EUROPEAN COMMISSION
Directorate-General for Education and Culture

Lifelong Learning: horizontal Lisbon policy issues and international affairs
Lifelong learning: innovation and creativity

EDUCATION AND TRAINING 2010
WORK PROGRAMME

Cluster 'Mathematics, Science & Technology' (MST)

PEER LEARNING ACTIVITY (PLA)

organised by

the Dutch Ministry of Education, Culture and Science
and the Platform Bèta Techniek,
in cooperation with the European Commission
Directorate General for Education and Culture

REPORT

Theme: **The Dutch Delta Plan**

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Place: **Amsterdam, the Netherlands**

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Report, PPT presentations and documents: see website: http://ncm.gu.se/node/1959

A very special thanks has to be expressed to the Dutch Ministry of Education, Culture and Science and to the Platform Bèta Techniek for their outstanding support in the preparation, the organisation and the implementation of the PLA in Amsterdam from 13 to 17 November 2006.
A warm thanks also to all the people met during the PLA and who gave very useful information. Finally also thank you to all the participants to the PLA and especially to those who prepared and made a presentation.

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INTRODUCTION : THE MST CLUSTER AND THE PLA OR PEER LEARNING ACTIVITY

Role of the cluster

As underlined in the Commission staff working paper supporting the 2006 Joint Report, the second phase of the Education and Training 2010 work programme involves different activities using various working methods depending on the nature of the thematic priority being addressed. The aim is to ensure a flexible approach that takes fully into account the specific needs of countries and of thematic priorities in terms of policy development and implementation.

On the one hand, Peer Learning Activities (PLAs) have been developed since 2005 by clusters of countries sharing common interest in a thematic priority. Their aim is to bring policy implementation closer to national needs and situations. PLAs are a specific feature of the Open Method of Coordination under the Lisbon Strategy. On the other hand, activities planned also include other methods of work: seminars, conferences, thematic and expert networks, studies and research, expert groups, support from Cedefop, ETF and Eurydice.

In that context, the Commission has set up a specific cluster on the thematic: "Maths, Sciences and Technology". The word "cluster" is used to mean the grouping of interested countries around a specific theme, corresponding to their national policy priorities and key areas of the E&T 2010 work programme, and on which they have expressed a desire to learn from other interested countries, or to share with others their successful or unsuccessful experiences.

This « MST Cluster » is composed of the following participants:
Cyprus – Denmark – France - Germany - Island – Latvia – Malta - Netherlands – Norway – Portugal - Slovakia – Sweden - United Kingdom.

The specific objectives of the MST cluster

The specific objectives of the cluster are as follows:

- Developing set of objectives in relation to the theme concerned: Maths, sciences and Technology
- Identify and plan two PLAs, in agreement with the Commission and the host countries
- Ensuring for each participant to relay the information to the relevant stakeholder in their respective countries.

THE IMPLEMENTATION OF THE PLA ON MST IN AMSTERDAM

General information about PLAs is to be found in annex 6 which is an extract from the background paper of the MST Cluster and PLAs of May 06.

THE PREPARATION OF THE PROGRAMME

Following the Dutch proposal to host a PLA on the holistic reform in the field of science and technology (through the delta Plan: Bèta Techniek) and the interest expressed by the members of

the MST Cluster at the meeting of 4 May 06 in Brussels, the concrete preparations of the PLA started in July 2006.

A preparatory meeting for the PLA was organised in the Hague on 18 August 2006. Ana Serrador of DG EAC was present together with the consultant. Several representatives of the Dutch Ministry of Education, Culture and Science attended the meeting plus representatives of the platform Bèta Techniek which assists the ministry in the implementation of the Delta Plan Science and technology. After some discussion it was agreed to organise a PLA on Maths, Science and Technology from **14 to 17 November in Amsterdam**.

The selection of the theme

The Dutch colleagues proposed during the preparatory meeting that the PLA would coincide with the **National Summit** to be organised at the occasion of the **interim review of the Delta Plan Bèta Techiek on Wednesday 15 November 2006.** It was agreed that the PLA t would integrate the activities related to the one-day National Summit on the Delta Plan / Bèta Techniek.

It was stressed that this day will focus on all the activities and initiatives taken so far over the past two and a half years to implement the plan to promote science and technology in the Netherlands at all educational level and strongly focusing on cooperation with industry (e.g. JET Net) , research centres, social partners etc.

It was thus agreed that the PLA would mainly focus on the development and the implementation of a holistic / systemic policy to promote MST at all levels of education. The fact that the PLA coincides with the interim review was considered to be a very strong element as particular focus could be given to the evaluation or assessment of policy development and policy implementation in the field of MST

It was agreed that the PLA participants would be able to select from the following **sub themes** according to their interests: (this is a provisional list!)

- **The gender issue in MST**
- **Cooperation school / University / teacher education and industry / research**
- **The role of teachers and teacher education in promoting MST**
- **Governance;** the impact certain MST policy measures may have on the organisations of schools, universities etc.
- **The transition from secondary education to higher education**

THE IMPLEMENTATION OF THE PROGRAMME

General remarks

The final programme added as an annex shows that the different elements that have to be in a PLA were indeed integrated. It was possible to implement the programme fully thanks to the perfect organisation of the Platform Bèta techniek.

There was information about the Dutch education system. There were extensive presentations on the Delta Plan Science and Technology by the decision-makers of the Ministry of Education, Culture and Science and by with the representatives of the Dutch Platform Bèta Techniek that supports the ministry in the implementation of the Delta Plan Science and technology.

There were several sites visits: one to the Science museum NEMO; one to the Blaise Pascal school (Penta College) in Rotterdam and one to the Junior College of the University of Utrecht. The fact that the PLA coincided with the Summit on the delta Plan enabled the participants to be in contact with numerous schools and organisations involved in the implementation of the Delta Plan Science and Technology.

As scheduled there were two half days of the programme dedicated to reflections on the information given and to the presentations of three of the participants. Finally time was also invested in cultural events such as a visit to the Hague over lunch and in wonderful social events such as the dinners in the restaurant of Jamie Oliver in Amsterdam and the New York restaurant in Rotterdam.

A DETAILED OVERVIEW OF THE PROGRAMME

INTRODUCTION: MS ANA SERRADOR, DG EAC, IN CHARGE OF THE CLUSTER MST

Ana Serrador started by thanking the Dutch Ministry of Education, Culture and science and the Platform Bèta Techniek, for the tremendous work they had done in organising this PLA. She then expanded on the objectives of the PLA stressing that PLAs should strengthen mutual learning and deepen the exchange of good practice between countries sharing similar concerns, in order to develop a common understanding of success factors for the improvement of policy-making and the implementation of reform.

She also stressed that PLAs should contribute to the policy-making at national, regional and European level through enhanced, practical cooperation, and by encouraging policy makers in participating countries to take full account of existing EU instruments (For example the indicators and benchmarks, the common references such as common quality assurance framework, key competences framework, policy framework on making best use of resources, teachers/trainers framework, etc. and policy recommendations resulting from the first stage of the E&T 2010 work programme, which should be used as a basis for structuring the PLAs) in the development of national education and training policies and systems.

THE KEY ELEMENTS OF THE DELTA PLAN SCIENCE AND TECHNOLOGY

Strategy & Approach

In the introduction on the strategy of the Delta Plan Bèta Techniek (Science and Technology) it was stressed that the starting point was the fact that the Netherlands want to become prominent knowledge economy, leader in the areas of education, research and innovation: economically competitive and socially innovative. In order to excel, the Netherlands needs a boost in science and technology making better use of technology and human talent, so as to successfully introduce innovations into society. Science and technology are powerful catalysts or growth and employment opportunities. Investing in science and technology brings rewards.

It was stressed that scientists and technical experts are needed in all sorts of fields: not only outstanding academics doing ground-breaking research, but also professionals running production processes. There is a whole world to be won, extending beyond traditional technical sectors. The service industry, healthcare, media, entertainment, transport and logistics offer opportunities through better integration of science and technology to create smarter and more productive working processes and better services. This is an innovative movement with the characteristic features of a learning organisation. The Ministry is eager to provide interested schools, companies etc. with tried-and-tested concepts. At the same time, the ministry is open to being surprised by fresh ideas and unexpected alliances. This facilitates optimal use of our combined talents for innovation and growth.

Influence on the choices of the young

Despite the good market opportunities, there are relatively few young people choosing to take science and technology subjects. Young children generally have a positive attitude toward science and technology subjects, but many give them up around age 14 or 15, partly due to the negative image that is given. Science and technology subjects are seen as one-sided, offering few opportunities for development. Moreover, in the current supply-driven education system, pupils have to make specific choices at a young age. That early selection is part of why many young people turn away from science and technology at an early age. Young people feel that a career in science or technology offers too little perspective. The social relevance of such professions is also not clear.

Pupil and career are key elements

It is crucially important to increase young people's interest in science and technology. From primary education to university, from vocational training to the business world: together, they face the challenge of making young people aware of the vast potential that science and technology offers in all areas of life. Together, an innovative education centered on the pupils and their talents can be implemented. With teachers who are alert to crucial points during young people's (school) career, e.g. when choosing a specialisation and study programme. Employers and sectors can offer more appealing careers and utilise their technological talents more effectively.

Focus on talent and innovation

The Science and Technology Platform (Platform Bèta Techniek)has the task of increasing enrolment into, progression through and graduation from science and technology subjects. That goal is achieved by offering a quality approach and customised solutions, with good, appealing study programmes – including new options - that meet the demands of the (future) jobs market – and by offering appealing jobs. The main goal of the Platform is to contribute to a dynamic knowledge-based economy, in line with the ambitious Lisbon agenda set by the European Union. In this regard the

Platform primarily focuses on the development of scientific and technological talent – the human capital that is worth its weight in gold.

Realising ambitions

Whether you work for an education or knowledge institute, in a sector or a business, everyone has ambitions. Your business may want a stronger science
and technology recruitment policy. Your school may have plans to integrate subjects or introduce continuing learning tracks; a university may be expanding its bachelor's programme. Ambitions are the first step, but putting the plans into practice comes next. By joining the Platform's innovative programmes, organisations can make their ambitions a reality.

Joining a growing network developed by the Platform

It was stressed that the science and technology movement is gaining in strength and speed. There are now 1330 primary schools, over 150 secondary schools, almost 175 VMBO schools, 10 regional training centres,18 polytechnics and 10 universities that are working with the Science and Technology Platform on high-quality education.
Challenging science and technology education that offers opportunities for top talent, while giving people with less training the chance to join a modernised knowledge-based and service economy. The same applies to an increasing number of businesses, sectors and regions that are working with the Platform to develop potential and a career policy for scientists and technical experts. The growth of the science and technology movement offers opportunities. It is a good time to join in, and for those already involved to take advantage of the growing network and the opportunities to learn from each other's approach. The Knowledge and expertise available in the fields of innovation, science and technology continue to grow.

Personal responsibility at one's own pace

In the Platform programmes, institutes, sectors and businesses take responsibility for innovation. Organisations decide for themselves how they innovate and set their own pace. The Platform plays a role as an initiator and provides innovative solutions. Active support is offered in the form of advice, feedback and practical assistance. Everything is geared to realizing the ambitions of the participating organisations. The partnership is formalised in clear performance and innovation agreements between the platform and the participating institutions.

Profiting from knowledge base and expertise

Organisations that choose science and technology can count on inspired services from the Science and Technology Platform, which is the linchpin of expertise in the field of science, technology and innovation. The Platform offers additional financial resources, but primarily focuses on advice, monitoring and auditing, expert meetings, focus groups and knowledge exchange. This allows businesses and institutes to profit from the knowledge network and know-how of the Science and Technology Platform. Practical solutions and in-depth research yield the insights needed to apply solutions in other contexts as well. This knowledge base only continues to grow.

