



**NATUURTECHNISCH INSTITUUT ( N A T I N )**

**INSTITUTE FOR NATURAL RESOURCES AND  
ENGINEERING STUDIES  
Secondary Vocational Education**



**QUALITY MANAGEMENT AT NATIN – MBO:**

**INTEGRATION OF THEORETICAL  
AND PRACTICAL COURSES  
AND  
DEVELOPMENT OF A  
QUALITY MANAGEMENT SYSTEM**

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J.Lachmonstraat 180-182 /  
Leysweg  
P.O.Box 1912  
Paramaribo – Suriname  
Tel.: 490497 / 490579  
E-mail: [natin@sr.net](mailto:natin@sr.net)  
Website: [www.natin.sr](http://www.natin.sr)

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## INTRODUCTION

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In 1998 an Action Program was initiated that developed into the first NATIN / VVOB – project “Strengthening of technical education in Suriname at NATIN”. This was a five-year project that ended in December 2002.

In 2003 a second five-year project “ Quality Management at NATIN” started. The main objectives are: improvement of the learning environment, integration of theoretical and practical courses, teacher training and introduction of competency based learning methods, integration of environmental subjects in the curriculum, quality promotion and quality control.

At this moment most of the efforts are aimed at the development of a quality management system. In the education sector in Suriname, NATIN is recognized as being one of the pioneers in quality development. The private sector as well has shown great interest in this process.

NATIN graduates make up an important part of the workforce and by raising the quality of the program and assuring quality control, our graduates will be better qualified for their job. These well-trained and skilled professionals will benefit the public and private sector and have an impact on the social and economic development of Suriname.

Drs. Dave A. Abeleven  
Managing Director NATIN-MBO

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## CHAPTER 1

### A GENERAL OVERVIEW OF NATIN

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#### **General information**

The Institute for Natural Resources and Engineering Studies (NATIN) in Suriname offers four-year vocational programs on a senior secondary level. The Institute was founded in 1973 and is the one and only school offering these programs in the daytime. There are 2130 students (25% female students) enrolled this year (2007-2008) and we have 126 full-time and 80 part-time teachers employed.

There are three sectors: Natural Resources, Technical and Laboratory sector.

1. The Natural Resources sector offers: agriculture (crop science and animal science), forestry (production and tourism), mining, land surveying and hydrology/meteorology.
2. The Technical sector includes: building, civil engineering, electronics, electrical engineering and mechanical engineering.
3. The Laboratory sector has chemical engineering and medical laboratory technology.

The courses are primarily intended to prepare students for the job market, but they also offer students the possibility to enter schools for higher vocational education. They can also enter the University of Suriname, after completing a pre-program of 1 year.

The third year includes an internship of 12 weeks; the students are placed with various companies, departments in the government, hospitals etc. In the fourth year they have to finish a project also in 12 weeks before graduation. They can do their own project or participate in research, specifically in the major in which they are about to graduate. Students have to pass a final examination, which includes theoretical as well as practical courses and also includes the project.

It is known that NATIN graduates are successful in studies at Institutions and Universities abroad: Holland, Belgium, the USA, Brazil, Cuba, and Russia.

To enter NATIN a student must:

1. Have passed the final exam of the Junior General Secondary Education B-stream (MULO-B). This form of education, which takes four years, aims to prepare students for Senior Secondary Vocational Education (NATIN) or Higher General Secondary Education (HAVO) or Pre-university Education (VWO), **and** have passed for an entering exam
2. Have passed the final exam of the Junior Vocational Education. This form of education also takes four years and offers students job-orientated courses in addition to general subjects. It prepares also for follow-up programs in Senior Secondary Vocational Education. Only students with a diploma of the C-stream (LTO – C stream) are admitted.

### **The NATIN Organization**

Our Institute is within the structure of the Ministry of Education and Community Development (MECD). We are part of the Technical Vocational Education and Training (TVET) System. The Department of Vocational and Technical Education is responsible for the coordination at junior and senior levels and of technical teachers training. This Department has a Bureau at its disposal: the Bureau for Vocational and Technical Education (B N O).

