –teacher dialogue are shared and new questions are raised.

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## 1. Introduction

In order to fill the gap between the needs of the labour market in terms of qualified GEO personnel, and the lack of interest in GEOspatial skills amongst students, it is necessary to start a profound dialogue between teachers and the professional field. Teachers not only have to make sure that the learning aims of their GEOspatial curricula meet academic standards; these aims should also be aligned with the current needs of the labour market. With the support of the labour market, teachers can improve reaching out to students, and persuade them to deepen their GEOspatial skills to broaden their future career opportunities. In this paper, we present two new initiatives to intensify the dialogue between teachers and businesses: the National GI minor programme and the GEOSkills Plus project. The National GI minor in the Netherlands developed from a grass root initiative that fully took off once the GEO stakeholders were onboard. The experiences from the Netherlands were up-scaled to the European level to analyze and discuss the conditions required to address the mismatches in Europe.

## 2. GI Minor Programme of the Netherlands

Several reports indicate that there is a mismatch in the Dutch labour market between the number of students graduating from university and the demand for GEO graduates by the professional field. There is a considerable demand for young GEO professionals on the labour market, but not enough graduates to fulfil this demand. The acquisition, processing and presentation of Geographic information is a flourishing industry in the Netherlands. In 2009, there were 15,000 GEO- information professionals active in the Netherlands, spread across the business sector (65%), the government (32%) and the research sector (3%). The combined turnover of the sector was estimated at 1.5 billion euros. Despite the general downturn in the economy, the GEO- business sector in 2009 still shows a healthy growth of 8%. Although the GEO-sector took into account a temporary dip, it is expected that the sector will continue to grow structurally.<sup>1</sup>

In 2012 the National Minor programme in the Netherlands<sup>2</sup> started with their first intake of 32 BSc students from a wide range of disciplinary backgrounds. After years of preparations and consultancies with the professional field, a joint curriculum was developed by a consortium of 5 universities, for 3rd year Bachelor students, open to students of all universities in and outside the Netherlands. Provided by the best university teachers of the associated universities. The minor programme is programmed in the first semester of the third year of the

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<sup>1</sup> Based on “Marktmonitor Nederlandse GEO-informatiesector” 2009 / 2010, GEOBusiness Nederland, April 2010; website Foundation for GEO Labourmarket, [www.ArbeidsmarktGEO.nl](http://www.ArbeidsmarktGEO.nl)

<sup>2</sup> [www.nationaleGIminor.nl](http://www.nationaleGIminor.nl)

BSc programme. The minor builds on an introductory GEO-information course from the first or second year of their studies, and consists of advanced courses in GIScience, specialization courses at one of the associated universities, and a Research Project.

The Research Project at one of the GEO businesses is an obligatory part, attracting many students to the programme. Employers applaud the initiative (see text box 1). They show a great interest in GEO-information graduates who have gained practical training and experience during their study. Students have carried out research projects at municipalities, provinces and ministries (e.g. Ministry of Infrastructure and the Environment, Ministry of Defence), at semi-governmental organizations (such as Water Board or Kadaster), at large companies (e.g. Royal HaskoningDHV, Fugro, Arcadis), medium sized companies (such as Geodan) and small companies. Supervision is done by both academia and the hosting organization. During this process, professionals strengthen their ties to the research community of the universities.

## **2.1. Background of the GI Minor Programme**

### **2.1.1 BSc programmes in the Netherlands**

Two changes at the policy level promoted the business – teacher dialogue in higher GEO education: 1) the introduction of minor programmes at the universities; and 2) the academic BSc as an end qualification for the labour market. Whereas teachers in the BSc used to be focused on laying the foundation for their discipline to be further deepened in the 100% linked master, teachers now have to consider delivering BSc students directly to the labour market. So the inward disciplinary focus had to be broadened. Teachers have to know better what developments are taking place in the professional field. A minor programme is an excellent opportunity for strengthening further the link with the labour market.