Feedback as a mirror

One important part of the partnership is monitoring and auditing. Experts from the Platform regularly discuss the actual situation with the participating schools and businesses. This feedback allows them to show everyone a mirror of their work. Institutes and businesses gain insight into how

effective their measures are. In part thanks to the support from the Platform, organisations can maintain a consistent line and constantly improve.

The right connections

The Science and Technology Platform makes agreements at the level of the school, institute or sector, and also tries to create favourable preconditions at national and regional levels. The Platform makes the right connections, e.g. by forging alliances of politicians, employer organisations and the education sector. The approach is also in line with the policy lines in the Industry Letter (Industriebrief), the Memorandum on Peaks in the Delta (Nota Pieken in de Delta,(Ministry of Economic Affairs),the Direction for Primary and Secondary Education (Koers Primair en Voortgezet Onderwijs),restructuring of MBO senior secondary vocational education and the science and technology sector plans for HBO higher professional education and university education.

The Platform also signed covenants with industrial areas such as Eindhoven, Limburg and Twente. There is close cooperation with well functioning regional networks such as the Techno-centres, the ITSO cities and Syntens. Arrangements with sectors will provide form and content in the coming years for the broad science and technology ambitions.

Knowledge development

Successful innovation is closely connected to the way in which organisations gain, apply and share new knowledge. To promote knowledge development, the Platform worked with the ROA Research Centre for Education and the Labour Market to set up a research programme. Newsletters, an annual essay collection entitled Technotopics and the biannual Technomonitor offer access to trends, developments and data in the field of education and the labour market. The Platform also supports action-driven research and is involved in exploring the state of science and technology in various fields and sectors.

Sharing knowledge

Innovation demands open source networks where knowledge is shared. Each Platform programme therefore ensures accessible infrastructure. Such formats as online knowledge banks, multimedia presentations, expert meetings and master classes ensure that everyone in the science and technology movement can share experiences, via a low-threshold point of access.

CHOOSING A LONG-TERM APPROACH

The Platform works with organisations whose goals and plans are embedded in their organisational policy, so that innovation continues even after the temporary incentives end. To facilitate this, the Platform has developed a **compass**, setting out guidelines for realising the science and technology ambitions. The guidelines are based in part on successful experiences that the organizations have had.

The compass is composed of 6 key elements as parts of institutional policy:

- Image and representation
- New methods (new didactics/ reorganize work)
- Chain approach
- HRM-policy

- Professional orientation & career development
- Innovation (contents, products & processes)

Setting a course by a tried-and-tested compass

Businesses and institutes can use the guidelines to draw up their policy. They determine for themselves whether they want to use all the elements of the compass as an integrated whole or only certain elements. Organisations can also work in stages, starting with a few elements – such as HRM policy, new forms of working, career orientation – and later embracing others, such as a chain approach, image and conceptualisation.
The more compass elements schools and businesses integrate into their organisational policy, the greater their chance of successful innovation and of strengthening the position of science and technology.

Good organisation,clearly defined programmes

To give the science and technology movement the power and drive it needs, focus is required. A good organisation and clearly defined goals make it possible to actually realise innovative ideas. Based on expertise acquired and concrete experiences from the world of science and technology, the Platform has developed programmes throughout the chain. Tailored to various sectors of education and the labour market, these programmes give schools, institutes and sectors the opportunity to take control of implementing their ambitions in the field of science, technology and innovation.

Different images, different choices

Besides this sector-and programme-based approach, the Platform also aims to increase awareness and improve image. Working with players from the education sector and the labour market, the Platform is seeking to change the way people see science and technology – for example by showing young people different worlds in science and technology, different images that can change their minds. The 'worlds of science and technology' fit in with young people's motivations and the innovations in education. These worlds also offer businesses and institutes openings for communicating effectively with young people. Direct connections that create a dialogue involving young people, students and professionals are important in that context. The Platform is accordingly closely involved in the Youth and Technology Network Netherlands (Jet-Net), which creates direct contacts between pupils and researchers from the business sector. The Platform also supports what are known as one-on-one networks between students and pupils in the "science 1 on 1 " ("beta 1 op 1") programme, in cooperation with the higher education sector.

OBJECTIVES OF THE DELTA PLAN

Long-term objectives

Objective: more employees that make a contribution to innovation.
Indicators:

1. More attractive, more differentiated and more popular education in science and technology throughout the sector, manifesting itself in a lower dropout rate and more graduates from the vocational sector and S&T university study programmes;
2. More attractive career prospects for knowledge workers and, especially, among scientists, engineers and researchers on the labour market.

Medium-long term objectives:

Objective: 15% more graduates from the higher S&T study programmes in 2010 than there were in 2003.
Greater balance between the intake of men and women. Better international recruitment position forscientists and engineers.

Interim objectives for 2007

1. 15% higher intake for 2007;
2. higher intake of women and ethnic minorities;
3. more foreign students and knowledge workers.

THE PLATFORM BÈTA TECHNIEK (SCIENCE AND TECHNOLOGY)

The implementation of the Delta Plan Bèta Techniek is the responsibility of the Platform Bèta Techniek. The Platform was commissioned by the government, education and business sectors to ensure sufficient availability of people who have a background in scientific or technical education. The aim: to achieve a structural increase of 15 per cent more pupils and students in scientific and technical education and to use existing talent more effectively in businesses and research institutes. The aim is not just to make careers in science more appealing, but also to introduce educational innovations that inspire and challenge young people.

The Platform therefore targets schools, universities, businesses, ministries, municipalities, regions and sectors. The objective is to ensure that the future supply of knowledge workers will meet the future demand.

It is not simply about 15% more beta technicians. It is about working to create talent for the future: more beta technicians who have broader competencies, and increased affinity with science and technology in the entire population. It is also about more effective deployment of the talented professionals already in the job market. Particular attention is paid to women and ethnic minorities. A broad approach is needed. The approach is divided into the 5 subprogrammes outlined below. Full information is to be found on: http://www.deltapunt.nl/

SUBPROGRAMMES OF THE DELTA PLAN BÈTA TECHNIEK (SCIENCE & TECHNOLOGY)

The following subprogrammes of the Delta Plan Science and Technology were presented to the PLA participants

- **VTB: Verbreding Techniek Basisonderwijs** (**Enlargment Technology**
- **Primary school)**
- **Universum (supporting schools with a science profile in general**
- **secondary education, HAVO and VWO)**
- **Ambitie or Ambition (supporting lower and upper secondary vocational schools: VMBO and MBO)**
- **Sprint (More students in science in polytechnics HBO and universities**
- **Act (Promoting appealing careers in technology)**

The programme :VTB (Verbreding Techniek Basisonderwijs)

Start young for later / Innovative Primary Education

Linking exploratory learning and technology with their fields of learning as an excellent means of forming modern and motivating learning environment or children. VTB, together with regional networks constitutes a major reform in primary education. There are already 1,330 primary schools working in the programme. Teacher training colleges are involved too. They translate the key technology aims into competences for future teachers. A total of
2,500 primary schools will e given an extra impulse with VTB up o 2010.All primary schools will then also have access to the knowledge and skills they have developed. The knowledge infrastructure will be strengthened by the establishment f a center of expertise, linking various databases and lecturers.

The added value of VTB

- Extra energy and dynamism: schools can fulfill their own ambitions
- Technology will become anchored in school policy
- Schools can promote themselves in their surrounding areas
- Expertise will be combined and promoted
- Integrating subjects will become easier through broadening them within VTB
- Schools will be supported regionally by a network made up of schools, businesses, technology centres, guidance services and science centres
- Smoother tie-up between primary education and the first years of secondary education.
- What ’s learnt young will be remembered later. That ’s why it is important to encourage children ’s inquisitiveness and to bring them into contact with technology at a young age in a way that appeals to them. The Verbreding Techniek Basisonderwijs (VTB) programme (Broadening Technology in Primary Education) corresponds well with the ambitions and facilities primary schools have. Already there are many primary schools that have proven that children learn more effectively and have more technical skills when there is enthusiasm for technology.

The programme : **Universum**

Better off with science / Creating a distinct profile in science

More and more schools are joining the Universum Programme. In 2006, some 70 schools were added to the first 30 pioneer schools. Monitoring, auditing and meetings allow schools to share experiences, proven concepts and good practices with each other, thus working together to build national innovation. Each Universum school nominates a following school,which it supervises and which may develop into a Universum school.

The added value of Universum

- Schools can create a distinct profile for themselves in science
- Strong appeal for pupils, parents and (future) teachers
- Schools take a structured approach to improving quality based on a compass that education institutes developed themselves
- Access to an active network for advice, expertise, feedback and various forms of practical assistance
- Taking a leading role with new developments in the science subjects and in developing the new science subject: Nature, Life and Technology
- Connected to a network of universities, polytechnics, knowledge institutes and businesses. The Universum school is close to social developments, which facilitates a smoother transition to higher education
- Close cooperation with Jet-Net, the network that brings young people and businesses together.

The programme : Ambition programme

Backbone of the knowledge-based economy

VMBO (upper /senior secondary vocational) schools and regional training centres that join the Ambition Programme face a challenge: bringing their education programmes more into line with young people's preferences and the demands of the labour market. Pioneer schools show that relevant, appealing education inspires more young people to choose technical studies and to progress to continuing education and work. Through shared knowledge and experience, the Ambition Programme invites schools to innovate and achieve excellent performance across the full scope of technology.

VMBO (lower secondary vocational schools) Ambition

Forty schools can sign up for the Ambition Programme each year. Participating schools gain access to knowledge and experience that they can use to realise their own ambitions. An interactive process of monitoring young people, teachers and school management makes it clear which innovations have an impact. In the VMBO programme, the Science and Technology Platform works with the Techno-centres, Schoolmanagers and Platforms representing vocational education and training.

MBO (upper secondary vocational schools) Ambition

The Ambition Programme or BO senior secondary vocational education) will start in 2007 with 7 schools. More than 20 schools will ultimately be able to participate. They make that choice based on the ambition of making intermediate technical vocational education as appealing as possible to all

those involved. Attractive, relevant education brings on more students, while improving progress and graduation into the labour market.

The added value of Ambition
Schools that affiliate themselves with Ambition:

- Profit from the latest insights in student enrolment, professional fields and teaching.
- Share knowledge with their institutions to introduce innovations that lead o greater achievements
- Receive support from the Platform in realizing their ambitions.

The programme : **Sprint**

Science and technology at top speed / Cherishing science and technology talent

Science and technology play an essential part in all aspects of our rapidly developing world. Scientific knowledge and skills are therefore wanted on the labour market and offer students important assets for their future.
Education can respond better to this need. More variation in the width and depth, close-knit networks with secondary schools and vocational training, close cooperation between HBO and academic institutions. Sprint also encourages good cooperation with businesses, research institutes and alumni networks.

The added value of Sprint

- Sprint links in with the internal ambitions and innovation policies of polytechnics and universities
- Active support with the network in the form of advice, expertise, feedback and various forms of practical assistance
- Access to networks of ambitious science schools and pupils
- Extra attention to student enrolment, progress and graduation
- Support in realizing continuing learning tracks and in educational innovation to offer students more variation
- Better supply of future researchers at universities
- Broader options for strengthening ties to businesses
- Option of developing educational programmes offering interesting content, which combine quality with appeal
- Educational institutions gain a clear picture of the progress of their educational innovation. Sprint is a learning programme.