### **Team of Directors**

The Director is the team leader and is assisted by five (8) deputy-directors in the following departments:

1. Administration and ICT
2. Facility Management and Maintenance
3. The 1<sup>st</sup> year Program (basic program) educational affairs
4. The 1<sup>st</sup> year Program (basic program) student affairs
5. Technical Sector educational affairs
6. Technical Sector student affairs
7. Natural Resources educational & student affairs
8. Laboratory Sector educational & student affairs

After working for 31 years at NATIN, from 1990 – September 2006 in charge as Director, ir. Marijcke Kaboord retired and was succeeded by drs. Dave Abeleven.

## **Middle management**

In every sector a co-coordinator who is in charge of the specific program heads the majors. The general courses, part of the program of every major, each have their headperson.

The middle management amounts up to 16 persons and over the years has proven to be very effective in the organization.

## **Departments**

We have several departments, each with their specific mandate. We can mention the “decaanaat”, in charge with social support and well being of students. More recently we established the department of Internal Quality Management, to give effect to our efforts of setting up the NATIN Quality Management System. The departments in charge with ICT facilities and the network, the maintenance of our database, general facility management and administrative support should also be mentioned.

## **School committees**

We have several school committees. One of the more specific is the one organizing the internships. Others are in charge with special projects, the library, and sport events.

## **Students**

This year (2008-2009) there are 2300 students enrolled.

## **Our Vision**

The Institute for Natural Resources and Engineering Studies aspires to be a leading, development orientated and dynamic institute that train (young) people on secondary vocational education level to become professionals in the technical-, natural resources and laboratory sectors, within the production and services labor market of Suriname.

The graduates of NATIN have the quality, the potential and the competencies to fulfill their leading role in the development of our country, and are therefore known nationally, internationally and regionally.

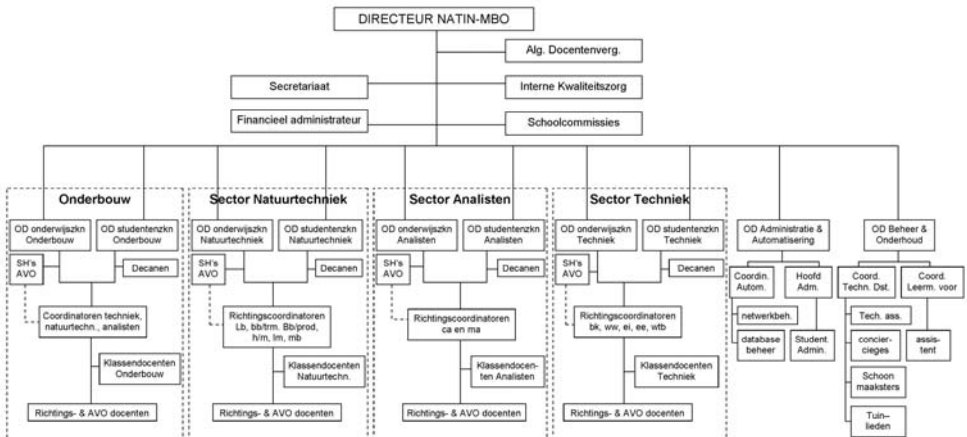
## Our Mission

The Institute for Natural Resources and Engineering Studies has the following mission:

- We offer young people who have enrolled in our programs a safe and on society and economic development orientated learning environment, where they are educated in specific and expert knowledge and competencies, so that they can develop themselves into professional staff that is independent, responsible, social skilful and upright and that is aware of the importance of a healthy living- and working environment.
- We choose to offer a wide range of courses that is synchronized with the labor market and the society at large and inform our students of this. This way they can make a choice that fits well with their talents and ambitions.
- Annually we want to deliver well educated and motivated professionals to the business community and the government in the technical-, natural resources and laboratory sectors, which can have an important contribution to the social and economic development of Suriname. We do this through the efficient and responsible use of available learning methods, equipment and materials integrated into an educational concept that focuses on the individual student, but also the labor market.
- We want that our courses have the reputation that the graduates are able to do courses on a higher educational level and are able to reach good results.
- We are defined by the characteristics of being dynamic and self active: a team that strives for continuous quality orientated development and expertise. We base ourselves on the following values: integrity, responsibility, equality, good fellowship, involvement, affectionate commitment and expertise.

