

Sustainable learning



Society sustainable learning
Guus Geisen
Nico van der Meer
Tijn Nuyens

Chapter 1: Background "sustainable learning"

In January 2004 a dramatic event at a secondary school shocked The Netherlands. A teacher was shot to death in the canteen of the school by one of the students.

In the days that followed the media highlighted this drama as we often see happening when complex problems like this occur. At the press conference the day after most journalists asked just one question: who's to blame? Also in several newspaper articles and newsprograms this question came up.

The school's principal explained the impossibility of pointing "the guilty". In his advocacy he pointed at the complexity of the problem, at all the different facts and their interdependency. The schools lack of openness is not the most important cause of this shocking event (Educational Minister) nor the decreasing Christianity (Bishop Simonis), nor the diversity in different cultural backgrounds, nor the poor safety measures, the criminal background of the child's parents nor the quality of the education. We can find the cause in the combination of these facts, their interdependency and various facts not mentioned.

Our world becomes more complex and smaller at the same time. Events often have impact on large parts of the world. The terrorist attack at the World Trade Center in New York, the SARS epidemic and very recent problems in avian influenza are examples. One hundred years ago it was impossible to think that a conterminous decease in China could have these kind of impact in the western economics. A farmer in Nebraska noticed at the attack on the WTC in New York: "Strange that ideas created in a cave in Afghanistan have this immense impact on my income"

For centuries we focussed on close relationships: the family, the society. Now we must more and more manage to interact with the world as one big village, the world as a global village. We are more and more connected by the increase of airtravel and technology. The importance of being aware of what the consequences of our actions are for other people, other places, for the next generation.

The machine age thinking of the 19th century created specialists. Not only in factories but also in schools, hospitals, banks and several other organizations fragmentation became important. This approach has brought us prosperity at one hand, but on the other it brought us the limitation of specialization and fragmentation: a specialist knows a lot about little.....

Nowadays interdependency and relationships characterize the development in our society. As individuals and as a group we try to understand complexity so we should try to teach our children as well. Education doesn't compete with this development. We can conclude that education seems to be more fragmented as ever. Content and organization bare the marks of machine age thinking: productivity, uniformity and fragmentation still are core competencies in our schools. We still prepare our children for machine age thinking because we don't ask ourselves what impact the even faster changing developments in direction of the globalization means for education. "The future looks alien to us...(Peter Senge)

There is a growing gap between the complexity and interdependency at one hand and the investments we do to prepare our students to understand this complexity at the other. This gap is an increasing challenge in education.

We do not argue the importance of the subjects but there is a missed understanding of the interdependency between aspects of the curriculum. Our students must be able to see the interdisciplinary, interconnectedness, complexity and dynamic of problems.

We need to master important questions for example:

- How can we handle the increasing CO₂? What to do with global warming and climate change.
- What is the impact of the vast economical development of countries like China to use of energy and related environmental burdening and the need for replacement for decreasing fossil energy sources?
- How can we handle aids in Africa?
- What to do with the knowledge that 15 % of the worlds population owns 85 % of the wealth on earth?
- What can schools do to prevent the increasing violence?

All these problems ask for a different approach we are not used to. We cannot solve these problems from one point of view or discipline. We cannot solve terrorism by using defense specialists. Detection gates cannot solve violence in schools.

Many problems bare many different aspects like geography, history, biological, philosophical and political aspects. We have to see these subjects as systems: as related elements with a constant influencing each other. Schools have the obligation to learn children understand and influence systems.

This is not an easy task. Schools being based on fragmentation are used to offer separated information. In secondary schools and higher education schools are organized with teachers and subject in separate classrooms. This makes it hardly possible to develop the interdisciplinary approach as a fundament in systems thinking. Thinking in and about systems thinking is one of the biggest challenges of this time.

Peter Senge, founder of the concept of the learning organization wrote "The fifth Discipline, the art and practice of the learning organization" in 1990. A new way of thinking and acting is needed and systems thinking (the fifth discipline) is the possible leverage to do so.

It's a philosophy and an approach. The first shows us a world of interdependency and quick changes, the limitations of looking at details and not the big picture. The second gives us tools to research our way of thinking, to clarify. It helps us to search for new opportunities to really solve the problems and prevent us from acting upon symptoms. It teaches us to not only look at the short term but also the long term. Not only to the consequences but also the effects we do not expect.

