



# Education: Surveying the Issues

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**Many science and engineering courses are facing falling numbers across Europe, at a time when there have never been so many young people going to university. The causes of this phenomena are complex. Are business, media and marketing studies perceived as an easier option, and a quicker route to riches, than engineering and geomatics? The author argues that in today's market-driven education many institutions need to re-focus their courses.**

**A**t the start of this academic year, in September last year, I had the honour of welcoming to my Introduction Geodesy lectures which I give at Delft University of Technology, exactly ten novice students, seven boys and three girls, all fresh from high school. Over the past quarter of a century the number of new students welcomed into my department at the start of the academic year has never been so low as in the millennium year. The number is no more than 25 percent of our top years.

During the last year, I have received several signals that this is a problem we do not face alone in the Netherlands. It is a Europe-wide problem, or even a worldwide one. The crucial question we face is: what are the reasons for this dramatic decline? This article is an attempt to answer this difficult question. In order to do so, we will consider a number of issues we believe are crucial. The issues, formulated as hypotheses, which we will scrutinise are as follows:

1. The large reservoir of high school students are no longer choosing beta-studies, amongst which is technology. This is because it has a low profile and does not offer sky-high career opportunities. Let's summarise this hypothesis as: "Wealth makes students opt for the easy road."
2. The content of our studies is regarded as 'fuzzy' and it is hard to communicate the logic of the curriculum.
3. There is no need any longer for professionals fostered with the knowledge and skills we provide them with.
4. Education as a commodity has become too expensive.

In the remainder of this article we elaborate upon the above issues in separate sections.

## Hypothesis I: the easy road

It is a general observation, at least within Europe, that high-school students having progressed to the point where they have to make hard choices, get worried about the forthcoming final exams, and increasingly opt for the non-technical, non-beta studies. Why do high school students have this attitude, of choosing alpha-oriented educational goals, where the demands are both lower intellectually and in terms of the effort required and course duration?

The easy way to explain this phenomenon is to state that our young generation has become

reluctant to do hard work. However, this is an argument which could be made at any time in history and is inadequate. In order to find an answer to this question I would like to quote D. van Andel, retired head of the research department of Akzo Nobel, who recently received a doctorate from my university. He states: "Too many students opt for an MBA. Everybody wants to become a manager, but when everybody is a manager who bakes the bread?"

Should one blame youth for their MBA choice? I don't think so. Times change, not people. However, young people today do have a very good nose for those prospects which are considered by their parents and society as important. On that list, 'Good Education' is written in capital letters. With the same capital letters the word 'Management' is written. Indeed, youth receives a plethora of signals that to become professionally involved in management is very attractive and brings prosperity.

For example, they see that the men and women who are managers can afford a bigger house, a larger car (or even two!) and more expensive vacations. Indeed, at least in Europe, the reward system – both at governmental level as well as in industry – is such that the more people you have under your control, the higher your salary is. An engineer, who is good in his skills but is not a people manager, will stay at the executive part of the production or R&D department. He will notice that his bank account will remain low. His family and neighbourhood will start asking questions, and, although very knowledgeable and skilful, and probably also professionally satisfied, he will feel unrewarded.

So, at high school your environment expects that you will become engaged in management, sooner or later. Why should one go the long road via the technical path? There are sufficient alternatives. It is much more profitable to start doing management right from the beginning. As a result, you will opt for studies where they teach you the necessary management skills. So, it is fairly unrealistic to expect our young generation to choose the heavy and often lonely technical path, when they receive a plethora of signals from the older generation that you're making a stupid decision when doing so.

An additional treat is that the more communicative young people step into non-technological studies, leaving technical studies to the more intellectually able students but perhaps with poorer communication skills. Since, technical oriented curricula do not emphasise very much the development of communication skills, the 'communicative' distance will therefore grow in the future, resulting in yet another bad signal towards younger generations.