## Organization Structure

### ORGANISATIESTRUCTUUR NATIN-MBO



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## CHAPTER 2

### QUALITY: THE LEADING THREAD

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#### **Introduction**

NATIN always has been a school where teachers were encouraged to evaluate and to effect improvement. But we walked a long way to come where we are today: developing a Quality Management System.

The structural approach started in 1998 when we organized a seminar on “Integral Quality Management”, as part of the program to commemorate our twenty-fifth anniversary. In my presentation I reflected on the statement if quality really was an issue for us. In reality our student population was growing every year, for them graduating from NATIN apparently held perspective to a career in life. Indeed, many of them found their way to the labor market in Suriname, but also abroad. The need for well trained and skilled professionals still exist and as stated before NATIN is the one and only school offering the mentioned specific programs in the daytime.

#### **Plan of action**

At the seminar in 1998 the planned activities within the quality framework were classified in three categories:

- Training of management, teachers and administrative and technical personal
- Educational development: curriculum, educational materials, new textbooks, upgrading the library and (technical) laboratories
- Renovation and building of additional classrooms and facilities

In the following years, several activities were executed within each category and indeed a lot has been accomplished. But we realize that we have the task of a systematic approach to reach the goal of developing and establishing a NATIN Quality Management System.

#### **Partners**

##### ***The Ministry of Education and Community Development***

As mentioned before NATIN is within the structure of the Ministry of Education and Community Development (MECD). Responsibilities



include: salaries of teachers and all other personal, basic facilities like physical infrastructure and textbooks for students, budget for teaching materials, inventory and operational costs.

In the year 2000 additional classrooms were built to facilitate the growing student population and more recently a renovation of all buildings on both our locations was carried out. Since last year these facilities were used to the full extent, so again more were needed to place all students. Last month we were accommodated in buildings on a third location just across our main location.

We also received new editions and recently published textbooks for student use.

These activities and contributions definitely enhanced the quality of the physical infrastructure and as such the quality of the learning environment.

### ***The students***

Our students every year pay a very modest entrance fee (SRD 150,- - in USD: USD 52) , but they have another very important contribution. NATIN has a history of self-acting wherever possible and so they work on projects in the school environment. A few examples are: transferring a drawing classroom into a computer lab, constructing the tables, installation of all electricity and enhancing security; placement of a glass wire cable for better internal communication; practical teaching of refrigerating techniques by installing and maintenance of cooling equipment and appliances; renovating school facilities; improvement of the school environment.

These activities also work towards integration of theoretical and practical courses and getting practical experience on the job.

### ***The Flemish Organization for Development and Technical Assistance (VVOB)***

#### **Pre-project phase**

Co-operation between NATIN and VVOB started in the 1986, by sending a teacher in the electrical engineering section. In the period up to 1997 this support was extended to a total of five (5) teachers in the chemical laboratory, the mechanical engineering, the electrical engineering and the building section.

From 1995 on, focus was set on thematical subjects to get from an individual effort to a more coherent approach. Three themes were decided on:

1. evaluation and adaptation of curricula
2. improvement of the educational process by supporting strengthening of pedagogic and methodical skills of teachers
3. institutional strengthening

In this period experience was gained in working within this thematical framework. The results were discussed in sessions during internal meetings and external evaluation visits.

## **Projects**

### ***First project 1998-2002***

After VVOB expressed their willingness to support technical education in Suriname as a means to attain a quantitative and qualitative improvement of the economical sector, an Action Program for 1998 was set up. This was mainly a continuation of the thematical approach adopted in 1995.

In 1999 five co-operants were part of the team of the sectors chemical laboratory, mechanical engineering, electrical engineering, building and natural resources. The program included: teaching courses and evaluation of courses; training teachers in specific subjects (AutoCAD); training of administrative personnel in use of the computer and basic course Word; support of management.

Gradually this program became known as the first NATIN / VVOB – project: “Verbetering van de opleiding van technisch middenkader in Suriname bij het NATIN” (Strengthening of technical education in Suriname at NATIN).