The programme : **Act Programme**

Appealing careers, innovative businesses / Better sectors,strong key areas

The ACT Programme helps employers to take a structural approach to availability and better deployment of scientists and technical experts.
For example, science and technology action agendas have been drawn up for technical sectors and an inventory has been made of the 'human talent' dimension of the key innovation areas. The aim of this is to guarantee the ongoing availability of talent for the strong innovation clusters in the

Netherlands. Integrated regional action plans are also being implemented in active innovative industrial core areas, such as in Eindhoven,Limburg and Twente. The Casimir programme shows that public-private mobility makes the job of researcher more appealing. It will be enlarged towards the future.

The added value of ACT

- Reduce the shortage of science and technology staff
- Businesses and institutions strengthen innovation and competitive capacity by
- systematically developing talent for their company
- Benefit from pooled strengths in the network and resources of the Platform, Syntens, Techno-centres, regional and local governments.
- Employers benefit from the extensive network of ambitious science and
- technology-oriented educational institutions
- Businesses and institutions benefit from each other 's knowledge and from successful, sometimes unorthodox concepts
- Improve the image that younger generations have of the world of science and technology
- Researchers gain valuable experiences that strengthen their career potential

JET-NET

Jet-Net was set up in 2002 between - at that time - five major companies, the economics and educations ministries, Dutch employer's organizations and intermediary organizations in the education sector. Its prime aim is to stimulate increased interest among high school students to pursue their studies and future career in Science and Technology. Direct encounters with technical experts from the businesses give pupils a much better image of working in the technology sector, which allows them to choose a better course. Lesson modules, 'engineers for the classroom', career guidance and all sorts of excursions offer pupils a fresh new image of technology in businesses and its value to society.

Facts and figures

- target increase of annual enrolment in higher science and technology education: 5000 students;
- 25 active (mainly large) industrial companies (with over 60 operating units or company locations) in all regions;
- An additional 180 individual engineers and technologists of a wide range of companies participate in school briefing sessions for students;
- 125 participating schools (= 25% of all pre-college schools in the Netherlands);
- 300 science and math teachers are involved on a regular basis;
- average input (capitalized employee capacity and out of pocket expenses): 25k / 35k euro per school/year;
- effectiveoutreach: 25.000 students per year participating in Jet-Net activities.

Jet-Net Quality development and standardization

Special teams are assigned to assist the Jet-Net companies in quality development and in formatting the various types of program components, thus facilitating effective relations with the schools.

A joint venture in all respects
Jet-Net makes a substantial contribution to the overall innovation of pre-college education. This is a major success factor for Jet-Net and for the schools involved.

Jet-Net Programs
Programs are established between individual schools and companies, ideally covering the entire school period. They are both geared to add practical context to the science curriculum but also to enlighten students on the broader career prospects in industry and technology.

Jet-Net Excursions and guest lectures
As part of an initial orientation program companies assist schools in allowing students to develop a general understanding of industry and technology.

Jet-Net Workshops and projects
Students are given group assignments in which they learn to present a report on specific themes, or to develop a solution to a specific technological problem.

Jet-Net Individual assignments
Company staff can assist individual students, e.g. in setting up their end of school thesis.

Jet-Net Regional and national Events

Jet-Net Career Day
Each year students of Jet-Net schools aged 16-17 years are invited to participate in a major educational event offered by the Jet-Net companies. In 2005 some 1500 students experienced examples of new technologies in many fields and had various interactions with young engineers and technologies on the prospects of a career in industry and technology.

Teachers Events

Both in the regions and at national level Jet-Net companies regularly invite teachers of the schools for special sessions. These are designed to further enhance their joint programs and to provide teachers with a broad outlook on current trends in industry and technology. Also they allow the companies to better understand the needs of the schools.

RESEARCH INTO ATTRACTING TALENT INTO MATHS, SCIENCE AND TECHNOLOGY

Dr. Jan de Lange gave a keynote speech focusing on the research programme 'The talent programme' of which the objective is to pinpoint which talents children have and how those talents can be built on to the benefit of promoting maths, science and technology. The research is cross and inter-disciplinary involving researchers and scientists of various nature such as psychologists, neurologists, scientists, pedagogues etc.

The instruments to do this new type of research (supported by the Ministry) are the following ones: observe children 'in the wild' and to give parents 'eyes' so that they can spot and encourage the talents of their children.
It was stressed that the 'sparkling coefficient' had to be promoted with children and that talents had to be charted early on to be tapped into and promoted. It was stressed that rich activities had to be promoted to as to raise and stimulate the child's interest and curiosity and keep the sparkling coefficient well alert.

This lecture and the lecture given during the Summit (mentioned later) by Dr. Annette Karmiloff-Smith showed the importance of investing in new types of research which can help promote the interest for maths, science and technology with children up from a very young age. It was stressed that a better overview of research into promoting maths, science and technology was needed and that new initiatives had to be developed in that area.

THE ACTIVITIES TO PROMOTE SCIENCE AND TECHNOLOGY AT A CRUCIAL AGE

During the visit to the Blaise Pascal school (part of the Penta College) in Rotterdam, the participants to the PLA were able to see how this school organises for youngsters of about 15 years of age and who have to make a choice towards their future studies, activities to promote their interest for maths, science and technology.

There was a variety of activities: one was the speed dating for girls organised by VHTO mentioned here below and there were other activities for boys and girls. One of the activities was organised by the Stichting Techniekpromotie of the Technical university of Delft. Engineering students are involved to promote maths, science and technology with school children. Another initiative involved future science teachers promoting science with pupils at that school.

The activities of VHTO: gender and MST
National expert organisation on girls/women and science/technology

VHTO makes an effort - in many different ways - to increase the involvement of women and girls in technology education, the technological employment market and government policy.
VHTO has a great deal of (quantitative as well as qualitative) data about female technology students and engineers, and up-to-date expertise about technological education and fields of employment. VHTO employs this expertise (among other things) to realise improvement in the following areas:

- Quality improvement and expanding the allure of technology education
- Supporting junior female engineers and assisting them in their career development
- Support in the recruitment and career policy of the technological business community

Improving the connection between technology education and the knowledge and interests of girls in secondary education.

As a result of being the national coordinator of WiTEC (Women in Science, Engineering and Technology in European Countries) VHTO is able to set up and test initiatives in the field of women and technology with transnational partners. In addition, participation in this European network offers many possibilities for translating foreign renewal impulses to the Dutch education and employment market.
Although the innovative activities of VHTO are primarily focused on women and girls, they have a much broader impact. Female as well as male students and engineers take advantage of these innovations.

VHTO is organising the following activities:

- Speed dating: young girls of about 15 about to make a choice in secondary education, talk with female professionals in science and technology.
- Promo teams: universities involve female students when organising public information and recruitment activities in S & T.
- Mentoring: a woman with broad work experience (mentor) is linked to someone with little experience or to some still in training (mentee).
- Work shadowing: one or more female secondary school pupils or students are taken to the workplace by a female professional.
- Visiting lecturers: they go to schools to give lectures about S & T.
- Equilibrium. This publication concentrates on the combination between worktime and private life time.
- Employable is a research on careers of male and female engineers
- WiTEC. VHTO is coordinator of WiTEC in The Netherlands. WiTEC is a European network of universities (for scientific studyfields), universities in higher education, enterprises and individuals. WiTEC means Women in Science, Engineering and Technology in European Countries

JUNIOR COLLEGE UTRECHT

Traditionally, in Dutch senior secondary schools little attention is paid to differences in abilities within a class. In 2004, Utrecht University and schools from the Utrecht region decided to develop a radical initiative to tackle this issue: **the Junior College Utrecht JCU**. This is a school for the last two years of VWO (pre-university education). JCU started in 2004 with 25 5VWO students that were selected from 13 schools. It is located at the University College Utrecht campus. JCU-students follow all their physics, chemistry, biology and mathematics lessons in the JCU. The other lessons are followed in their own schools. A special two year curriculum has been developed, taught by eight secondary teachers from partner schools and by a number of university teachers. The initiative was planned as a pilot project for 3 years. In 2005, the 2004 group passed to 6VWO a second group of 50 students (two classes) was selected. In April 2006, the first group took the final examinations. A new group of 50 students was selected and started in August 2006. Many students are interested in participating in the JCU. The 'JCU open day' attracted 170 interested students and their parents. About 75 students are selected by their schools to apply for the JCU. They will be invited for an interview and about 50 students are selected to start in the course.

The JCU curriculum

The JCU has two main goals, one aiming at the education of talented students and one at the innovation of science education in upper secondary schools:

- To offer an interesting and challenging science education program to talented and motivated students (age 16 – 18)
- To provide a working place to partner schools for innovation of the science and mathematics curricula

The JCU curriculum has five characteristics that are different from science curricula in regular VWO (general secondary) schools.

1. Accelerated pace

This implies that subject matter from the national VWO syllabuses biology, physics, chemistry and mathematics is taught in a shorter time than on usual VWO schools. Thus, a half year time is saved to study topics beyond the syllabuses.

2. More comprehensive

In spite of the accelerated pace, the curriculum is taught in a more comprehensive and profound way than at the regular VWO-schools. E.g. the students do lab work using university laboratory facilities; more attention is paid to theoretical and research backgrounds of syllabus subject matter.

3. Focus on coherence of sciences

As all JCU-students study the full science and maths curriculum, it is possible to pay much attention to the coherence of the sciences. Among others, this has resulted in including interdisciplinary projects in the curriculum.

4. Stimulating students' inquiring attitude

Students that are interested in the sciences should get much room for asking their own questions and finding answers, for developing their inquiring mind. Therefore, in the JCU-curriculum an inquiry curriculum line is implemented. That implies open inquiry assignments in the subjects as well in interdisciplinary projects. This line results in two big investigation assignments guided by researchers from Utrecht University:

- the pre-thesis at the end of the 5Vclass
- the JCU thesis half way the 6V class

The JCU thesis agrees with the 'profielwerkstuk' that is part of VWO examination, but it counts 120 instead of the regular 80 student hours.

5. Enriched program

In addition to the VWO syllabuses, topics beyond the syllabuses are taught. In the 5V classes these have the form of a seminar or a lecture on a topic, of an excursion to a university lab, or of a project. In the 6V class, university modules of a large size are taught by university specialists, elaborating issues at the front of research.

Titles of some interdisciplinary projects	Titles of the university modules
DNA (biology and chemistry) Human perception (physics and biology) Luminescence (physics and chemistry) GPS (physics and mathematics)	Modeling Astrophysics HIV/AIDS Nanoscience

THE FLYING DUTCHMAN: SCIENCE AND TECHNOLOGY SUMMIT 2006

As mentioned earlier the PLA coincided with the Flying Dutchman, the science and Technology summit organised by the Platform Bèta Techniek on behalf of the Ministry of education, Culture and Science. It took place on Wednesday 15 November in the Passenger Terminal in Amsterdam and was attended by some 150à teachers, heads, companies, senior officials and people promoting science and technology across the Netherlands.
The day was composed of presentations and discussions focusing on what had been achieved after two and a half year by the Delta Plan Science and Technology. It was also an opportunity for schools to see what had been achieved as there were numerous stands of schools with their projects to show and explain what they had done.
The day was rounded off with a presentation of the seven key guidelines towards the immediate future. Those seven guidelines can be seen as the key elements resulting from the interim evaluation or review which has taken place over the past months.

THE VISIT TO NEMO: THE SCIENCE CENTRE IN AMSTERDAM

Science center NEMO is the biggest science centre in The Netherlands. Here you can discover the wonderful world of science and technology in a playful and entertaining way. The Amsterdam-based NEMO covers a wide range of scientific and technological subjects.
The museum wants visitors to return home with a feeling of satisfaction, with an (even) greater fascination for science and technology than before and -perhaps- determined to choose an education or career in science or technology.