## Hypothesis II: fuzzy contents

The last decade or two, many new sensor types have become operational or are under development. Examples are the high-resolution airborne and spaceborne digital cameras (such as those used in the IRS and Ikonos satellites), GPS and GLONASS, Laser Altimetry, and Interferometric SAR. The accuracy and level of detail of the geo-data which these sensors produce, not only supports national economies in fields like agriculture, forestry, mining, water and coastal management, marine fisheries and sustainable development, but they are also very useful for large-scale applications such as urban and infrastructure planning. This progress is accompanied by two other technological revolutions: computer technology and telecommunications in general, and more specifically the rapid growth of the (wireless) Internet. These developments are still expanding rapidly.

Dramatic changes are also taking place in the needs of society. This is because for many decades, an intensifying process of exploitation of the earth has been in progress, mainly induced by growing world population. One of its consequences is precision farming. Increased use and multi-purpose use of land causes increasingly severe problems including natural disasters and lack of drink water. As a result, today land is not only a source of wealth, as it was up to the 18th century, but it is also a commodity and a scarce community resource, which increasingly faces competing pressures. We know that we must take care of the environment, because we have the technology to destroy the weak ecological balances created through millions of years of evolution. As a result, we need to monitor and manage environmental processes and the effects of human activity at the square metre level, inducing a huge and steadily increasing need for geo-data.

In addition, humankind increasingly follows a busy lifestyle where we are frequently on the move and want to use that time efficiently. While en route, we want to have access to location-based services in order to help us with navigation or to find points of interest. The transport companies, both of goods as well as passengers, want to know where their vehicles are, instantaneously or off-line; the latter to carry out analysis for route optimisation purposes. These types of mobile geographic services, enabled by wireless communication, require good quality, up-to-date and timely geo-data.

Is our educational system in sync with these developments? I don't think so. We, as teachers, all notice that the above developments are increasingly important and affect tremendously our profession. Each of us regularly adopts what we consider as exciting advances into our regular courses, often on an ad hoc basis. Although all these technological developments bob up in our curriculum, because of the catch-and-grasp principle, there is not much coherence in it. Many aspects may be based on the same principles, but the principles are taught in different courses, from different backgrounds, and consequently result in a dispersed dissemination of knowledge. This may

be not all too dramatic from an academic perspective. In my opinion a person becomes an academic because he has learned to converge confusing, contradictory, and inconsistent knowledge, stemming from many different sources, into one consistent framework. However, when the divergence process goes on for too long a time, a new curriculum arises, which at first is regarded as a crude amalgam of non-fitting pieces.

It is hard to communicate the logic of such a curriculum and as a result it is difficult for our promotion team to "sell" this vehicle to high school students, who are raised with new and ever evolving technology. Given the above, one may thus expect that the promotional team will be unable to communicate a consistent curriculum. The curriculum is presented as the sum of courses, without an over-arching philosophy. The resulting confusing image absorbed by high school students is consequently, in many respects, old-fashioned and is not seen as quite the right invitation to join our courses.

The governments of many European countries have, in what has become known as the Bologna Declaration, adopted the Bachelors/Masters structure for higher education. The main reason to do so, is to arrive at a better harmonisation of the higher education systems within Europe.

In order to make our study sound more attractive, we have recently, within the framework of the Bologna Declaration, chosen a new brand name for our new Bachelors programme. The new name is Technical Geography. The advantage of this name is that one can make a story out of it. Since physical geography and social geography are existing courses (although often located in the soft sector of education) it therefore becomes much easier to explain that one can also study the technical aspects of geography; how one can collect information about the earth; and how one can use IT and communications technology to store, use and disseminate it. However, the contents of the three years of basic studies, remains largely the same in the transfer to the three years Bachelors programme. It is questionable whether a new name, without being accompanied by a rigorous new product, will be effective in the short or the long term.