As a result of the Bologna Declaration in 1999, the BSc – MSc structure (BaMa) was introduced in the Netherlands in 2002 in a rather pragmatic way. The existing academic four or five year curricula were split up in two: the first three years were called the BSc programme, and the last year, or last two years in case of a beta programme, were called the MSc programme. As this Anglo Saxon structure was so new to our country, it took time before we understood the full implications of the BaMa system. The fact that a BSc consists of a major and minor was unheard of, as was the idea that a BSc diploma could be an end qualification for the labour market.

In 2011 / 2012, the BSc programmes at the VU University of Amsterdam, Faculty of Earth and Life Science, introduced minor programmes of 30 study points in their curricula (European credit points: half a year of study). This was the outcome of fierce debates within the university, where staff opposed the idea of reducing the disciplinary study programme with half a year in favour of such a broad minor programme. They feared that the introduction of minor programmes not 100% related to their academic discipline would lower the quality of the BSc programmes and that the end terms of the programme could not be met anymore.

The possibility of a BSc diploma as an end qualification for the labour market is the next new step within Dutch universities. Until now, there have hardly been BSc students who would not

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continue with a master programme, and no study advisor would advise them to do so. But since the Dutch government has stopped the favourable bursary programme for master students starting in 2015, students themselves are more tempted to look at the BSc diploma as an end qualification for the labour market.

### 2.1.2 GIS in BSc curricula at the VU Amsterdam

With the nomination in 1990 of Dr. H.J. Scholten as professor at the VU University Amsterdam, the first chair in GEO information in Europe was established. Research and education in GEO information science was started, and the number of students steadily grew and expanded from a specialized master programme (UNIGIS) to several broad BSc and other master programmes: such as GEO introductory courses in economics (GEO marketing), health (Health Geography), Environmental Studies, Earth Sciences, Earth and economics, Archaeology, Criminology etc. Also at other Dutch universities, students of various disciplines were introduced to GEO information knowledge and skills.

As a result of these introductory GEO courses, there is a limited number of students who discover the relevance of the spatial dimension within their own discipline, and want to deepen their GEO understanding. However, university efficiency rules do not allow for specialization courses for small groups of students. On average, a specific course requires at least of 25 students to reach the breakeven point. So these few highly motivated students at each university could not specialize further in their area of interest, except on their own account in their thesis research. As well, the highly motivated GEO teachers had no possibility to teach beyond the introductory level, because of the efficiency restrictions each university applies.

## **2.2. The National GI minor programme**

As soon as it became clear that the Netherlands would also adopt the minor structure in their BSc programmes, the GEO teachers of five Dutch universities came together to discuss their difficulties in attracting sufficient numbers of students for further specialization in GIS. This grass root initiative resulted in an agreement between five Dutch universities at teacher level, to design a minor programme for all students from Dutch universities who want to improve their knowledge and skills beyond the introductory level, taught by the best and most motivated GEO teachers. The support of the “GEO Market Employment Foundation” (to be discussed later on in this paper) has been crucial in the actual implementation of this grass root initiative.

The minor focuses on third-year students who have completed an introductory GEO course at their university. In the Netherlands, we estimate that approximately 700 students from various disciplines have been introduced to GEO (computer science, physical sciences, social geography and planning, life sciences, environmental studies, economics, engineering, etc.). Within this pool of students, we aim to interest up to 40 motivated and qualified students for the GI Minor programme. Students coming from higher vocational education (HBO) with a basic knowledge of GEO-information are also welcome. A third target group includes professionals working in the GEO-information labour market who are interested in additional learning.

The minor consists of three parts:

- Two core courses: “GEOData Acquisition” and “Geographical Analysis and Visualization”. The two courses are taught by teachers of all the universities involved in the GI minor, and physically takes place at the VU University Amsterdam
- One or two specialization courses taught at the collaborating GI minor universities. These courses reflect the research specialization of each university, e.g “Land Use Change” at the VU University Amsterdam, “Spatial Accessibility & Transport Network Analysis” at Utrecht University, “Remote Sensing” at Wageningen University or “Visualization, Web Dissemination and the Quality of GEO Information” at ITC (Faculty for Geo Information and Earth Observation) of Twente University.
- A Research Assignment carried out at one of the private or public professional entities. Usually this implies a two month assignment carried out at the offices of the businesses or external organizations. The Research Assignment are a huge success: students are very motivated to enhance their GEO knowledge and skills when they see that this can be directly put into practice, and we receive very positive feedback from the external supervisors.