They try to achieve this by creating interactive exhibitions which fire the imagination of the visitor, by developing educational products, projects and games, and by making programmes such as lectures, demo's, workshops and science theatre.

Forbidden NOT to touch
Visitors are invited to use their senses and have a stimulating and fascinating experience. There is only one rule at NEMO: please touch everything you see and explore!

Who should one visit NEMO?
People of all ages are welcome to visit NEMO and set out on their own voyage of discovery. The primary target group are children aged between 6 and 16, with or without their parents and grandparents. NEMO also wants its adult visitors to learn something about science and technology. The museum tries to cover all levels of education.

The **Mission of NEMO**
NEMO believes that their science centre does light fires in the minds of their visitors! This is why they are often successful in bridging between informal and formal learning. Because they aim to inspire the visitor rather than to teach them. They want to encourage the fascination and wonder of the visitor, rather than to accumulate facts. They want to encourage the visitor to actively explore, experiment and experience things rather than to passively absorb information. Ironically enough: by not being didactic, they often promote learning!

Interactive exhibitions

NEMO's Wonder Lab
At *NEMO's Wonder Lab* the visitor can step in the shoes of a scientist and do all kinds of experiments in physics, chemistry and biology.

Why the World Works
The interactive exhibition *Why the World Works* offers the visitor a collection of exhibits on electricity, magnetism, light & colour, and other every day physical phenomena.

Journey through the Mind
Journey through the Mind is an interactive gallery on psychology, cognition and the brain. It's motto is 'know thyself'. The exhibition is full of experiments and interactive games on how we perceive and interpret the world, on feelings and emotions, the psychology of memory and learning, and how we interact with each other.

Code Name DNA
At *Code Name DNA* the visitor explores how heredity works and why someone looks like his/her parents. Want to know how you will look when you reach the age of eighty? Visit *Code Name DNA*!

Water Worlds
Water Worlds is an interactive exhibition about the technology behind clean drinking water. Geared specifically to the younger visitors, they experience hands-on the many steps involved in purifying water and getting it to our homes.

Amazing Constructions
Amazing Constructions is an interactive exhibition on how to use knowledge of form, shape and mechanics to build man-made constructions.

Studio Bits & Co
One big digital playground where the visitor can experiment with the building blocks of interactive multimedia and other digital applications such as games, animations, websites, video and audio productions.

New: Teen Facts
This new exhibition is about the science behind adolescence, about hormones, brains, sex, self-esteem and risk taking.

THE ESERO PROJECT ESA: THE EUROPEAN SPACE EDUCATION RESOURCE OFFICES

During the visit to the NEMO science centre information was given about the ESERO project of ESA, The European Space Agency.

The primary task of the European Space Education Resource Offices, an initiative of the European Space Agency, is to encourage and inspire young people to learn more about science and technology by drawing upon their enthusiasm for space exploration.
The ESERO's are intended to be the first ports of call for anyone in Europe requiring educational support related to space activities. In particular, teachers may approach the ESERO's for information and advice on how to introduce space-related topics in their lessons.
The Offices will be responsible for the development of close relations with national education stakeholders and assist in the provision of educational materials and activities tailored to each Member State. They will also help to promote science and engineering as careers in the European space sector, and provide support for the delivery of national curricula, e.g. through the provision of educational kits and other products.
The first ESERO, to be officially opened on 10 April, will be located on the top floor of the NEMO science centre in Amsterdam.
In the near future, ESA is planning to open two more ESERO's in Belgium and Spain, with the long-term objective of establishing one or more of these Offices in every ESA Member State.

THE PRESENTATIONS BY PARTICIPATING COUNTRIES

Participants to the PLA were invited in advance to make short presentations and three countries accepted the invitation to do so.
The following three presentations are added as annexes 2 in the form of PWP presentations and/or a short word text to the present report:

- Maths action plan in Portugal by Alexandra Pinheiro
- A Joint Promotion of Mathematics, Science and Technology (MST) by Trond Bergene and Thorvald Astrup
- Maths , science and technology in Iceland by Edda Lilja Sveinsdottir and Allyson Macdonnald

The three presentations made by the colleagues showed very clearly that all those countries face the same problems and were trying to find the answers to the same challenges such as:

- promoting the interest and motivation for MST up from the pre-primary and primary school
- develop a chain strategy which is integrated all through the different stages of education
- train better teachers (in initial and in-service teacher education) who can strengthen the teaching of MST in the primary school
- strengthen cooperation with industry and research
- strengthen cooperation between schools, universities and other institutions of higher education

7 PRIORITY GUIDELINES FOR THE FUTURE OF THE DELTA PLAN

At the end of the Flying Dutchman summit of 15 November the seven priority guidelines for the future of the implementation of the Delta Plan Science and Technology were presented. There are mentioned here in a summarized way.

The 7 priority guidelines are the following:

Keep on course

More science and technology in the primary school

Stronger focus on the Bèta-techniek teacher

Strengthen Bèta-techniek in MBO (upper secondary vocational education)

Tap into untapped talent in Professional Higher Education (HBO, bachelors)

Promote mobility of researchers (extending the Casimir programme)

Strengthen regional cooperation companies and education / knowledge institutions

Keep on course

Maintain and enlarge activities implemented so far in the Delta Plan

The broad chain approach has to be strengthened

The bottom-up approach has to be maintained and enlarged
The result-driven innovation via result agreements with partners (schools, higher education) must be further developed

More science & Technology in the primary school

Enlarge the VTB programme to the first years of secondary education (from 4 to 14 yrs)
S & T has to become a compulsory key component in initial primary teacher education institutions (PABO)

Focus on the Bèta-Techniek teacher

Increase the attractiveness of B-T teacher
Mobility and exchanges of B-T teachers at secondary school level (HAVO/VWO) have to be promoted through e.g. interaction with universities and companies
Experiments have to be developed with promotion routes to enrich the careers of teachers

Strengthening Bèta-techniek in MBO (upper / SENIOR secondary vocational education)

Work at 'hard' technical disciplines and in the area of disciplines which have common edges with other disciplines so as to increase the interest of the learners in those schools.
The MBO sector will have to come up itself with proposals as the Delta Plan promotes the bottom-up approach.

Tap into untapped talent

Better professional counselling, better preparation and better student guidance of children of migrant origin in HBO has to be enhanced so as to have more students of migrant origin study science and technology in vocational or professional higher education (professional bachelor's level).
A contract will be concluded between the Platform and the 5 HBOs (Professional Higher education institutions) in the Randstad (around the big cities in the centre of the Netherlands) that have half of those students to share, bring together and deepen knowledge, expertise and experience. The objective is also to strengthen cooperation between HAVO, MBO and HBO;
Introduction of experimental financing of 5 HBO (professional higher education institutions) linked to results to promote the initiatives mentioned above.

Promote mobility of researchers

The Casimir programme (mobility of researchers between public and private sector) is successful but too small-scale.

Develop a large scale action for mobility of researchers

Promote cooperation with Companies

Regional cooperation between companies and education / knowledge institutions is working and proves very useful to promote science and technology: Jet-Net is successful!

Ensure Bèta-Techniek students early on in their studies of good prospects for a job.

Set up an approach focusing on key areas where well-trained people are needed.

THE REFLECTIONS SESSIONS DURING THE PLA

Two large discussions sessions were integrated in the PLA. These sessions proved to be very useful and enables to reflect on what the information given, the people met and the sites visited. During those sessions the presentation of the participating colleagues were also included and were part of the overall discussions.

All the participants stressed repeatedly that the PLA was extremely useful and very well prepared and implemented. They all expressed their gratitude towards the Dutch colleagues of the Ministry of education, culture and science and of the Platform Bèta Techniek for the time invested in the preparation and the implementation. Participants also appreciated greatly the time several dutch colleagues invested in giving further information and answering questions during the sessions or during more informal parts of the programme. They also thanked them for the very varies programme which enabled the participants to meet all the stakeholders and beneficiaries over the four and a half days of the PLA. The PLA had really been a learning event that will have an impact on policy making and policy implementation in the countries involved and possibly in all the countries of the Cluster through the present report. In this way the objectives of the Peer learning Activity have definitely been met.

As this was the first PLA organised in the framework of the cluster of MST, several participants stressed that the Netherlands had put the stakes very high for future organisers by organising such a high quality event. It would be difficult for other countries to reach the same level for a similar event in the future.

Here below elements are mentioned on the one hand that are thought by the participants to be particularly innovative and thought-provoking and on the other hand elements that raised particular concerns with the participants to the PLA. The latter elements should not be seen as criticism but as reflections that arouse during the PLA from the part of the participants. Both these elements and issues (and the reflection on them) will be beneficial to the participants and to the organisers of the PLA. Both the innovative and the contentious elements or issues should definitely also be integrated in future PLAs on the topics of MST so as to compare with what is being done or achieved in other European countries.

SUCCESS FACTORS

The following elements were thought to be particularly innovative and can be considered as success factors of the Delta Plan and its implementation. They are expanded upon factor by factor later on:

- A careful analysis of the situation
- The Holistic approach with clear targets
- The clear implementation strategy to reach the objectives
- The networking amongst stakeholders
- The focus on gender issue
- The focus on ethical aspects of science across all initiatives
- The bottom-up approach
- The output or result driven approach linked to contracts
- The chain approach creating links between different types of institutions
- The strong cooperation school- industry
- The focus on research supporting the Delta Plan work
- The flexibility of the implementation of the projects with limited red tape
- The recognition of and the respect for the autonomy of the schools
- The role of the Platform Bèta Techniek to secure implementation
- The motivation, commitment and expertise available at the Ministry and at the Platform
- The monitoring and support of the activities implemented
- The fact that an important budget is available to support the Plan
- The political support
- A strong information strategy towards all the potential beneficiaries

Comments on each of the success factors

- A careful analysis of the situation

A careful analysis of the situation had been carried out in the years preceding the Proposal of the delta Plan Bèta Techniek or Science and Technology.
Several studies had been made and statistical information had been collected. Initiatives had been set up in previous years such as the activities of the Axis Foundation that just preceded the delta Plan Bèta Techniek. The different actions and activities of the Delta Plan reflect what had been highlighted and pointed out in the different reports and studies.

- The Holistic approach with clear targets

Most, if not all, participants thought that the holistic approach was particularly innovative. The Delta Plan and its activities in 5 key areas address and involve all the key beneficiaries and groups in education that can promote MST ranging from primary school, to general secondary school vocational schools, professional higher education, universities and other institutions of professional higher education.
It was also thought to be very important that very clear targets are set for the Delta Plan as a whole and for all the beneficiaries and agents involved in it.
It was also thought to be good that the Delta Plan had been built on several other studies looking into depth in key issues related to promotion of maths, science and technology.

- The clear implementation strategy to reach the objectives

The strategy to implement the Delta Plan and reach the target set in due time, was thought to be particular interesting. This strategy is composed of the following elements:

- inform all the stakeholders
- build partnerships involving various stakeholders: schools, universities, companies, government, the Platform etc.
- the integration of the involvement in the Delta Plan into the mission and vision of the stakeholders concerned
- the role and work of the Platform: stimulating, initiating, connecting innovations etc.
- the promotion of bottom-up innovation by inviting stakeholders to come up with innovate ideas and proposal
- the support given to innovative projects based on strategies within the projects to reach objectives that support the delta Plan targets
- the monitoring and support given to innovative projects to strengthen their implementation
- the enlargement and up-scaling of innovative projects that prove to be successful; a spiral approach from a limited number of project to the creation of a critical mass and an impact on the whole system at all levels
- the chain approach involving partners and beneficiaries at all levels
- the career centred approach meaning that efforts are made to have more people in MST careers
- the combination of innovation and performance through clear target setting, monitoring and auditing respecting the full autonomy of the stakeholders involved.