In November 1999 VVOB appointed a senior officer as adviser to NATIN, who came for work visits in the next few years. The input from this adviser was highly appreciated. Up to 2002 the following action points were performed and executed:

1. Curriculum: evaluation and adaptation, development of text books for student courses, teacher training in Didactical analysis at the curriculum and the classroom level.
2. Knowledge building: methods of regular inventory of class room courses, listing needs of practical shops and laboratories and buying equipment and machines, supplying

new books for the library and inquiries about expectation of the labor market.

3. Institutional strengthening: supporting management at the upper (director and co-directors) and middle management level ( heads of sectors), extending administrative digitalization and training of professionals for managing the computer network and database.

All these activities were performed within the context of raising the quality of the programs so that graduates would be better qualified for their job. There are various important outcomes of this project, but a few outstanding ones should be mentioned:

- Comprehensive analysis of the curriculum
- Implementation of new technologies: Auto Cad and other software programs
- Teacher training “Didactical analysis at the curriculum and classroom level”
- Library with (2,000) recently published books relevant for every sector
- Equipped training facility
- Computer lab
- Shop for refrigerating and installation practices
- Operational databases: student administration, internship data

We can state that the first project was successful: many steps were taken to support the process of raising the quality of the programs. After evaluations we were convinced we would have to continue these steps and develop instruments to control the process and that efforts had to be focused on setting up a NATIN Quality Management System: the second project was outlined.

### ***Second project 2003-2007***

In November 2001 deliberations started about an extension of the NATIN / VVOB – project. NATIN management thought it necessary to continue working on quality improvement of the education process, put additional efforts in strengthening practical classes and to establish a system for maintenance and management of the facilities.

In the meantime VVOB adopted the “Project Cycle Management” system for developing and executing projects. The project-oriented

experience acquired by the NATIN team made it possible to fully participate in all the steps that had to be taken.

In 2003 the project “Kwaliteitszorg op het NATIN-MBO: een betere integratie van de theorie en het praktijkgebeuren en het opzetten van een Intern Kwaliteitszorgsysteem” (“Quality Management at NATIN-MBO: integration of theoretical and practical courses and development of a Quality Management System”), came into effect.

The specific objective of this project is to ensure the availability of well-trained and skilled professionals for the public and private sector.

This project has the following specific domains:

1. An optimal learning environment is established in function of integration of theoretical and practical courses.
2. The link between theoretical and practical courses is recognized and is presented in the right way regarding didactical and pedagogical requirements.
3. The teachers are trained and able to present courses in a competency-based curriculum.
4. The NATIN Quality Management System is developed on the level of organization as well as on an educational/pedagogical basis.
5. Environmental topics are systematically integrated in the program of different sectors.
6. Project management is effective and efficient.

In each of the domains activities were projected to reach the objectives. Each of these activities is innovative and leading to improvement of the quality of NATIN programs and management. However we strongly emphasize the coherent approach in which all activities are inter related. This gives a guarantee for the project outcomes defined at the start.

Project management covers regular on site monitoring to assure the ongoing process. Monitoring is also done quarterly by written Progress Monitoring Reports and yearly a Result Monitoring Report is produced.

At this point it is necessary to point out one of the important features of the NATIN / VVOB – projects. From the beginning it was thought better not to work with a selected NATIN project team, but to involve the whole team of management and teachers in the project. We decided to work through the existing formal organization framework. Our Belgian

colleagues were also fully recognized as part of our team. We work together to enhance our professionalism, to raise our own competencies and to assure the improvement of quality of our organization and programs. In this way during the whole project period we worked towards sustainability of accomplished results. Sustainability often is thought of in the last phase of projects, but we think that with our approach, we built in assurance on this point.

### **Project outcomes**

Under the heading “Quality: the leading tread” a description was given of actions undertaken in the structural approach of developing and raising quality of NATIN programs as well as a progress report on results. These results are now grouped according to themes and reviewed.

### ***Institutional strengthening and training***

In a seminar in 2000, the NATIN team discussed the needs, subjects and topics for training to further develop expertise. The starting point was the strong belief that improvement and innovation not only depend on new textbooks, better equipped workshops and other facilities, but even more on skilled, trained and motivated school management and teachers. In fact the institute, already known for its active approach adopted the idea of quality promotion, development and control, starting with training of teachers.