#### **Quotes from the GEO-information labour market**

*In areas where Arcadis advises, knowledge of spatial information is of great importance. Thus graduates who offer a broad range of disciplines with a specialization in GEO-information are valuable.* Gerben Koppelman, Chief information management Arcadis

*There are more and more services becoming available based on location information, computer power and the availability of data is infinite. We need people who know how to read this data, make it accessible and subsequently create apps for various usages.* Marcel Timmer, Director of Developer & Platform Evangelism Microsoft

*Within Shell, in which more than 80% of the information is location-related, knowledge of Geographic information is a valuable benefit.* Jack Verouden, Data Management and GEOMatics Manager, Shell

*In the information revolution in which we presently live, GEO-information is the connecting link. GEO-information is the future, directs the future.* Noud Hooyman, responsible for GEO-information policy in the Netherlands, Ministry of Infrastructure and Environment

*With knowledge of GEO-information, you can give optimal meaning to information within your own field of expertise, because you are able to discover patterns and structures.* Theo Thewessen, director Geodan

*I expect that the demand for trained personnel in GEO-information will greatly increase. This is partially due to the aging GEO-information labour market on the one hand and due to new requirements to streamline GEO-information into business processes on the other hand.* Peter Hoogwerf, executive GEO Land Registry

*For analyzing and visualizing satellite information and climate change, knowledge of Innovative GEOinformation techniques is crucial.* Dr.ir. F.J.J. Brouwer, chief executive of the Royal Dutch Meteorological Institute

*There is a need for T-shaped people, who have knowledge of two disciplines. If GEO-information is one of those disciplines, you process a unique combination of skills.* Jan Willem van Eck, Director of Strategy, ESRI Netherlands

*A basic knowledge and understanding of the potential of GEO-information is necessary in order to help resolve*

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Textbox 1: Quotes from the GEO-information labour market in support of the National GI minor programme.

### **2.3 Business – teacher dialogue in the Dutch National GI minor programme**

The Business sector is involved in the curriculum of the National GI minor in several ways. Representatives from the professional field play a role in the opening address of the programme each year, provide guest lectures, and assess, together with the university teachers, poster presentations of students for example. During the formulation, monitoring, presentation and evaluation of the Research Assignment, teachers and external supervisors are in close contact. At the closure of the minor, all external supervisors are invited to attend the student presentations, and actively engage in the followings discussions.

One of the nicest examples of setting up a “community of learners” are the Research Assignments carried out in the field of Geodesign, a rather new area of study. Geodesign concerns the sustainable design of a building, city, region or even the world, using (geo) information technology. Geodesign links professionals from various disciplines such as geographers, planners, architects and geo-ICT workers. Students of the GI minor programme were placed each at an external organization, exploring the conceptual as well as technical possibilities of Geodesign for that particular organization. As the software and concepts are very new and developing fast, every two weeks training and discussion sessions were held at the VU University Amsterdam for students as well as their external supervisors. In these sessions, the opportunities of Geodesign for e.g. Water Boards, Municipalities, and companies were interactively addressed, leading to a rich and meaningful learning environment for teachers, external supervisors and the students. The enthusiasm of this “community of learners” contributed substantially to the 3D developments in the Netherlands, such as the a manifesto “Breakthrough 3D” (2014), signed by more than 65 people from different disciplines. This manifesto displays the collaboration over the next years between government, science and industry to better align 3D initiatives in the future. The manifesto has been presented to the Minister of Economic Affairs, Mr. H. Kamp.