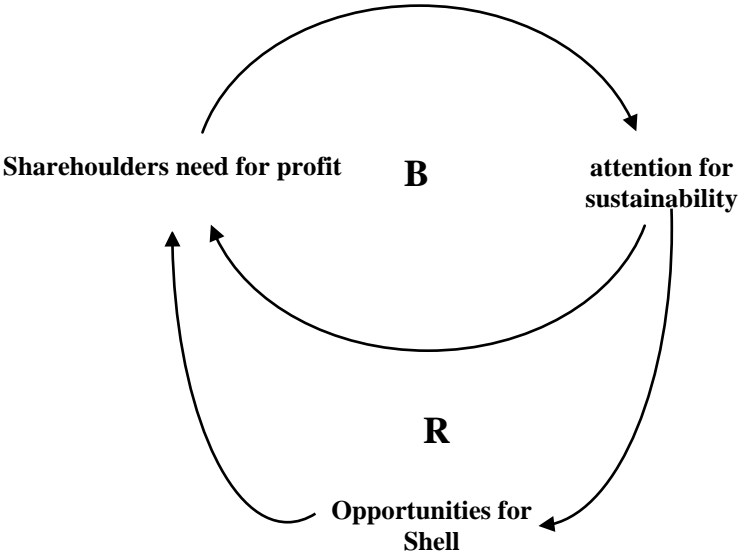
If we can combine both approaches, systems thinking offers the opportunity to end fragmentation, searching for guilt, fighting symptoms and intellectual fundamentalism.

In a world of increasing interdependency systems thinking is more then "a nice idea".

Companies see the need to think and act different more and more. Sustainability and societal and responsible entrepreneurship are topics. (Chapter 4)

Shell executive Van der Veer pointed February 8th in an interview with Paul Witteman the great importance of thinking in long-term effects and sustainability. He explained that for a company making profit and sustainability doesn't have to be adversaries. In the systems language it looks like this:

If the need for profit for the shareholders grows, the pressure for making more money is growing faster and paying attention to sustainability lesser (short loop). This effects the short term positively. In long term thinking it will lead to less opportunities for and therefor less profit (long loop).



Systems thinking and sustainability are connected indissoluble. In systems thinking long term effects of our actions is one of the most important starting points.

What does sustainability means to us?

As an illustration of sustainability we ad this passage of the website of the ministry VROM:

*Sustainability is a development that foresees in the need of this generation without endangering the need of the future generations. The term sustainability became actual after the conference for environment and development of the united Nations in Rio de Janeiro 1992
The gathered members agreed to strive to sustainability.
The Dutch plans and actions for sustainable development are documented in the "The action program for sustainable development. It has an international and a national strategy. According to the plan The Netherlands has to be a sustainable society in 30 years. Far-reaching national and international goals are needed. The contribution of the common civilian is of the biggest importance.*

These developments will have their impact on education. At this time there is not much happening in education in systems thinking and sustainability. It reaches as far as the sustainable school building.

This project wants to influence this development positively. The government recognizes the increasing necessity for new changes in education. There are several developments in education in searching to connect to the need of tomorrow. All together they form the fundamental development in "sustainable learning".

In this we understand the development of curricula and methods in which systems thinking is connected to sustainability. We want to build a network in which students, teachers, developers, coaches, companies, and government work together. In our vision we teach students to interact with the problems of today and the future that adds its contribution to the development of the world as a place worth living in; for the present generations as well as for the future generations. We want to support the consciousness of students in the process of globalization and what they can do to work towards a better world.

Chapter 2: The goals of the project.

In the last chapter we have tried to point out why working at systems thinking and sustainability is needed in these times and the meaning and relationships between both developments. Also we stated the lack of development in sustainable learning in education.

In close contact with Peter Senge we developed a plan to give an impulse in Dutch education towards systems thinking and sustainability. In this chapter we explain the goals of the project. We want to start with 4 schools that in a way are familiar with the concept of organizational learning and systems thinking.

What will we see in the school in 2 years?