As a result of this seminar we set up an intensive training program; a small team in our department of Internal Quality Management developed most of the programs and training documents. It is important to understand that the internal training program is linked to views about curriculum reform, performance-based learning enhancing the social, communicative and attitudes of graduates.

We organized workshops and training programs in the period May 2001 – November 2006. The main topics are:

- Improvement of the educational process through strengthening of pedagogic and methodical skills of teachers. Didactical analysis at the curriculum, course and classroom level. This is a recurrent training program, every year the newly appointed teachers have to attend.
- Cooperative learning: training teachers to use it as an instructional method for developing skills to get results based on teamwork. All

newly enrolled students are confronted with this method during their introduction week and teachers are stimulated to use it in the classroom.

- Curriculum reform: defining general and specific objectives for program courses.
- Cross sectoral themes and integration of courses.
- Environmental issues, to be subsequently incorporated as one of the cross sectoral themes.
- Computer training for teachers and other personal in using Microsoft programs, the Internet and specific software programs, e.g. Auto Cad and P L C.
- Training of professionals for managing the computer network and database.
- Development of written communication skills, e.g. writing reports. From the concept of train-the trainers, teachers participated and were trained and now can instruct students.
- Strategic management and communication.
- Teambuilding and efficient meeting techniques.
- ISO – 9001: Procesmanagement training.
- Management training for top and middle management on developing competencies on human resource issues, e.g. leading people to better performance.

As a result of this training program NATIN has a professional team teaching an innovative curriculum and up to the task of developing a Quality Management System within the educational framework.

## **CURRENT DEVELOPMENTS AND CHALLENGES**

### ***Curriculum reform***

The total NATIN program is being reviewed, quite an operation with the 14 majors, each with their specific courses. The general courses are also part of the evaluation.

The first step was to identify duplications and/or gaps in individual courses and sector programs. Teachers evaluated the courses and in doing this also used information given by relevant parties in the public and private sector. This already resulted in necessary adaptations and innovations.

A very important feature of this curriculum reform is that subjects are not only mentioned and subdivided, but that learning objectives are determined.

### ***Performance-based learning***

NATIN has also made the strategic decision to reform the base of its courses from knowledge based learning to performance-based learning. Performance-based learning has four features:

- Competencies are identified: what need the learner, the student, be able to do as a result of an instructional experience
- Performance is required: can the student perform each competency
- Performance standards are explicitly stated: students know what is expected
- Learning activities and teaching strategies provide opportunities for students to develop the competencies

### ***Improved learning environment***

The availability of technical books and professional journals to teachers and students is very limited, so the need for a library in the school is evident. There is a library, but the books and journals had become obsolete in the last decades. It was decided to modernize the library facilities and buy a wide variety of new books. Through the Internet there is access to a universal digitalized library system and thus to almost unlimited information.

This is big help to teachers who used to develop learning materials; with the latest information at their disposal they are again stimulated to write leaflets and own textbooks.

However, these learning materials are only part of what is needed to execute the specific practical courses in the different programs. Every workshop and laboratory has to be equipped with a specific inventory of machines, tools and materials. During the projects most of these facilities were remodeled and in part modernized by installing new equipment.

One of our achievements is the laboratory for refrigerating and installation techniques with advanced equipment and our laboratory for industrialized automation (PLC). We are now working on installing equipment in our automotive shop to carry out diagnostic tests and to update the workshop for work on cars and heavy equipment.

### ***Cross Sectoral themes***

One of the objectives is to achieve that environmental topics are systematically integrated in the program of different sectors. At a certain point we decided not to introduce “Environmental Studies” as a new major in the NATIN program, but to opt for incorporation of environmental aspects in all majors. Teachers of the NATIN Environmental Group offered awareness lectures to their colleagues and selected materials were made available in a special section of the library on one location. In the first year program the course on “Safety” was extended to “Safety and Environment” and is offered to the more than 600 students. By the end of 2004 different majors incorporated environmental aspects in 23 courses. We consider environmental awareness as an ongoing process and will keep working in this area.

Another remarkable outcome of these efforts is the development of the “School Milieu Beleids Plan” (“The Strategic School Environmental Document”) that is now coming into effect and has as its objective to achieve that the school facilities and locations are environmental friendly and safe for everyone.