- The networking amongst stakeholders

Networking between the different stakeholders on the one hand involved in the concrete projects of the five sub programmes and on the other hand in charge of the general implementation of the Delta Plan Bèta Techniek, was also thought to be an important success factor.
The networking is the basis for dissemination and valorisation of the outcomes and achievement(s. it is the corner stone to come to a critical mass and to see to it that the innovations are generalised across the whole education system at all levels.

- The focus on gender issue

Participants appreciated that there was a clear focus on the gender issue and that specific partners, such as the VHTO were invited to play a specific role in this area. The fact that those partners also received clear support within a target approach was also appreciated.

- The focus on ethical aspects of science across all initiatives

According to the information given, it was also the objective to invite all of those involved in promoting MST to see to it that ethical issues are also focused upon while teaching and learning sciences.. the ethical issues were thought to be by several PLA participants critical elements in the overall general education or Bildung of all 'learners'.

- The bottom-up approach

It was thought to be important that the bottom-up approach seemed to enhance the motivation and commitment of schools and other partners or stakeholders involved in prompting SMT. It clearly appeared from the information given that top-down approaches (which had been applied in several countries across Europe in the past) had proven not to be so successful. Inviting schools and other educational institutions plus other stakeholders to come up with concrete invite and to invite them to turn into strategic plans supporting the Delta Plan proved to be very useful and showed that the bottom-up approach is paying off. Linked to this is , of course, the fact that the stakeholders coming up with concrete ideas and suggestions for projects have to outline clear strategic plans showing that they will contribute to the overall targets set by the Delta Plan Bèta Techniek.

- The output or result driven approach linked to contracts

The output or result-driven approach by which support is only given to those schools, educational institutions and other potential partners who have clear strategy plans with clear targets and objectives built onto and linked to the targets of the Delta Plan was thought to be particularly useful and interesting. This approach definitely has an impact on the motivation and the commitment and creates a solid basis of key institutions and partners really concerned by the Delta Plan and all its activities.

- The chain approach

The chain approach by which links are created between different types of institutions of education, primary schools, secondary schools, higher education institutions, universities, companies, NGOs and other stakeholders was though to be particularly useful in strengthening the implementation of the Delta Plan and in creating strong networks.

- The strong cooperation school- industry

The strong involvement and cooperation with industry was an element was acclaimed by all participants. In the framework of the Jet-Net project it was thought that this cooperation was definitely very successful. Several PLA participants thought that the Jet-Net initiative could be very useful also at the level of their country. Participants were also impressed by the commitment of the companies involved in the different Delta Plan activities.

- The focus on research supporting the Delta Plan work

The presentation by Dr. Jan de Lange showed that it was very important that the concrete implementation of activities in the framework of the Delta Plan were also supported by research activities. The fact that the Dutch Ministry of Education, culture and Science invested in such

research was thought to be a key element in strengthening the activities linked to the delta plan. It was suggested that in different European countries more should be invested in research to see which elements are crucial in promoting MST.

- The flexibility of the implementation of the projects with limited red tape

The pLA participants were also impressed by the fact that once institutions and stakeholders had been given support based on a clear target-oriented project supporting the overall targets of the delta Plan, the administrative red-tape was limited to a minimum. Too often the coordinators of innovations in education are burdened with heavy administrative regulations which require them to invest heavily in the red tape. This was definitely not the case in the activities supported by the Delta Plan. However, it appeared very clearly that there was not a blank cheque given to the institutions or partners involved, as the basis for the support was a clear strategy plan of each project showing how it contributed to the overall targets of the Delta Plan and its activities.

- The recognition of and the respect for the autonomy of the schools

All the initiatives and actions proposed within the frame work of the delta Plan Science and Technology, seem to be full based on the respect of the autonomy of the schools. The schools have, as autonomous entities, to decide whether or not they will be involved in the sub programmes of the delta Plan. They have to discuss it within their respective teams and come up with clear proposals that fit and contribute to the Delta plan strategy. It was also stressed that schools have to include their activities concerning MST in the school plan or the pedagogical plan which is the responsibility of each autonomous school.

- The role of the Platform Bèta Techniek to secure implementation

It was thought and confirmed that such a holistic and comprehensive plan as the Delta Plan Bèta Techniek to promote Science and Technology could only be successful if there was a body in charge of the implementation and if this body – The platform – had been given the means to see to the implementation (and all the elements of it) at all levels.

The participants thought that it was very wise by the Ministry of Education, Culture and Science to have entrusted the responsibility of the implementation to the platform and it staff which was definitely very competent and very dedicated and committed to the implementation of the action Plan. It also appeared very clearly from the contacts that there was a very clear relation between the Ministry and the platform built on mutual trust, confidence, clear delimitation of responsibilities and regular exchange of information on all issues concerning the implementation of the Delta Plan. The strong cooperation between the political decision-makers and the implementation platform is definitely an element of the success of what has been achieved so far.

- The motivation, commitment and expertise available at the Ministry and at the Platform

From all the meetings and contacts during the PLA it appears very clearly that commitment, motivation and expertise abound with all those involved and in charge of the Delta Plan both at the level of the ministry and at the level of the Platform. These elements will definitely have an impact on the next issues mentioned in the success factors: the monitoring and support.

- The monitoring and support of the activities implemented

The monitoring and support activities implemented by the Platform Bèta Techniek are crucial to the success of the delta Plan. It became clear that the Platform, while fully respecting the autonomy of the schools and while respecting the innovative ideas but forward by schools and other partners, were able to help them integrate those innovative ideas in clear target-oriented projects. The regular discussions with the projects , the site-visits to the projects and the continuous follow-up, are definitely elements that contribute to the success which has been achieved so far. The expertise and commitment of the members of the Platform also definitely have an impact on the commitment of all those involved as they clearly encourage, support and value all the partners and their work.

- The fact that an important budget is available to support the Plan

The PLA participants agreed that a key element of the success of the Delta Plan was also the fact that a large budget was available and had been committed by the political decision-makers to the implementation of the plan over several years. It was also thought to be very positive that over the next one or two years supplementary money will be made available (60.000 EURO) to enhance several activities such as the mobility of teachers.

It is clear that no major action plan to promote MST can be successful, if the necessary financial means are not made available to implement it. It was stressed that the flexibility with which the financial resources could be used, was an element that facilitated the implementation of the different activities of the delta Plan.

- The political support

It is clear that there has been all through the whole process of coming up with the delta Plan and of implementing it so far, there has been the necessary political support by the decision-makers. Their presence at the summit and their active participation in the debates showed their commitment and their concern to see things change as to MST to the benefit of the Dutch society and to Ducth economy, industry and trade.

- A strong information strategy towards all the potential beneficiaries

All the information received clearly points out that major efforts have been on the one hand to inform all the potential beneficiaries of the Delta plan at the start and during their activities so as to invite them to come up with innovative ideas. The several publications, the rich web site and the summit (Vliegende Hollander) held in Amsterdam on 15 November show that dissemination and valorisation of the outcomes of the Delta plan activities are very high on the agenda of the Ministry of education, Culture and Science and of the Platform Bèta Techniek.

CRITICAL ISSUES THAT NEED FURTHER FOCUS IN NL AND ACROSS EUROPE

Some elements or issues were mentioned that raised questions or controversy amongst the participants or were said to need further attention. This issues may be directly related to the information given about the Dutch holistic approach of the Delta Plan or they may be related to the discussions that were sparked of within the debates with the participants. All those issues would / could require more focus towards the future. Some initiatives or issues were also thought to be contentious as they could raise debates and would be difficultly accepted in a few countries. Some of those elements concern the Netherlands and others concern several, if not all, European countries.
The critical are first listed and then expanded upon each separately:

- The evaluation of the Delta Plan activities
- The lack of focus on and or involvement of initial teacher education especially at the level of primary teacher education
- The lack of focus on professional development of teachers through in-service activities
- The very early selection of pupils in the NL which has an impact on the choice of sciences
- The lack of explicit focus on maths within the Delta Plan
- The possibly elitist approach of initiatives such as the Junior College of Utrecht
- The lack of focus on the promotion of MST with children of migrant origin in general and definitely with girls in particular
- The opportunity given to secondary school teachers to do doctoral studies and get a PHd.
- The key role of counselling
- The involvement and the role of association of MST teachers
- The role of parents
- Curriculum versus curiosity
- The construction and use of tests in science

Comments on each of the critical issues

- The evaluation of the Delta Plan activities

The possible lack of explicit evaluation of the Delta Plan up from its conception and the clear outline of the evaluation up from the beginning and throughout the implementation was possibly perceived as a weakness. Some participants regretted not having been given clear information about the evaluation and the budget to implement the evaluation. Neither was it clear whether schools involved in the projects were given any tools to set up self-evaluation of their activities in the framework of the Delta Plan.

It was also mentioned that, although the summit of 15 November , was an interim review, not much explicit reference was made to the evaluation.
The Dutch colleagues of the Platform and the Ministry clarified this issue by stating that over the next period extensive evaluation will be implemented involving all the stakeholders concerned. So far the interim review had been mainly based on internal and external reflections through special groups of experts involved in the implementation of the Delta Plan. Sweden, Cyprus, Norway, France and Iceland thought this was a very important issue.

- The lack of focus on and or involvement of initial teacher education especially at the level of primary teacher education

Most of the students who decide to start the primary school teacher education studies come mainly from one of the non science profiles in secondary education; viz. the culture and society profile. Few come from the two science profiles: Nature and technology, nature and health. This means that the future primary school teachers have had little or no science during their secondary education which definitely has an impact on their interest or lack of interest in sciences.
Sweden, Cyprus, Norway, France and Iceland thought this was a very important issue.

- The lack of focus on professional development of teachers through in-service activities

It is important that towards the future in the Netherlands and in many other European countries more attention is given to the professional development of teachers in general and of MST in particular. The role of the teachers is definitely crucial in enhancing interest in and motivation for MST and special efforts are required to invest in the professional development of those teachers. It was also thought to be useful to reflect on which incentives could be given to motivate teachers to invest in their professional development. Sweden, Cyprus, Norway, France and Iceland thought this was a very important issue.

- The very early selection of pupils in the NL which has an impact on the choice of sciences

It was explained that a first selection of pupils is taking place at the end of the primary school, which has an impact on the choice of sciences. Later on, at 14 or 15 years of age, when the final choice has to be made for one of the four key profiles, too many choose for non science profiles. This is why the Delta Plan is supporting initiatives to influence the choice of the profile at that age.
Other participating countries like Sweden and Norway pointed out that the final selection is delayed till 16 years of age.

It was pointed out that this issue has to be linked with the problems addressed in the Commission's communication **"Efficiency and equity in European education and training systems"; COM (2006) 481 final. Attention has to be paid especially to the issue of early tracking of young people in the education systems. The issues of "tracking" arose discussion also on the issue of 'streaming".**

All the PLA countries (Sweden, Cyprus, Norway, France and Iceland) thought this was a very important issue and needed further attention.

- The lack of explicit focus on maths within the Delta Plan

A few of the PLA participants (Sweden and Iceland) thought that the Delta Plan was mainly focusing on science and technology and did not give enough attention to mathematics which play a key role in enhancing maths and technology. The Dutch colleagues of the Ministry and the Platform, however, argued, that mathematics was thought to be an integrative part of the Delta Plan Bèta Techniek. Many of the activities implemented also have a focus on maths.
Hence it was suggested that a future PLA would take as the major focus the teaching and learning of maths. This will be the case for the May 2007 PLA in Göteborg, Sweden.