### **3. GEOSkills Plus Project**

In 2008 stakeholders in the Netherlands joined forces to improve the GEOspatial skills of students and to raise the number of students. The cooperation model was based on a triangle uniting the private sector, public sector and the education sector. Within the GEOSkills Plus project, we expand the dialogue to the European level. A pyramid model is proposed as foundation for cooperation to bridge the gap and raise awareness to improve the GEOspatial skills of students. After providing background information on the GEOSkills Plus project, we present the exchange of best practices and the business-teacher dialogue.

#### **3.1 Background of the GEOSkills Plus project**

##### **3.1.1 The Netherlands: establishment of a cooperation model**

The GEOspatial related businesses, governmental departments and education institutes concluded that the GEO market in the Netherlands was rapidly growing and innovating in 2008. The GEO Education and curricula were however not growing. The number of students were too low and the courses seemed to have a dull image amongst the students. This conclusion was the start for the establishment of a 'GEO Market Employment foundation' to address these issues with all the stakeholders that are involved.

The board members of the foundation were representatives of the GEOspatial business sector, government or the educational institutes.

The foundation focusses on three activities:

- Promotion: To create awareness among target groups with various means;
- Renewal: To initiate activities throughout the entire education chain in order to optimally match education developments with labour market needs;
- Cooperation: To develop initiatives in order to optimally connect private and public employers with educational and research institutions, as well as with students.

The first two activities focus on improving student enrolment of GEOspatial technologies curricula. The latter focuses on solving labour market issues, including the demand for good internships and starter jobs.

Since the start of the foundation several market studies have been executed to monitor the results of the work. The foundation contributed to the development of new and existing curricula and more students enroll the GEOspatial courses. Other countries are facing comparable challenges. Therefore the foundation also initiated the European project 'GEOSkills Plus' to exchange the best practices between countries and at European level.

#### **3.2 GEOSkills Plus: exchange of best practices**

The GEOSkills Plus project is an ambitious project aiming to encourage cooperation between GEOspatial vocational education and training (VET) in Europe and the labour market. In order to address this issue and exchange best practices, a consortium was formed by partners

from Belgium, Bulgarian, Lithuania, the Netherlands and two European branch organizations, CLGE and EuroGEO.

The project started in October 2013 and will be finished in September 2015. The project is financed by a grant under the Leonardo da Vinci Programme of the Lifelong Learning Programme from the European Union. The project is focusing on Vocational Education and Training (VET). During the project the research will focus on VET level but also take into account the developments at higher education.

The aim of this two-year project is to enable European countries to exchange best practices and innovation to overcome the mismatch between Europe's GEOspatial vocational education and training and the GEOspatial labour market. The project is divided into several packages, focusing on the challenges, best practices and innovations in Europe. Questions to be answered are:

- Who are the key players that need to take responsibility in order to improve the GEOspatial labour market? (Cooperation Model)
- What are the challenges towards meeting the needs of the labour market? (Bridging the Gap)
- What has been done so far in Europe? (Raising Awareness)

### 3.2.1 Identification of the gap<sup>3</sup>

In Europe there are different mismatches between the education sector and the other stakeholders. Within the project the Technical University of Vilnius (VGTU) carried out a study to define a set of gaps:

- Imbalance of the number of students and demand of the labour market;
- Discrepancy between expectations of job market (employers) and student's professional abilities (qualification, knowledge, practical skills etc.), (lack of motivation for life learning);
- Variance between the fast technological development and delayed improvement of study curriculums;
- Dissonance between narrow geo-specialized study programmes and multi-disciplinary needs of market;
- Inadequacy between locally educated students and internationally widening market (internationalization of the geo-market).