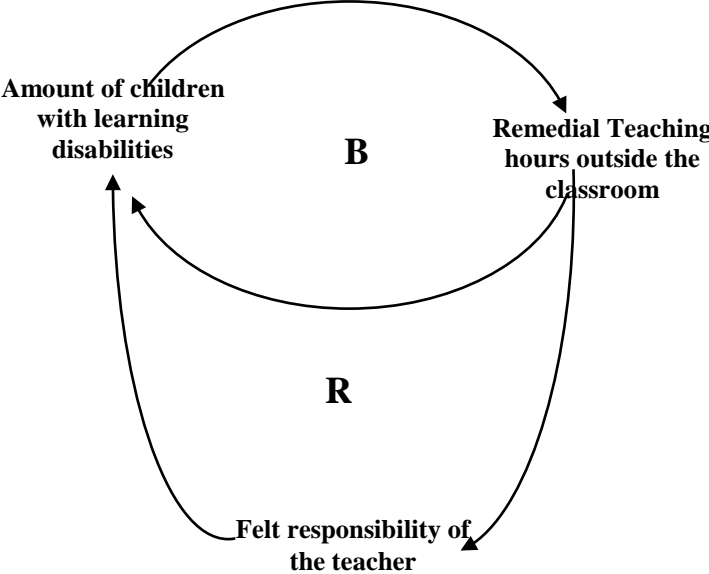
In the participating schools we will see all children in classrooms using system tools in their daily work. They know the most important methods and tools which support systems thinking and use them in favor for their own development.

They use mind-maps to show the interdependency of the subject. These tools are also used to solve small problems in the classroom. They know the habits of mind and use them in a functional way.

They use Behavior Over Time Graphs (BOTG) to obtain insights in a story, to communicate with each other, to see and understand time schedules in history and become achieve deeper understanding in different learning processes. In working with causal loops we see interdependency in the elements of our reality, learning to think cyclical, and discover what the effects are on long and short term (sustainability).

Not only for students it is evident to use these tools but also teachers in school can use these methods. Teachers can also distinguish long and short term effects.

For example:



As a teacher assesses the amount of children in the classroom with learning problems is increasing the leadership can choose to solve the problem to support these children with remedial teaching outside the classroom. On short notice this will pay off. But

there will be no impulse to the teacher to handle the differences in the classroom himself. The amount of children with learning problems will in the end increase more and more.

In participating schools we can see a growing involvement at the professional development as reflected in a learning school culture. In team meetings many systems tools are used. Mental models are discovered with the help of the ladder of inference, dialogue and open communication. Children are active involved and partly also the architects of their own development that is less directed by knowledge of facts.

Problem solving, transferring functional knowledge, learning with and from each other, using habits of mind, thinking cyclical and interrelated, having eye and ear for long term effects are at hand.

Systems thinking in schools and classrooms is the leverage to fascinating education. Using systems thinking is the leverage to the other 4 disciplines as Peter Senge explains in "the fifth disciplines" books:

- personal mastery: making your dreams come true
- shared vision: creating your desired futures in the school and the classroom
- team learning: systems thinking leads to many methods in cooperative learning
- mental models are investigated talked about and adjusted.

Goals concerning the visual processes in schools:

- Schools prepare their students for a small world of interdependency and coherence and not for a future that doesn't exist anymore
- The curricula contains theme's who are explicitly related to sustainability:
 - CO₂-discharge, the use of energy resources;
 - Global warming and climate change;
 - Violence, war and terrorism;
 - Ecosystems: fishbanks, exploitation of the rainforest, pollution, waste
 - Poverty: 15 % of the people own 85 % of the wealth;
 - Sickness as aids and other epidemics;
- Motivation an self confidence in all participants seems to grow;
- Differences between students and differences between teachers are starting-points and are seen as experiences to work together and learning from and with each other;
- Schools have a learning culture and use the five disciplines of organizational learning;
- Participating school are willingly sharing their experiences. There is a connection to the WSNS+ project "Looking and learning schools"

Goals related to the products schools can use:

- Transferable folders with lesson examples and portfolio's are developed by participating schools ;
- In a fieldbook theory has been translated to practice and worked out in examples;
- In a video the principles of Learning Natural are visualized;

- The developing of a course “systems thinking in the classroom” for Primary schools (K-8 grade). New schools can use this course as a starting point;
- Publications show the successful process of the project.