### ***Information Communication Technology (ICT)***

When in 1985 the program was extended from three years to four years, a computer course was incorporated in the final year (and also a management course). Up till 1999 these classes were offered in the computer lab at the University, then NATIN installed its computer lab, financed with funds from the NATIN / VVOB – project. From then on apart from the Microsoft Office program a more integrated approach started in the different majors, e.g. Pascal for electrical engineering, Auto Cad for mechanical engineering, building and civil engineering and Chem Sketch for laboratory majors. Starting in 2002, all students have to write their final project in Word and do a Power Point presentation.

NATIN developed a completely computerized database network. It consists of the

1. database for the student administration and timetable for classes (GP-Untis Natin), internship addresses and teachers administration
2. database for NATIN inventory management and maintenance: the NATIN Visual Database (NAVIDAT) (in progress)

At the end of 2003 a wireless Internet connection was established that was changed to ADSL in 2006. Both our locations now have Internet



access, not only in the computer lab but also in other labs and workshops, management and teachers' offices and our administration office.

### ***The NATIN Quality Management System***

After a seminar in 1998, we began working on quality promotion and this issue stayed with us as the leading thread in our daily NATIN life. As mentioned before, after evaluations we decided that we would have to develop instruments to control the process and set up a NATIN Quality Management System. At this moment most of the efforts in the on going project are aimed at the development of this system.

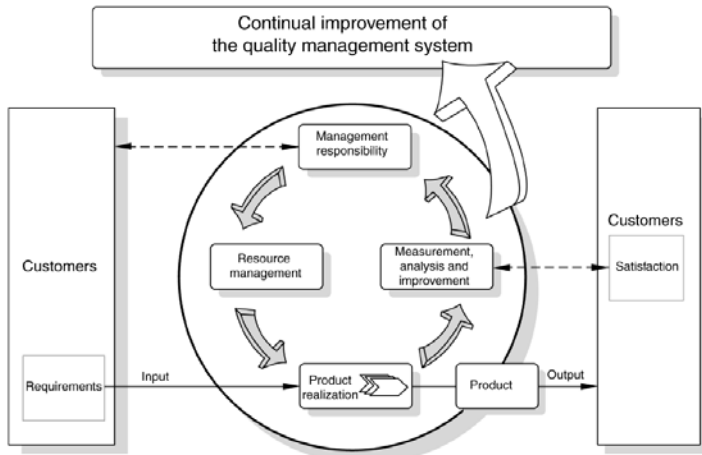
In the meantime the results and progress gradually became known to the education sector and NATIN is now recognized as one of the pioneers in innovation and quality development in this sector. The private sector as well has shown great interest in this process and suggested to go for an ISO-certification.

In Suriname ISO-certification is known to companies, and it took us some time to get used to the idea of this process in our educational institute. After intensive deliberations we decided that it was not only within the scope of our project, but that it would be an important additional achievement. After consulting the Ministry and the VVOB the decision was taken to go for it.

The first step was to bring in professionals of the Safety Technology Institute to execute a Baseline Assessment of the NATIN Management System connected to the ISO 9001-2000 norm. This resulted in a report outlining existing gaps.

At the same time the Department of Internal Quality Management was established within the organization framework. The assigned officers intensified the process of informing the NATIN team and involving them in the process. The training Process management was organized for relevant groups and the above-mentioned professionals give us insight in the ISO 9001 requirements, the processes and how to describe these.