The preliminary analysis of gap existence in European countries is presented in Fig.1

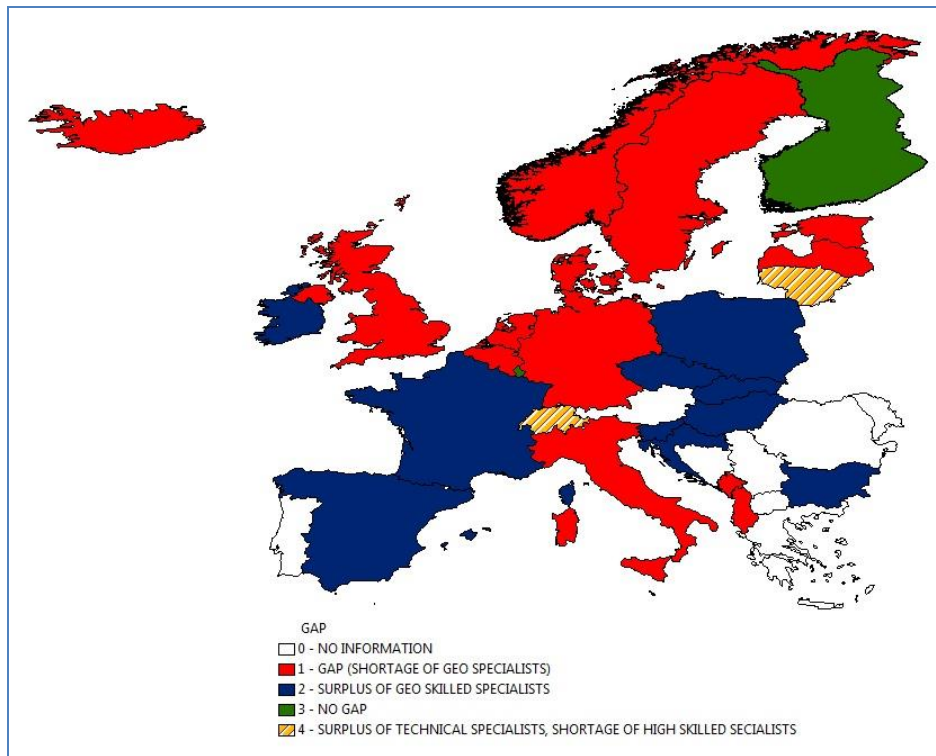
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<sup>3</sup> Source: reports on [www.geoskillsplus.eu](http://www.geoskillsplus.eu)

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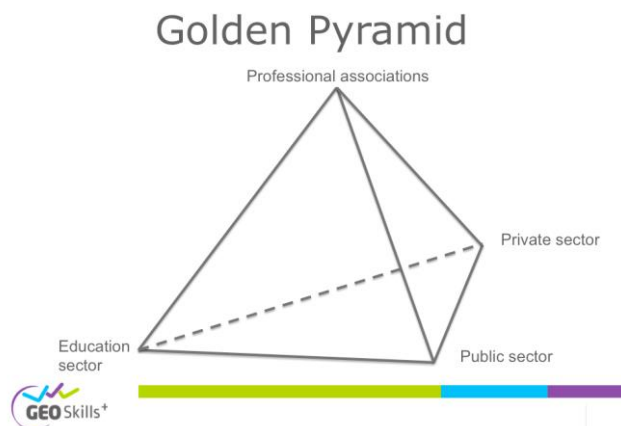


**Figure 1: Preliminary Gap existence in European Countries (Source: GeoSkills Plus project)**

The gap in each of the countries is a result of different backgrounds and mismatches. The Analytic Hierarchy Process was used to assess the influence of gap factors. These factors were divided into three main components: factors related to the GEO market, external factors and factors related to the educational system.

### 3.2.2 Pyramid Model

The Dutch cooperation model is based on a “Golden Pyramid” (see Fig. 2), uniting the GEO-business sector, the academic world, professional associations and the governmental side.



**Figure 2: Golden Pyramid for improving modern GEO curricula based on business - teacher dialogue.**  
**Source: GeoSkills Plus project.**

With an eye on future expansions of the ongoing project, it was decided to create a pyramid at the European level. Although educational issues are member state affairs or even sub-national affairs, it is useful to develop a pyramid at the European level.