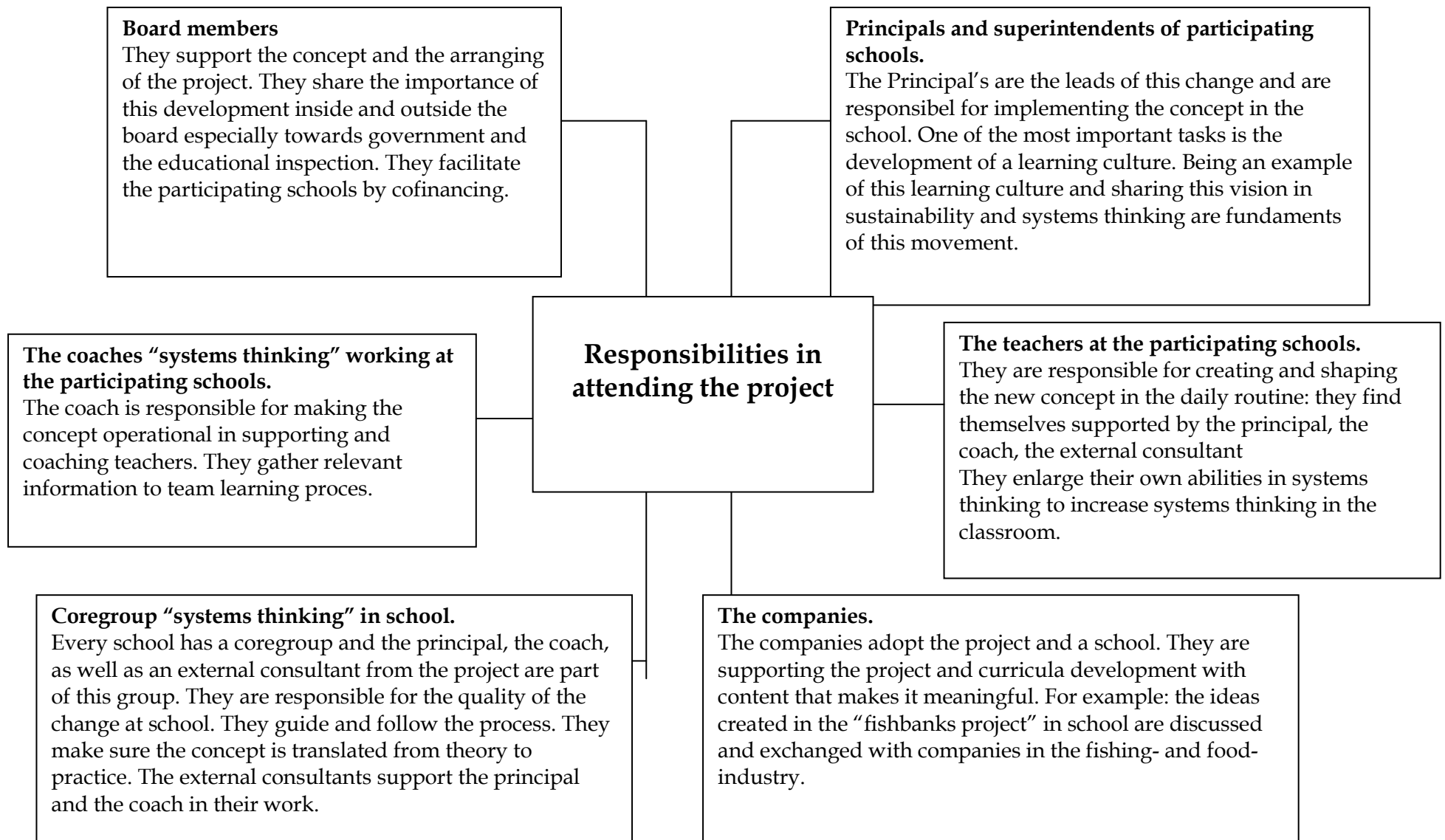
The power of the concept lies in the coherence of the different activities. The integral approach is used to have the same starting points and methods in the classroom as well as at the school level. Children, teachers and leaders use mind-maps, graphic organizers, behavior over time graphs, causal loops, archetypes, iceberg, stock and flow diagrams.