## Hypothesis III: no market

About the third hypotheses (there is no need anymore for professionals fostered with the knowledge and skills we provide them with) we can be brief. Given the technological developments and social needs sketched above, and also the fact that each of our teachers steadily adjusts his or her courses according to new developments, there is no doubt that the knowledge and skills we teach our students is much in demand by many commercial firms and public organisations. There is no doubt that the professional skills and knowledge of our teachers is more than sophisticated enough and up-to-date to ensure that they transfer latest developments going on in their professional field to the students.



*Just what is turning off large numbers of young Europeans from Geomatics?*

## Education as a commodity

The change in our attitude to information, which took place during the last decade of the previous century, is noteworthy. Information has become a commodity like any other. Information stands at the foundation of any knowledge. One may readily state: without information, no knowledge. How does one

transfer knowledge? By Education. When knowledge is the king of information, why then can it not be a commodity like information? We see that this reasoning, which is naturally in line with the information as commodity paradigm, is increasingly gaining momentum. Governments in all western countries stimulate universities and HTOs to pull in foreign students. They do this, not because of social or development programmes but, because the export of knowledge brings profits.

The importance of knowledge for national economies has made a commodity of knowledge itself. The benefits of this export are expected to be twofold. In the first place, foreign students enrich the economy of the exporting country because of tuition fees they pay, which usually are typically \$5,000 to \$10,000 a year per course. In the second place and more for the long term, those who complete their studies will belong to the decision-making community in their home country. There, it can be expected that they will advocate the products and companies of the country from which they gained their own prosperity.

### Commodity or public good?

The US undertook an attempt to put education at the agenda of the World Trade Organisation in 1999. However, in Europe some forces are reluctant to do so, arguing that education can never be a commodity because it is a public good. However, is education really a public good? Education determines one's way of living. Certain studies are chosen because a degree in that sector results in high or even phenomenal earnings, such as the medical profession. Furthermore, all over the world there is strong demand for education.

In India, for example, there is a huge deficit of software engineers. In order to meet the export target of \$80 billion in software products by 2008, there are an additional 2.2 million high quality software engineers needed. To solve this problem, the upgrading of engineering colleges has been suggested as well as the creation of new ones. How should the costs associated with the establishment of these centres be distributed? Should it all be taxpayers' money, because society hopes to benefit from the resulting products? Or should the costs be paid by the students themselves, because they will gain huge profits, in the form of exceptionally high salaries, in the future? The model seems to be going in the direction of selling knowledge to the future software engineers. Are they then willing to pay the fees? Professionals already in the IT sector say that people will be ready to spend big money to get education in a sector where big money is to be made. So, when the rate of return on invested money is relatively short, people should have no problems in paying big sums to get a degree. Education therefore becomes increasingly engaged with the supply and demand principle.

Should education then be considered as a commodity? Frankly, this question is no longer an issue, because the train is already in motion and has travelled some considerable distance. Therefore, one must accept that education is a commodity, rather than swim against the tide!

### Conclusions

Being educated by highly qualified teaching staff, our students today are perfectly skilled and knowledgeable to attack many of today's technical problems induced by social needs. This type of professional is in high demand. Also the fact that education has become a commodity is not quite such a hindrance in attracting students, because it has become a general tendency – worldwide – that, when the return rate of the invested money is relatively short, students have no problems in paying big sums of money to get a degree.

The main answer to the central question we posed in this article: 'What can be the reasons for the dramatic decline of students enrolling in surveying studies?' is that our young generation does not opt for the heavy often lonely technical studies, because they receive a plethora of signals from the older generation that this is not an appropriate choice. In addition, the walls which have arisen in the past between departments in institutions of higher education, prevent rapid adaptation to the steadily changing needs of society and rapidly evolving technology. As a result, high school students perceive a fuzzy image of a variety of Victorian engineering studies which does not match with the world they are confronted with in their daily lives. Thinning and reshuffling of the walls would be appropriate to focus the image once more.

### Disclaimer

The opinions and views presented in the article are solely those of the author. They do not at all represent the opinions and views of the Delft University of Technology.

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