- The possibly elitist approach of initiatives such as the Junior College of Utrecht, JCU

A few of the PLA colleagues (Norway)thought that initiatives such as the JCU, although they were very valuable and successful and highly important o promote sciences with gifted youngsters, could be considered to be elitist in their approach especially in Scandinavian countries which have equity and equal opportunities as a very strong element in the whole education policy and strategy.

It was suggested that the elitist element could be easily avoided by having those youngsters contribute to the quality of learning of MST in their schools by investing themselves in helping other pupils that are not that good at MST. This also appeared to be the case in the JCU project where the students in that project were invited to invest themselves in peer learning activities to the benefit of fellow pupils.

- The lack of focus on the promotion of MST with children of migrant origin in general and definitely with girls in particular

It is clear that the issue to promote the interest of migrant children for MST is a difficult issue across all the countries in Europe. One of the priorities of the Delta plan is to focus on talent that has not bee tapped into so far through a special initiative with HBO institutions (institutions of professional higher education). It was also mentioned that it was very difficult in the NL (and in other European countries) to set up actions to attract more girls of migrant origin into MST studies and careers as there was a strong opposition of parents and relatives.

- The opportunity given to secondary school teachers to do doctoral studies and get a PHd.

The Swedish participant pointed out that Sweden will give the opportunity to secondary school teachers to get a doctoral degree during their career as teachers. They will be part-time exempted from teaching to be able to do so. He stressed that the objective of such a PHd was not to do fundamental research but to be involved in research linked to pedagogical sciences in the field of MST . It is hoped that by having more teachers with a research background in the classroom this will have an impact on the quality of the teaching of science in the one hand and on the motivation of youngsters for science on the other hand.

The issue of having secondary school teachers do a PhD during their teaching career sparked of a debate. Within this debate some argued that the PhD would be focusing on research in science, technology or maths education and in the pedagogical / didactical approaches related to it others argued that it should be mainly focusing on action research. Some (e.g. Cyprus) argued that action research was part of the research in MST education. It was thought that it would be useful to do research work on classroom teaching of MST, on the curriculum contents and the pedagogical methods to convey the curriculum, on in-service training of MST teachers and on action-research related to MST. The results of research at local or regional level, could be fed back into the education systems at the different levels (SE).

Some participants (FR) wondered whether this was the right approach and thought that this kind of step was maybe too strong for the result that can be expected.
It was pointed out that in Greece it is possible for any teacher to apply for the possibility to do a PHd during his or her career. Those selected are given a certain number of years to get their PHd. They have to agree to the fact that they will stay at least another 15 years in teaching once they have got their PHd.

- The key role of counselling

It was stressed by several participants (NO, SE) that the counselling of pupils early on was an important element to enhance the interest for MST and for careers in this area. Counselling coupled with other initiatives towards teachers, pupils and other target groups, were thought to be the best strategy to reach a substantial effect in promoting interest in MST.

- The involvement and the role of association of MST teachers

It was thought by some PLA participants (SE, Cyprus) that more prominence and attention could be given to the role of the associations of MST teachers. Associations can play an important role in promoting and disseminating innovation. This does happen but it could be strengthened in several European countries.

- The role of the trade unions

It was argued by some participants (SE, Iceland, Cyprus) that the role of the trade unions is crucial in trying to implement innovations in education in general and in MST in particular. A closer look at the role of trade unions could prove to be very useful towards future innovations in education.

- The role of parents

Some of the PLA participants (especially Cyprus) wondered to which extent the parents are addressed by all the activities implemented in the framework of the Delta Plan and whether not more focus should be given to this target group.

- Curriculum versus curiosity

One of the issues that brought about an interesting debate was the statement of one of the speakers that the curriculum kills curiosity. Hence a slightly heated debate developed during which some (Iceland) stated that the curriculum in no way was an obstacle to enhancing curiosity with children which is seen as a key element to enhance the motivation and interest for MST.

It was stressed that it is the way in which the curriculum is implemented and that it are the pedagogical and didactical methods used which have a major impact on the interest and motivation for MST. A curriculum doesn't have to be seen as a straightjacket but as (flexible) guidelines for teachers to bring about creative and competence-based learning environments.

It was argued by SE that according to the country there were two possible approaches. One was the soft approach by which the curriculum sets the direction or creates a general framework leaving the implementation to the responsibility and the creativity of the teachers. The other one is the hard approach by which the curriculum is very detailed and has to be fully and strictly implemented by every teacher.

In the latter case the curriculum becomes a suffocating straightjacket, it was argued, and it could lead to de-professionalisation of the teachers who do not make efforts to implement the curriculum in a creative way any more and update their skills and knowledge to do so. If the curriculum is not applied flexibly it is difficult to introduce into the curriculum changes that takes place in science and technology. One of the participants expressed the hard approach in this way "if what you teach is not in the syllabus, you are in trouble!"

- The construction and use of tests in science

Some participants (SE, NO, Iceland) thought that it would be useful to invest time in studying the way in which tests are being developed and organised for sciences in different European countries. Some countries argued that a large part of the tests at a certain age is oral. Others advocated in favour of integrated tests within which contents and competences were tested in an integrated way. Within the discussions held it was clear that there was a tension between on the one hand contents (a more knowledge-driven approach) and on the other hand competences (a more output- driven approach focusing on what pupils they can demonstrate that they are able to do).

PRIORITY ITEMS FOR DISCUSSION AND POSSIBLE ACTION FOR THE CLUSTER TOWARDS THE FUTURE

Participants to the PLA thought that the following issues required by priority action towards the immediate future:

- Strengthen the focus on research in MST at national and at European level
- Deepen the issues related to initial teacher education for MST especially at the level of the primary school
- Promote the professional development of MST teachers through in-service training activities
- Compare the monitoring systems of innovation mechanisms (such as the delta Plan Bèta Techniek) of SMT across Europe
- Compare the evaluation systems of innovative mechanisms of MST across Europe
- Continue the organisation of PLAs in MST towards the future

STRATEGY TO IMPLEMENT SOME OF THOSE PRIORITY ISSUES

The members of the MST cluster have a major role to play in developing and implementing some of the priorities outlined above.
The members of the MST cluster can play a key role in promoting the possibilities for cooperation in the framework of the new Integrated action programme for lifelong learning or in the framework the R & D projects.

It is important the all members of the Cluster MST are aware of the rich potential of the ILLLP.

The following actions may be supported under the key activity of policy cooperation and innovation in lifelong learning, as referred to in Article 3(2)(a)of the ILLLP:
(a) individual mobility, as referred to in Article 5(1)(a), including study visits for experts and officials designated by national, regional and local authorities, for directors of education and training establishments and guidance and experience accreditation services, and for social partners;

(b) multilateral projects, as referred to in Article 5(1)(e), aimed at preparing and testing policy proposals developed at Community level and innovation in lifelong learning;

(c) multilateral networks, as referred to in Article 5(1)(e), of experts and/or institutions working together on policy issues.

Such networks may include:

(i) thematic networks working on issues related to the content of lifelong learning or to lifelong learning, methodologies and policies. Such networks may observe, exchange, identify and analyse good practice and innovation, and make proposals for a better and wider use of such practices across the Member States;

(ii) (ii) forums on strategic issues in lifelong learning;

(d) observation and analysis of policies and systems in the field of lifelong learning, as referred to in Article 5(1)(f),

which may include:

(i) studies and comparative research;

(ii) development of indicators and statistical surveys, including support for work undertaken in the field of lifelong learning in cooperation with Eurostat;

(iii) support for the operation of the Eurydice network and funding of the Eurydice European Unit set up by the Commission;

(e) action to support transparency and recognition of qualifications and competences including those acquired through non-formal and informal learning, information and guidance on mobility for learning purposes, and cooperation in quality assurance, as referred to in Article 5 (1)

(f) other initiatives, as referred to in Article 5(1)(h) (accompanying measures), including peer-learning activities aimed at promoting the objectives of the key activity referred to in Article 3(2)(a).

They can take to this effect the following action:

- Disseminate information about the possibilities available in the framework of the new ILLLLP
- Be involved in projects and/or networks in the area of policy development and implementation in the field of MST in the transversal programme of the ILLLP
- Invite key players and stakeholders in the field of MST to involve themselves in European projects in the framework of one of the sectoral sub programmes of the ILLLP: Comenius, Erasmus, Leonardo da Vinci and Grundtvig
- Help to find partners for European projects addressing key issues in MST
- Be involved in reviewing, monitoring and follow-up of such European projects
- Disseminate good practice developed at regional, national or European level within and outside the framework of European programmes.

THE EVALUATION OF THE 1ST PLA OR PEER LEARNING ACTIVITY IN MST

THE SUMMARY OF THE EVALUATION QUESTIONNAIRES

The information in this section is based on the evaluation forms filled in by participants to the PLA. The evaluation form is added as annex n° 4

All the PLA participants agreed that the programme was well balanced and gave a full overview of the different parts and issues related to the delta Plan for science and technology.

> One participant suggested in the evaluation form that it would have been useful to receive an organizational chart of the delta Plan.
> Another participant stresses that the opportunity had been given to meet the delta Plan that was very interesting and important but at the same time more time should have been available to think about the presentations and discuss their contents.

The PLA participants agreed that the programme enable to meet all the actors and beneficiaries art all levels: senior officials, decision-makers, teachers, heads, inspectors, universities, students, pupils etc.

> One participant stresses in relation with this item of the evaluation that "the existence of the MST cluster is fundamental and absolutely necessary for all countries. It is critical that all countries know what is happening and what kind of policies are being implemented in each country about MST. Through the group we can discuss and exchange experiences and more 'importantly, we can discuss policies and indicators that could be important for the future".

All the PLA participants agree that the Dutch colleagues of the Ministry of Education, Culture and Science and of the Platform Bèta Techniek plus other colleagues met were always available to answer any question at any time.

Most of the PLA participants thought that more time should be made available to reflect on the issues and to discuss them in depth.

All the PLA participants fully agreed to the fact that clear information on the objectives of the PLA were available before the PLA itself.

All the PLA participants agreed that the information which was sent to participants in advance (such as a background paper drafted by the consultant) were useful in preparing oneself for the PLA.

> It was regretted by some PLA participants that no explicit written information was available on the interim evaluation. Any information would still be welcome even after the PLA.

All the PLA participants agreed that the presentations made by three colleagues on the situation and the activities as to MST in their countries (Iceland, Norway, Portugal) were complementary to the core topic and issues of this PLA.

All the participants agreed that the discussions within the PLA group were well organized and fruitful (but too short as mentioned earlier!). Some thought that the summaries made by the consultant proved to be very useful.

All the PLA participants agree fully that the programme was very well organized and smoothly implemented.

> One of the participants states that “the programme details and the actual programme didn’t always match, so I wasn’t sure what was about to happen, but what did happen was always useful. Would it be possible to get a “corrected” programme with the names of the people whom we met or made presentations. I don’t think that I was able to use the summit on Wednesday as well as I would have liked.

All the PLA participants agreed that the PLA has proven or will prove to be useful for policy development and policy implementation in their countries.

THE LESSONS LEARNT TOWARDS FUTURE PLAS

The length of a PLA

Three to four days was agreed to be the right length of a PLA. Definitely not shorter as time is required to combine the moments of information, the site visits, the meetings with stakeholders, the presentations of participants and the periods of reflections during the PLA.