In emphasizing team learning we involve all actors in mutual attunement. We share a concept with a mission: working together to offer children fascinating, adaptive education and prepare and support them to be able to be part of the society in a vastly changing complex world.

There is a balance in thinking and acting for all participants. We emphasize the support for the acting of the teachers because in them we can find an important leverage.

Participating on this project involves all participants.

(see the schedule on the next page)



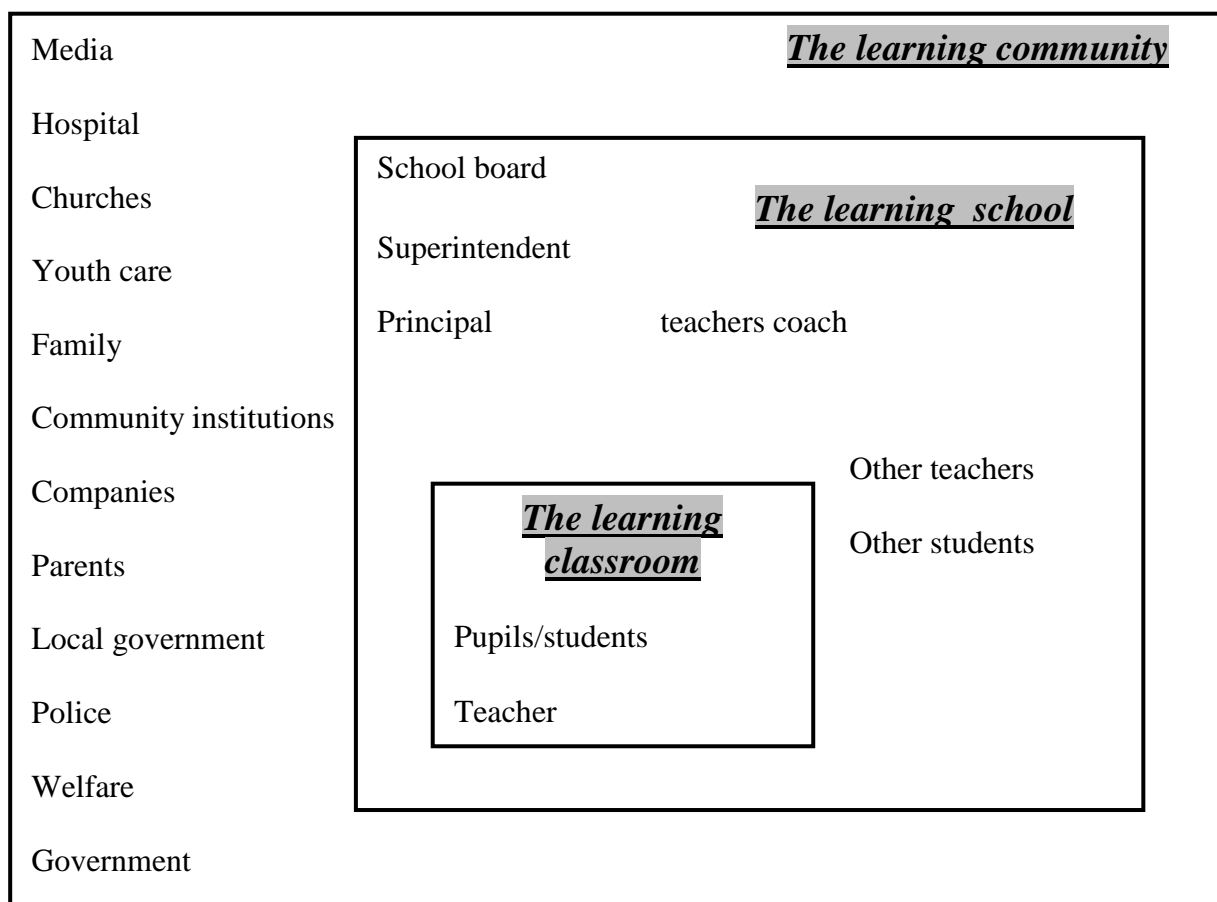
Chapter 3: Action plan

To make systems thinking and sustainable learning successful working **in** the system is not sufficient. We also have to work **at** the system. We have to have common understanding on what's the system as we talk about excellent education?