The goal is to bring together the GEO community and its stakeholders in a structural way. Informal contacts exist all over Europe, but formalized approaches are lacking and this causes far from optimal outcomes. A structural cooperation within the “Golden Pyramid” will lead to a better understanding between the actors, an increased job matching and employability and will enhance innovative practices.

During the second workshop in Sofia in October 2014 it was stressed that human and financial resources are needed to get this Golden Pyramid up and running. Based on the Dutch experience, it is strongly advisable to start with the human resources and to address the financial questions in a second phase. Think big, start small.

### **3.3 Business – Teacher dialogue**

The best way to intensify the dialogue between teachers and business is to work together with all partners from the pyramid, as described in 3.1.3. Jointly the partners can discuss how to improve the alignment of the GEOspatial curricula with the current needs of the labour market.

#### **3.3.1 Best practices of awareness raising in the different countries<sup>4</sup>**

Based on best practices and research on specific national gaps and needs, the GeoSkills Plus project has established national awareness raising strategies promoting the benefits of geo-education for society to be implemented in Belgium, Bulgaria and Lithuania. The proposed awareness raising approaches for implementation can be divided into five broad categories: Personal communication, Mass communication, Education (including promotion campaigns among minors), Public Relations and Advocacy. The tasks foreseen within the implementation plan for each country are designated to address several target groups.

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<sup>4</sup> Source: blog on [www.geoskillsplus.eu](http://www.geoskillsplus.eu)

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**Personal communication** will focus on presentations to geo-related conferences and wider audience events, smaller-scale public fora, presentations or workshops to vocational and university students, parents, teachers and face to face meetings in schools addressed to vocational students and parents.

**Mass communication** to involve feature articles for promotion of geo-education and geospatial technologies in popular science magazines, posters and brochures with explanation of what geodesy and geoinformatics are and how they can provide excellent future professional realization of the students, a cartoon on geodesy, audio-visual resources (pre-recorded), short educational movies on GIS, a website/blog, media interviews and electronic publications accessible via the Internet, participation on local radio and television talk-shows.

**Formal and informal educational programs** can be carried out in schools, colleges, adult learning centers and libraries, museums etc. They could involve static and travelling exhibitions and displays, participation to science communication meetings and conferences, papers and presentations related to promotion of geo-education or geo-related exhibitions and demonstrations during popular events such as FIG Working week, European Night of Museums, Famelab International 2015 „Talking Science“ competition, European Researchers' Night, science fairs, Geospatial World Forum, and connecting with large scale events like International GIS Day 2015, Earth Day or International Map Year. As mobile technology is getting more and more part of our lives, geo-related games and quizzes could be also developed.

**Public relations (PR)** efforts should focus on establishing and maintaining the reputation and credibility of the awareness-raising campaign. Regular press briefings should be produced on geo-related events in order to stay in contact with mass-media. Promotion of Open Doors Days at vocational schools and universities should be also considered when appropriate.

**Advocacy** will try to form strategic alliances and partnerships with government, civil society and commercial organizations. Meetings with government officials, geo-sector business and dedicated NGO, involved in education are essential for raising key people awareness on geospatial matters.

The best practices in the analyzed countries include the organization of educational events such as GIS Day; Science festivals; researchers nights; specific meetings/events that connect employers, employees and educational institutions preparing future workers in the field; web initiatives like the GoGeo campaign and GeoPlaza portal in the Netherlands and Geomobiel project in Belgium; and competition-based actions such as the development of mobile applications.

## **Discussion**

How to achieve a better match between the needs of the GEO labour market and the knowledge and skills of graduates? We referred to various Dutch reports that shed light on this gap between the demand of the labour market, and the low interest of students in GEO science. The experiences of the Netherlands were up-scaled to the European level to analyze

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and discuss the conditions for successful alignment of market GEO needs and students' GEO interest.