The elements composing a PLA

All the elements mentioned in the document drafted as the basis for the PLA in MST were considered to be valuable to a PLA. No major additions or changes are required. However, in the evaluation PLA participants stressed that maybe more time had to be scheduled for the explicit reflections and discussions within the group of participants.

The role of the host country

The host country had fulfilled the role it was supposed to play. It had organised and implemented a very rich programme. The preparatory meting and contacts have greatly contributed to the success together with the commitment of the colleagues of the Dutch Ministry of Education, Culture and science and of the Platform Bèta Techniek.

The role of the participating countries: short contributions

As mentioned already earlier, the contributions of the participating PLA countries were thought to be useful and complementary. It would prove to be useful to have the PowerPoint Presentations and a short text in word related to those presentations in advance.

PROPOSALS FOR FUTURE PLAS

During the PLA in Amsterdam several suggestions were made as to possible future PLA in the course of 2007 (and possibly beyond that date). The organisation of a PLA in Sweden was already proposed and accepted at the May 04 meeting of the MST cluster.

PLA on Maths in Sweden (May 2007)

This PLA would be organised by DG EAC in cooperation with Bengt Johansson, director National Centre for Mathematics Education, Göteborg

Possible elements of the PLA

- Introduction to the Swedish education system
- Historical overview of Maths in Sweden
- The Swedish national plan for science education
- The transition between upper secondary education and higher education
- Special Swedish initiatives such as summer course on the internet; cooperation teachers higher education and secondary education
- The role of initial teacher education in promoting maths
- Municipal networks of maths educators
- Doctoral programmes focusing on science and supported by companies
- The role of teacher associations and teacher trade unions
- Projects to promote innovation in maths
- Nordic cooperation in the field of MST
- Visits to:
    - The Swedish Ministry of education
    - The National Centre for Mathematics EDUCATION
    - The science Centre (hands-on-science / mobile exhibition,, drama and science etc.)
    - Schools
    - Teacher education department
    - Research library in MST
    - Exhibition of all maths textbooks, journals and teaching materials
    - Etc.

PLA in France (date to be defined!)

This PLA would be organised in cooperation between Dg EaC and the French ministry of national education, higher education and research through Ms Florence Robine.

Possible elements of the PLA

- The French education system
- The French policy to promote MST

- The Main à la Pâte national action (or hands on science)
- The role of initial teacher education (IUFM: Institut Universitaire de la Formation des Maitres) in promoting MST in the primary school
- The role of the inspectorate in promoting MST
- Visits to:
    - The Ministry
    - Primary schools
    - IUFM

PLA in Cyprus (date to be defined!)

This PLA would be organised in cooperation between Dg EaC and the Cyprus Ministry of education and science through Ms Zena Pouilli.

Possible elements of the PLA

- The Cypriot education system
- The Cypriot policy to promote MST
- The Science fair action to promote science
- The role of initial teacher education in promoting MST in the primary and secondary school
- The role of the inspectorate in promoting MST
- Visits to:
- The Ministry
- Primary schools
- Teacher education institution

ANNEXES

Annex 1: The programme

Peer Learning Activity organised in Amsterdam from 13 to 17 November 2006

Programme

	a.m.	p.m.
Monday 13/11 Amsterdam	Arrival of participants	14.00 Welcome apéritif ! (PTA/ Movenpick hotel) 15:00 Visit to the Science center Nemo, Amsterdam; info by Michiel Buchel, director plus information on ESERO of EAS; info by Elke Delvoye 20.00 Welcome dinner ; Welcome address by Ronald van den Bos, MOCW
Tuesday 14/11 Introduction day **The Hague, Ministry of Education, Culture and Science**	*Background information* 9.30 Welcome 9.45 Objectives of the PLA by Ms Ana Serrador of DG EaC 10.00 The Dutch educational system: Ronald van den Bos, MOCW 10.45: The Delta Plan : Situation of MST in the Netherlands and the history of the MST approach in the Netherlands by Ms Mélissa Keizer, MOCW 11.15: The Platform Science & Technology: Marjolijn Vermeulen & Rolf Schreuder, Platform Bèta Tecgniek 12.30 lunch	*The Delta Plan Science & Technology* *13.00: short visit of the Hague* 14.00 : Dr. Jan de Lange : The Talent programme : a research programme 15.00: Policy development aspects & Policy implementation elements: doing the right things in the right way: Marjolijn Vermeulen, Platform Bèta Techniek 16.00; presentation by PLA participant: Alexandra Pinheiro: The Portuguese Maths action plan 16.45: Discussion within the PLA group 17.45: end of the day
Wednesday 15 / 11 Participation in the national Summit **Passengers Terminal Amsterdam**	Participation in the Summit meeting and event focusing on the progress made during two and a half year of implementation of the Delta Plan Science and technology; - Introduction session by Minister of Education, Culture and Science - Reflections on the Universum programme - Different workshops - Fair with stands of schools and other organizations promoting MST - Keynote lectures - Round table discussions - Etc.	Separate meetings with Dutch participants of the summit according to be arranged according to expressed interest of PLA members - Cooperation education –industry – research: International Jet-Net presentation by Teun Graafland, coordinator Shell NL - Keynote lecture by Prof. dr. Annette Karmiloff-Smith : Research on the development of the child's brain - The conclusions of the summit with the 7 future priority guidelines; - a.o. by Hans Corstjens, director Platform Science & Technology

	Free participation of participants	- Reception
Thursday 16 / 11 **Amsterdam**	PTA Movenpick hotel, 9-12 Discussion and reflections within the PLA group Presentations by some of the PLA participants: - Presentation by Trond Bergene: the Norwegian programme for the Joint Promotion of MST - Presentation by Edda Sveinsdottir: Recent developments in MST in Iceland - Comments on 7 priority guidelines Lunch	Visit to the Blaise Pascal School (Penta College) Rotterdam: - Promoting positive choice of MST in secondary school: attending two work sessions with pupils and teachers: robotics and bridge building; sessions run by university students o.a; Foundation promotion technique of the TU Eindhoven (Jelle de jong) - Special session on 'speed dating' (VHTO) to promote MST with girls through talks with experienced engineers, researchers etc; - Gender issues related to MST: debate with representatives of VHTO (coordinator Ms C. Booy) Boat trip on the Maas river Dinner at the New York Hotel (former building of Holland-Amerika Lijn)
Friday 17 / 11 **Utrecht/ Amsterdam**	Visit to Junior College University of Utrecht 9.30 – 11.00 Transition from secondary to higher education; the Junior College Utrecht University - presentation by Dr. S. Tromp, head of JCU - testimonies by students - discussions 11.00 – 12.30 Issues related to Governance and innovative ways for MST by Beatrice Boots, Platform Bèta Techniek 13.00 Lunch Amsterdam	13.30 -15 .30 Amsterdam Movenpick Discussion and reflections within the PLA group Some supplementary information on statistics by Ronald van den Bos, MOCW Brief information about the preparation of the final report Evaluation of the PLA by participants Concluding remarks by - Ms Ana Serrador, DG EaC , - Ronald van den Bos, MOCW and - Marjolijn Vermeulen, Platform Farewell drink
Saturday 18/11	Departure of participants	

Annex 2 : The list of participants

PLA – Amsterdam 13-17 November 2006
Liste of participants and e-mails

Country	**Name**	**e-mail**
The Netherlands	Marjolijn VERMEULEN	m.vermeulen@deltapunt.nl
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Denmark	Brian KROG CHRISTENSEN	Brian.Krog.Christensen@uvm.dk
France	Florence ROBINE	florence.robine@education.gouv.fr
Germany		
Iceland	Edda L. SVEINSDOTTIR	edda.lilja.sveinsdottir@mrn.stjr.is
	Allyson MACDONNALD	allyson@khi.is
Latvia		
Malta		
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	Thorvald ASTRUP	thorvald.astrup@kd.dep.no
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Slovakia		
Sweden	Max KESSELBERG	max.kesselberg@educult.ministry.se
	Bengt JOHANSSON	bengt.johansson@ncm.gu.se
United Kingdom		
Consultant	Yves BEERNAERT	yves.beernaert@educonsult.be
European Commission	Ana SERRADOR	ana.serrador@ec.europa.eu

Annex 3: The presentations by the participants

The Norwegian MST Strategy: A Joint Promotion of Mathematics, Science and Technology (MST) – Short version of the full text

Norway is currently facing a situation where the needs of the society and working life for expertise in mathematics and a number of natural science and technological fields are not being met. This means that the educational system is not providing sufficient MST competence. This is serious and will be a barrier to a positive trend for innovation, for working life and society in general.

The Norwegian MST strategy is a strategy for developing the necessary competence in the population that society, working life and trade and industry need in the natural science and technological areas. One of the most important policy instruments for succeeding in this is to strengthen the teaching of MST in education in Norway. Thus the government has in its inaugural declaration the following formulation:
especially strengthen the MST competency throughout the whole educational pathway and increase the efforts to recruit students to these subjects.

Increased competence in MST and better recruitment are the core elements in the strategy.

The challenges associated with teaching MST in Norwegian education have been apparent for a long time. There are grounds for concern when most western countries are experiencing a noticeable decline in recruitment to the various MST programmes of study. An even greater cause of concern is the fact that the problem appears to be more serious in Norway than in most other countries. The decrease in recruitment indicates a declining interest in MST, not just in the educational sector, but in the whole society. Among other things, this may be caused by a lack of understanding of the subjects' importance for the individual youth.

The level of knowledge in MST is also weaker than we would like, not least in an international perspective. Sound, broad knowledge in MST is important to the development of our welfare. Our future and progress in the international society are dependent on a high level of MST competence.

The government wants to make a proactive effort to strengthen MST. In the past, this effort has primarily involved improving the educational system as such, but this will no longer be sufficient.

We will only be able to provide a proper promotion of MST that will meet society's needs through a close collaboration among all of the parties involved, where *both education and working life jointly contribute to better recruitment and higher competence.*

Inherent in this strategy is not only an acknowledgement that we need new policy instruments and cooperative arenas, but also a request to all of the main actors to conduct a joint promotion and make greater efforts to strengthen MST in Norway.

The Ministry of Education and Research has assumed responsibility for the kindergartens. Therein lies a signal that competence development begins at a very early stage. It is important to instil positive attitudes to MST at an early age.

The main overall goals of the strategy are:

- improve the MST competence in the whole educational system, in working life and in the general public

- increase the recruitment to working life and education in MSTinstil positive attitudes to MST among everyone in the educational system and among the general public

The plan decomposes these goals into more operational goals and indicators for measuring attainment of the goals. The strategy document itself has a time span for the period 2006 to 2009. But an important element of the strategy is also that there will be yearly updated action plans. The first one of these was published in 2006.

Presentation by Edda Sveinsdottir a Allyson McDonnald of Iceland

Goals of the *Intentions and reality* research project in Iceland 2005-2007

The full text is to be found on the following website: http://starfsfolk.khi.is/allyson/step/

Goals of the study

The goal of the study is to describe and analyse the provision of science education in the late 1990s and early 2000s following changes in the law, a revised national curriculum, the reintroduction of a standardised examination in science and the participation of Iceland in international comparative studies.

the study will address the following key research question:

What is the nature of the gap between the intended curriculum and the actual curriculum – the intentions and the reality?

Subsidiary questions will include:

- What are the main features of the national curriculum in science in Iceland from 1999?
- What resources are available for science teaching and learning (particularly ICT) and what is their role?
- What learning and teaching practices are typically found in schools?
- What influences student choice with regard to science and technology in secondary, further and/or higher education?