For a long time we thought "the classroom" was the place where it happened. The teacher in his kingdom. We soon discovered excellent education could only be in reach if the school level supports the development of the primary process: shared vision, professional culture, learning from each other, personal leadership, etc. In short: the school as a learning organization. Lately the borders of the school are changing again. School cannot do this all by itself and the relationship with the society is more at hand. Schools working together with parents, youth clubs, , community institutions, extended family and familial network, local and national government, etc.

School-community interdependence

The world at large



The action plan in systems thinking and sustainable learning will feature the interdependence of activities. Chapter 3 shows this interdependence.

The following guiding ideas are important:

- we use the concept of organizational learning. The project started with Peter Senge's initiative and has his support;
- we will emphasize the curriculum, in which systems thinking and sustainability are connected;
- sustainable learning and systems thinking won't be new lessons in a lesson plan but will be a different way of looking at education, content and didactics;
- we strive for educators, schools, developers of curriculum, government and business to work together. Especially the relationship between schools and companies is evident. Today's children are not only tomorrow's employees, but also tomorrow's customers. Working together with companies is one of the goals of this project.

Possible activities

- founding a project group whose concern will be developing a strategy and looking for sources to be used in developing excellent curricula. The Creative Learning Exchange, The Watersfoundation, SOL International en SOL Nederland could be possible supportive organizations.
- Peter Senge and Linda Booth Sweeney will have a supportive and initiating role. Linda published several articles about systems thinking in education.
- Employees in companies can support this project in content. Further we think to support team learning between education and companies and do some research in this area.
- Developing lessons and lesson serials on sustainable learning and systems thinking. These lessons will have their try outs in the pilot schools.
- Arranging courses in systems thinking and sustainable learning. The courses are primary focused on principals, superintendents, teachercounselors and teachers and secondly the courses will be focused on employees of companies and last for training the trainers.
- Spreading the concept by arranging and attending conferences, workshops, publications, interviews etc.
- Creating a national and international network of teachers and schools who work with systems thinking and sustainable learning;
- Developing new systems in assessment and evaluation. How do we (or I) know if learning occurred?

Chapter 4: How does this development fit?

As shown in the last paragraphs, there are a lot of examples in education in what we can see the new perspective. We will show the most important of the perspectives.

Sustainable, societal and responsible entrepreneurship.

More and more companies are concluding that profit on the long term always goes hand in hand with sustainability. Dutch multinationals like Shell and Unilever are examples and share this intend.

During the First Global Society for Organizational Learning conference at Helsinki in June 2003 several large companies from all over the world presented their thoughts, ideas and products based on sustainability. At several occasions the importance of education was mentioned. One of the participants stated:

*"How can we, as companies, support education to prepare children for the future as an employee of the company of the 21 st century? A company where sustainability and thinking and working interdependently are important guidelines.
If schools give this the most attention we as a company wont have to teach our employees this new approach. We do not need people who have a lot of knowledge, but we need curious, enthusiastic and well communicating systems thinkers"*

Leadership and moral purpose

This development is connected to the former subject.

In recent literature about leadership moral purpose was emphasized. This includes schools also. Michal Fullan appoints the importance of moral purpose in leadership at schools. What would we want to give along with our students? What is needed in futures society?

Tex Gunning at Unilever put it very well chosen at the First Global SOL conference at Helsinki:

*"We are bent upon a holistic integration: to combine personal and business growth; not only driven by the head but especially by the heart and the soul; we do not longer want people to leave their heart at home when they come to work; we want not only problem solving but creating something special: for our employees and for the society.
In this we need another type of employee."*

Developments in learning in the 21^e century”

In our country several innovations contribute to the educational development. “New Learning” is a continuous search in meeting the needs of children, students, the parents, the teachers, and the society. Some innovative examples:

- Multiple intelligence and cooperative learning (Gardner, Kagan, RPCZ Zeeland)
- “Active Learning Algemeen Pedagogisch Studiecentrum (APS)
- Systems Thinking in the classroom “Natuurlijk Leren” (Guus Geisen)
- Habits of mind (A. Costa) translated by NTO/Effect Nico van der Meer and Tijn Nuyens
- Brain-based Teaching
- TOM-project by the Educational Service Center MHR Bodegraven.