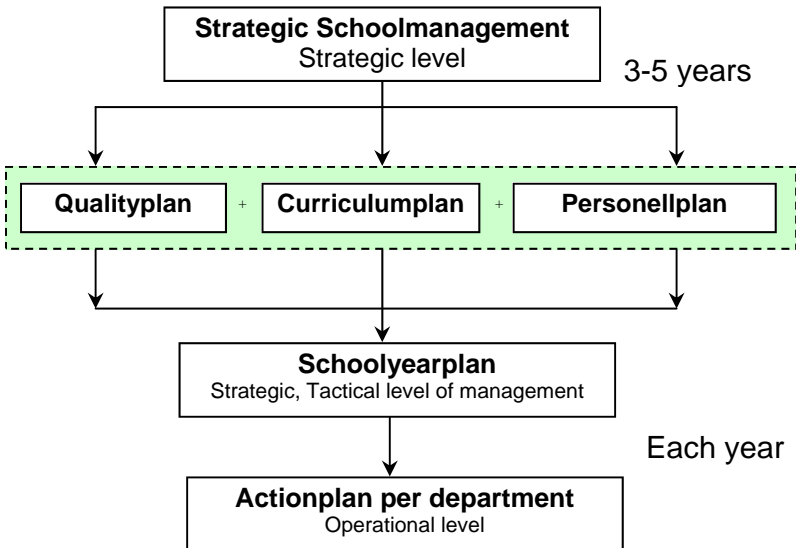
An action plan was developed and is now carried into effect; at the same time we are involved in editing the Quality Manual and to describe different processes. The job is not easy and requires adaptations; a lot of discussion is needed to decide the best procedures in the processes. Our objective is to get the ISO certificate at the end of 2007.



At the start of this ISO-certification process in which requirements for the features for mainly management processes are documented, questions came up about the relevancy in an educational system. We decided to opt for advice from a specialist in the educational quality system in Europe. Mr. Gilbert Buekenberghs worked for two weeks with us and introduced us to the European Quality Management system (EFQM) and more in particular to the Proza model of self-evaluation. We learned that there are similarities between the ISO and Proza model and took special interest in the aspect of self-evaluation. This aspect gives links to the specific educational processes.

Suriname is taking steps towards accreditation and recently the National Bureau for Accreditation (NOVA) was set up. Specialist from the Quality Assurance Unit at the University of the West Indies came to acquaint a selected group from tertiary / higher educational institutes with quality assurance. We attended the workshop “Establishing an Internal Quality Assurance Mechanism for Tertiary / Higher Education in Suriname”. Our observation was that NATIN has already taken important steps towards internal quality assurance and that indeed we are one of the pioneers in this area.

**Managementplanning**



### ***Development of the NATIN network***

The results of efforts and activities towards innovation and quality management did not remain unnoticed to the Ministry, the public and private sector, and various organizations in Suriname as well as abroad. In fact they proved to open new possibilities.

We can mention that NIMOS (National Institute for Environmental Development in Suriname) is promoting a training program to execute the Montreal protocol on controlling refrigerating practices. Some of our teachers participated and are now training others. Our refrigerating facility is used for the practical part of this program and we received additional specialized equipment.

More recently the Association of Professionals in Electricity and Refrigeration Practices donated instruments for our workshop. These will not only benefit our students, but are to be used in training courses for others as well.

Another interesting development is that the project developing a digitalized cadastre as part of the Geographical Land Information System (GLIS) has expressed the intention of establishing a partnership to support and help modernize education in surveying and related fields. The BHP Billiton is known to establish foundations for sustainable development in countries where the company have a seat. In 2005 the BHP Billiton Suriname Foundation for Sustainable Development was a fact and NATIN was the first to offer a project document. The 3-year project is already in progress and has objectives additionally to the NATIN / VVOB –project.

NATIN is participating in the project “Strengthening of Medical Laboratory Services in the Caribbean”, a CARIFORUM project funded by the European Union. Since 2003 we attend meetings and workshops on a regular basis for the purpose to standardize the curriculum for medical laboratory technology in Caribbean countries. We were introduced to WIDS, a system for Designing and Assessing Learning and we easily recognized it is completely in line with our process to introduce Performance-based learning.

In 2004, we were selected as one of the representatives to attend the Inaugural Conference of the “Caribbean Area Network for Quality Assurance in Tertiary Education” (CANQATE).

We now are an associate member and again participated last year in the yearly conference.

We referred to our participation in the seminar organized by NOVA with facilitators from the University of the West Indies, and the observation that in Suriname NATIN is recognized as one of the pioneers in the field of quality management.

In Belgium we have contacts with the K.I.H. De Nayer. One of their professionals came to Suriname to assist us in setting up our Department for general facility management and in two instances students did their internships at NATIN. Also two of our teachers did a program at De Nayer.

Paramaribo has a special relationship with Antwerpen covering education, town and urban planning, health, care for senior citizens, etc. In 2005 we participated in a delegation to Antwerpen, were informed about the educational system and visited institutes.