In an earlier study (1991-93) there were five areas of emphasis which will be revisited to some extent though not in as much detail. The questions in the earlier study were:

What was the nature of the gap between the intended curriculum and the actual curriculum – the intentions and the reality?

Subsidiary questions included:

What were the main features of the national curriculum in science in Iceland in the early 1990s?
What role did teacher education have in the development of science education?
What resources were available for science teaching and learning?
What learning and teaching practices were typically found in schools?

The earlier study was restricted to science education and to compulsory schools (age 6-15). In this study the analysis is extended to include secondary schools and will look particularly at lower and upper secondary education and links between them, such as progression (introduction of new

concepts and processes) and continuity (extension of earlier concepts and processes). The use of information technology as a resource in teaching and learning situations, an issue which was just emerging in the early 1990s, will also be considered.

The earlier study also included a literature study on a range of issues related to the research questions. The literature will be revisited on some of these issues but also to identify new issues. New emphases would be a fuller exploration of the place of science and technology education in society and its role in the Icelandic economy. There is however no reason to suppose that the gap between the intentions of policy-makers and the practical realities have diminished.

Presentation By Alexandra Pinheiro of Portugal to be added

Annex 4: The evaluation form

Evaluation form PLA Amsterdam 13 – 17 November 2006
1= I disagree
2= I agree more or less
3= I agree
4= I fully agree

	1	2	3	4
1.The programme was very well balanced as to the contents giving a full overview of the different parts and issues related to the Delta Plan for science and technology				
2. The programme enabled the participants to meet all the key actors or beneficiaries at all levels: senior officials, decision-makers, teachers, heads, inspectors, universities, students etc.				
3. The colleagues of the host country were available to answer any question at any time				
4. There was enough time for discussions within the group of participants of the PLA				
5. Clear information on the objectives of the PLA were available before the PLA itself				
6. The information sent to participants in advance proved to be very useful in preparing oneself for participation				
7. The presentation made by participants of the PLA were complementary to the core topic and issues of the PLA				
8. The discussions within the PLA group were well organised and fruitful				
9. The PLA was very well organised and smoothly implemented				
10. The PLA has proved / will prove to be useful for policy development and implementation in my country				

Please add comments for any of the topics or issues mentioned above
Take as much space as you like!

1.
2.
3.
4.

5.
6.
7.
8.
9.
10.

Please send back by e-mail to Yves Beernaert by 23 November 06
yves.beernaert@educonsult.be
Educonsult
00 32 474 987411

Annex 5: The preparatory document made available to participants

This document is available separately.
It was sent out to all the PLA participants before the PLA itself.

Annex 6 : The PLA or Peer Learning activities

These elements are taken from the original background document of may 2006.

Objectives of the PLA

- PLAs should strengthen mutual learning and deepen the exchange of good practice between countries sharing similar concerns, in order to develop a common understanding of success factors for the improvement of policy-making and the implementation of reform

- The PLAs should also contribute to the policy-making at European level through enhanced, practical cooperation, and by encouraging policy makers in participating countries to take full account of existing EU instruments (1) in the development of national education and training policies and systems.

Organisation of the PLA

The PLAs will go beyond information gathering and achieve constructive dialogue and assessment between policy-makers, practitioners and other key actors.

Although a certain degree of flexibility in the organisation and planning of the PLs is appropriate, sufficient time needs to be devoted to any PLA. A minimum of 3-4 days is needed depending on the specific topic, of which no less than two half days should be devoted to discussion and evaluation of results.

Preparatory meetings, involving particularly interested "peer learning" countries, the Commission's representatives and consultants, should be organised where appropriate in order to provide the necessary support and advice to the host countries.

PLAs should ideally include the following basic elements:

- presentation by the host country of opportunities and constraints for policy development and implementation;
- initial reactions of the "peer learning" countries;
- site visits;
- discussion on the key issues, as identified from the initial reactions of the "peer learning" countries;
- short presentations by "peer learning" countries on alternative policy approaches;
- identification of key messages, conclusions and questions from the PLA, possible follow-up activities and opportunities for dissemination;
- evaluation of results and methodology based on a questionnaire.

1For example the indicators and benchmarks, the common references (e.g. common quality assurance framework, key competences framework, policy framework on making best use of resources, teachers/trainers framework, etc.) and policy recommendations resulting from the first stage of the E&T 2010 work programme, which should be used as a basis for structuring the PLAs.

Participation in the cluster

The participation of relevant policy makers and practitioners increases the impact of the PLAs in terms of identification and dissemination of key conclusions which can be fed into implementation at the national level and policy-making at European level.

Each country participating in the PLAs (apart from the host country) can appoint a maximum of two representatives, ideally one at policy level, who will be able to address the critical factors for policy development, and one at a more operational level, who will be able to address the critical factors for implementation.

These representatives should have a responsibilities and competences related to the specific topic of the PLA. The knowledge and expertise required by participants should as far as possible be specified in advance.

In general the optimal number of countries participating in any given PLA should not exceed 10.

The host countries should, where relevant, invite social partners and other relevant stakeholders at national level to participate in the PLAs.

The role of the participants in the PLAs

The success of the PLAs depends on the joint effort on all parties involved. The organisation of PLAs is resource intensive and requires a substantial commitment by all actors to ensure their good management.

The role of the host country

The host countries is responsible for:

- the overall organisation and planning of PLAs, in agreement with the Commission coordinators and the Clusters;
- chairing of all meetings, with the support of the Commission;
- organising the logistics;
- preparation, of the necessary background and meeting documents to support participants discussions in close cooperation with the Commission coordinators and the consultants;
- providing comments on the draft summary report;
- facilitating and encouraging open mutual learning and setting up presentations of national policies to invite fair and well-argued critique and identification of both successes and failures.

The role of the peer learning countries

Representatives from the "peer learning" countries are asked to:

- participate, if requested, in planning meetings with host country representatives, Commission coordinators and consultants in order to support the host country and to ensure that the content and organisation of activities are not focused too narrowly on the experience of the host country;
- prepare a paper on national policy development and implementation on the selected topic;
- give a brief presentation of the paper;
- participate in the PLA discussions;
- amend, if necessary, the summary report following the PLA;
- contribute, where appropriate, to facilitating the PLAs in order to enhance the opportunity to discuss other countries' experiences and policies.

The role of the Commission

The Commission coordinators is responsible for:

- the overall management and steering of the activities, in accordance with the overall framework for the PLAs;
- agreeing on the organisation and planning of the PLAs in close co-operation with the Clusters and the host countries;
- ensuring the availability of the necessary background and meeting documents to support participants' discussions with the support of the consultants and in close cooperation with the host countries;
- ensuring links to the other relevant aspects/work of the Education and Training 2010 work programme and to all relevant research, statistics, policy recommendations, references and principles agreed at the European-level;
- participating in the PLA discussions
- approving the summary report;
- ensuring feedback and links between the different levels: the PLAs, the clusters, and the ETCG.

The role of the consultant

The consultant has to support, under the Commission's guidance, the following activities:

- organising and planning the PLAs in agreement with the Commission coordinators;
- supporting, the preparation of the necessary background and meeting documents for participants discussions in close cooperation with the Commission coordinators and the host countries;
- facilitating the meetings and structuring the discussions;
- supporting the steering of the process and ensuring the equal involvement of all participants and the efficient use of time and available resources;
- reporting on, and evaluating the methodological aspects of the PLAs;
- drawing up a short summary report.

Annex 7: Some useful websites

The websites mentioned below are directly linked to the programme of the PLA. They have been mentioned or referred during the different activities of the PLA.

Website Ministry of Education, Culture and Science, Netherlands (English!)
http://www.minocw.nl/english/index.html

Platform Bèta Techniek
http://www.deltapunt.nl/

Website Axis Foundation (predecessor of Delta Plan & Platform)
http://www.platform-axis.nl/

Jet-Net
http://www.jet-net.nl/start.html

Junior College Utrecht
http://www.uu.nl/uupublish/homeuu/onderwijs/overigonderwijs/juniorcollegeutr/30984main.html
(Dutch information)
http://www.nnv.nl/NNV/DATA/Downloads/FYSICA2006/Ton%20vd%20Valk%20-%20paper.doc
(Article in English)

VHTO

National expert organisation on girls/women and science/technology
http://www.vhto.nl/

WITEC

Women in Science, Engineering and Technology

http://www.witec-eu.net/

Freudenthall Institute for science and mathematics education

http://www.fi.uu.nl/fisme/en/

Stichting Techniekpromotie (students of TU Eindhoven promoting MST)

http://www.techniekpromotie.nl/

Amstel Instituut (University of Amsterdam)

Faculty of natural sciences, Maths and Informatics

http://www.science.uva.nl/amstelinstituut/english.cfm

Next generation Science (cooperation in sciences between UK-NL)
http://www.britishcouncil.org/netherlands-cf-ngs-rotterdam-report.pdf

Durven, Delen, Doen (Programme Dare, Share, Do: to support Innovation in secondary education)
http://www.durvendelendoen.nl/

Casimir programme (NWO) Mobility of researchers
http://www.nwo.nl/ (Nederlandse Organisatie voor Wetenschappelijk Onderzoek) see: subsidiewijzer

NEMO: Science Centre Amsterdam
http://www.e-nemo.nl/print_detail.php?id=5&s=85&d=551

ESERO project of ESA
http://www.esa.int/esaED/SEME3W59CLE_teachers_2.html

Kookdroom Foundation / Fifteen Amsterdam Restaurant
http://www.fifteen.nl/index.php?onderdeel=fifteen&menu=82

A Joint promotion of Mathematics, Science and Technology (MST) Strategy 2006-2009, Norwegian Ministry of Education and Research
http://www.naturfagsenteret.no/Strategiplan2006_eng.pdf

King Baudouin Foundation (B)
http://www.kbs-frb.be/code/page.cfm?id_page=125&ID=182
Information about cooperation school – industry
Publications

- A manual on school industry cooperation
- Placements in industry: a win-win operation for schools and industry
- Competence development at school and in industry
- More technology in general education

Annex 8: Some useful reading

The basic text of the delta Plan Science and technology:
http://www.minocw.nl/english/doc/2004/deltaplan_en.pdf

Research and technology development are key concepts for Dutch business, research institutes and universities whose ambitions extend beyond their own frontiers. Innovation that opens up new horizons has priority when it comes to international competition, improving one's position on the market, expanding sales outlets, extending networks and taking advantage of advanced expertise.
In the reports Benchmarking in the Netherlands, Science and Technology Indicators 2000, Science and Technology Indicators 2003 Summary (PDF) and Science and Technology Indicators, Summary 2005 (PDF) one can find analyses of the performance of Dutch economy in an international perspective and the characteristics of the Dutch science and technology system.

Conference Research - Industry cooperation in EU RTD projects

Please find all presentations, conclusions and the final report of the conference at : http://www.vsnu.nl/show?id=60219&langid=246

Brochures - Documents:

"CORDIS: EU Council Presidency Information Service for Research, Development and Innovation" (PDF)

"Dutch Innovation Letter" (PDF)

"Analysis of the Dutch innovation position" (PDF)

"Elaboration of the solution options" (PDF)

"Action for Innovation - Tackling the Lisbon ambition" (PDF)

"Science budget 04: Focus on excellence and greater value" (PDF)

"Science, Technology and Innovation in the Netherlands" (PDF) / Policy, facts and figures

"Dutch participation in FP5 funded projects" (in Dutch) (PDF)

"Overview of the first FP6 calls (2002-2003) from a dutch perspective" (in Dutch) (PDF)

"Dutch Compass for the European Research Area - Strategic framework for the internationalisation of research and innovation policy" (PDF)