The National GI minor example from the Netherlands demonstrates that by seeking collaboration, both between the universities at the national level as between the academic and business world, important results can be achieved:

- 1) *more students* can be taught in GEO information science, *exceeding the introductory level*. By concentrating the most motivated students in one programme, taught by the *best teachers* of the national universities, a high level of education in a specialised discipline can be achieved. This also meets the minimal numbers of students per course as required from the universities in order to deliver *cost efficient education*.
- 2) *New frontiers* in science and GEO business can be explored together. The Geodesign approach demonstrated that new developments in GEO science, can be explored by forming a community of learners with teachers, students and representatives of the professional field.
- 3) Intensified cooperation with all stakeholders can contribute to a *stronger GEOspatial sector*. Upon graduation, students have better GEO skilled. They fulfil the needs of the labour market and the demands of society and the environment.

The best practices of the participating countries in the GeoSkills Plus project can easily be recommended to other countries when there is need to intensify the dialogue between the education sector and businesses:

- 4) Mismatches in different countries can be addressed jointly. *Share experiences* on how to bridge the gaps is the most effective way. Cooperation with all stakeholders in e.g. joint *awareness raising activities* is expected to improve the quantity and quality of the students.
- 5) A *structural stakeholder cooperation* will lead to a better understanding between the actors. It will increase job matching and employability and will enhance *innovative practices*.

After sharing the grass root experiences of the Netherlands and the up-scaled experiences of the European projects there are plenty of questions left on the business – teacher dialogue in GEO science: how to involve the business community in the curriculum design? How to fine-tuning the needs of the professional field with the content of an academic curriculum? Are academic programmes too much inward looking? How much influence should the business community have on curricula design? What about academic independence and freedom? What should be the responsibility of the professional sector itself to train graduates in the relevant work processes of their businesses? And how would the professional field in the Netherlands react to BSc graduates as an end diploma instead of automatically asking for academic master level? And last but not least: how can we keep up with the current reality of fast development of technical tools, methodologies, applications and international GEO policies? If we want our societies to be able to take part in a single digital market, should not the GEO sector be in the front seat? We have to act and to cooperate to make this happen.

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Website [www.nationaleGImenor.nl](http://www.nationaleGImenor.nl)

Website [www.geoskillsplus.eu](http://www.geoskillsplus.eu)

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## **BIOGRAPHICAL NOTES**

### **Mathilde Molendijk**

Mathilde Molendijk works as a Manager at Kadaster International. She focusses on land administration in the region of Latin America and the Caribbean, where Kadaster is involved in projects in Guatemala, el Salvador, Suriname and Colombia.

Before joining the Kadaster, she worked as a Programme Manager at the VU University, coordinating the international MSc programme UNIGIS ([www.unigis.net](http://www.unigis.net)), the international MSc Programme Environment and Resource Management, the BSc programme Earth and Economics, and the National minor programme in GIScience. She coordinated several international GIS curriculum projects, e.g. in Asia and in Central Asia (e.g. the establishment of the MSc programme in GEOspatial Management in Central Asia (Asia Link program, EU, [tempusgem.zgis.net](http://tempusgem.zgis.net)) and an Erasmus Mundus student and staff exchange programme ([em-gsmart.zgis.net](http://em-gsmart.zgis.net)). Before the VU she worked as a researcher and teacher in Social Sciences in Paramaribo, at IMWO. During her career she worked on a regular basis as a training consultant for cadastral projects, in Honduras, Suriname, Bolivia, Paraguay, Slovakia, Albania, and Romania.

### **Paula Dijkstra**

Paula Dijkstra works as international coordinator for the Netherlands' Land Cadastre, Registry and Mapping Agency (Kadaster). She has a Master degree in Social Geography. Besides the GEOSkills Plus project she is responsible for tender management, project risk assessment, project administration and project archiving of the international projects. She has knowledge of different donor regulations systems for tender procedures. Also she is involved in the development of the international policies of Kadaster.

Paula is one of the visionaries behind the establishment of Jong Kadaster, a non profit association for young (new) Kadaster employees. Paula is also a leading player in building a global Young Surveyor Community. She organised the first European Young Surveyors Meeting (Lisbon, 2013) and the second Young Surveyors Conference (Kuala Lumpur, 2014).

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