In all these developments schools and classrooms are no longer products of the machine age but have similarity with a organism. This living organism is recognized by: many differences, interdependence and self-regulation.

In “new learning” it is all about:

- What do we offer our students? Goals and subjects.

Knowledge loses its functionality faster and faster so we need to broaden the goals. Skills and attitudes are becoming more and more important. The development of the quality of thinking and all intelligence’s will become the most important goals in education. In “Habits of Minds it ‘s all about the development of intelligent behavior that is needed now and in the future.

Examples of habits of mind we want to learn children in systems thinking and sustainability:

- Overseeing and understanding the whole
- Changing perspectives to understand reality better
- Searching for inter-relatedness in stead of separated elements
- Thinking cyclical: seeing relations in cause and effects
- Insights in the way our mental models influence our view of current reality and our views of the future
- Surfacing and testing assumptions
- Recognizing long and short term consequences
- Seeing unintended consequences of actions
- Looking for structures instead of guilt
- Avoiding quick fixes
- Using underlying structures to take actions that are the leverage
- Reflect on results of actions to redesign actions

- **On how children learn? The didactics**

We learn more and more from brain research how learning occurs. From biological point of view we learn that systems thinking fits the natural way of the function of the brain: not in laundry lists but in circles, mind-maps, relations and inter-relatedness.

Another important change is the role of the teacher. In modern didactics the teacher is no longer the only source of knowledge but the facilitator of passionate learning and students who can develop optimal.

Learning from each other (cooperative learning), creating inter-relatedness (systems thinking), communication (team learning and mental models), connecting life and learning (meaningful learning), connecting with passions of children (personal mastery) are examples of new learning.

- **How can we manage differences? Every child is special!!**

Like fragmentation uniformity is one of the deep roots of machine age thinking. In "things" this is possible, in nature it isn't. "*Nature has a kind of love affair with variety*" says Peter Senge. Seeing differences no longer as a threat but as a chance for team learning is one of the biggest challenges in education.

Addressing children on competencies (multiple intelligence's), leaded by basic needs and educational needs (adaptive education)

- **How can we interact with the fast changing environment? The learning school.**

The school and the classroom as a learning organization with Peter Senge's five disciplines as the fundament for development.

"Systems schooling for school systems"

This is a project started as an initiative of Peter Senge in cooperation with SOL-Netherlands and "Natuurlijk Leren", it's focussed on systems thinking and sustainability.

Senge wants to start the project with three countries in 2004: The United States, The Netherlands and China. SOL Netherlands (The Society for Organizational Learning is also involved. March 2004 this subject is scheduled at the SOL conference in Paris. SOL France also is interested in the project as it is planned.

"Natuurlijk Leren" will support systems thinking in the classroom in Turkey and facilitates two days working with teachers and principals at the end of February and in October.

Chapter 5: What is needed to bring Sustainable learning into reality in The Netherlands?

The project group started the society “Sustainable learning” (Stichting “Duurzaam Leren”) and the domain is registered (www.duurzaamleren.org). This society coordinates the activities and takes initiatives to support the development.

The Dutch pilot project starts in two places: Limburg and Zuid-Holland. In each area two schools from one board are involved. The support of the board is conditional.

They have to facilitate the participating teams to make the project successful.

Working together is formalized in a project contract based on shared appointments.

The society “Sustainable learning” creates new educational materials, curriculum, and different approaches in the classroom and the school. Peter Senge, Mary Scheetz, Linda Booth Sweeney, the Watersfoundation and the Creative learning Exchange participate in the project to translate their educational materials, share experiences and develop new materials for the Dutch schools.

The involvement of companies and government is essential.

There is an interest for companies because children are the future employees. They have to be able to think systemically or there will be no sustainability. Companies can support this project financially, in content, in the process and the products.

In 30 years, according to the government, The Netherlands has to be a sustainable society. It starts in us and children act natural in this. We have to make sure children unlearn this in schools.

Society sustainable learning www.duurzaamleren.org

Boardmembers:

Guus Geisen g.geisen@duurzaamleren.org

Nico van der Meer n.vandermeer@duurzaamleren.org

Tijn Nuyens t.nuyens@duurzaamleren.org