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# **Does teaching in Geography contribute to understanding Sustainable Development?**

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## **Introduction**

The national evaluation of knowledge in 2003 (NU03) in Geography of pupils attending the last year of our compulsory school was meant to have similar questions as the evaluation that took place in 1992 in order to be able to make comparisons. However, many of the questions of 1992 were in 2003 not relevant (e.g. the question about the Soviet Union). Moreover, the syllabus of Geography had since 1994 a new content, which in 2000 had become revised. The new dimension of Geography is the emphasis on Sustainable Development.

In our national evaluation of Geography in 2003 we had both one-dimensional and multi-dimensional questions. The one-dimensional questions, e.g. names, where to find different phenomena and how to handle different diagrams and tables, the pupils in 2003 managed as well as in 1992. In this paper we choose to focus the multi-dimensional questions and especially the ones about Sustainable Development.

## **From Environmental Education to Education for Sustainable Development**

Historically and under the name of Environmental Education the Science teachers took care of this domain. As has been put forward by many researchers and at many international conferences since the one in Stockholm in 1972 (Tbilisi in 1977, Rio in 1992, Thessaloniki in 1997 and in Johannesburg 2002) teaching for Sustainable Development includes other aspects than the ones of Science. It has to take into consideration our future needs, how to use and not mistreat resources, aspects about lifestyles and equal distribution and democracy and involvement. It also has to deal with aspects of creativity and belief in the future. Sören Breiting describes this change in the following table:

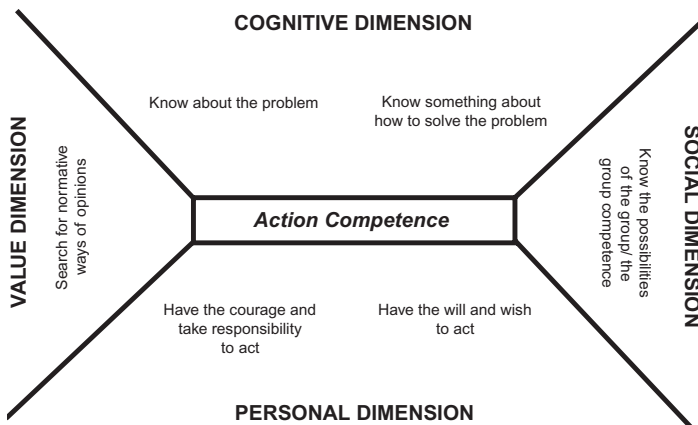
**Table 1.**

Earlier forms of Environmental Education	Environmental Education – the new generation
<b>The aims of the education</b>	
To change the way we act	Development of action competence
<b>Characteristic aspects</b>	
We (environmentally aware adults and teachers) know which is the best solution of the about how	Everybody should be involved in decisions about how to solve environmental problems (democracy)
We must stop or slow down the development	There are many different developmental possibilities
Environmental ethics – ethics concerning the relation between nature and mankind	Ethics concerning the relation between people with different opinions
Science subjects are the most important ones in Environmental Education	Humanistic and Social Science subjects are at least as important as Science
Experiences of nature are basic in Environmental Education	Experiences from society are important
Health aspects are not visible in Environmental Education	Health aspects are central in Environmental Education
Focus on different values among members of society	Focus on conflicts between different interests among members of society

After Breiting (1997)

Finn Mogensen (1995) discusses how “action competence” can be seen as a vital ingredient in education for sustainable development. He means that “action competence” has four different aspects, a cognitive, a personal, a value aspect and a social aspect, which can become visualised by the following picture. We have used his model as an instrument when analysing the understanding of Sustainable Development of our pupils.

**Figure 1.**



Action competence expressed as four different dimensions – a model for analysis – after Mogensen (1995)

### **NU03 – Sustainable Development**

In the spring of 2003 approximately 1800 students from 37 schools in Sweden answered to the students' test "Sustainable Development". The results of the students' answers to the test questions are reported here and so is an evaluation of the target fulfilment as seen from the objectives of the control documents. We also discuss possible explanations for the result.

Along with the test in NU03 presented to the pupils, questionnaires were handed out to pupils, teachers, principals and parents. One question was about the importance of environmental education. A majority of the respondents meant that this is important and almost all the teachers say that they work with or even emphasise environmental matters when teaching. The teachers also say that they try to link the schoolwork to what is happening in the world outside the school. However, there is a great discrepancy between what the teachers and the pupils express that has been taught during the last three years.

Based on experiences from 1992 the test in 2003 had only multiple-choice questions and we tried to use an easy language. Also, questions, that to some extent made it possible to make comparisons with NU92, were used.

At the end of the test there was a survey about the opinion about the test. Most of the pupils meant that the question were important and interesting, only a small minority thought it had a difficult language and a majority meant that the areas questioned about were not dealt with in school.

### **Results on the multidimensional knowledge questions of the test**

The multidimensional questions deal with the reasons for natural and environmental disasters and the consequences thereof for man. When revising the syllabus in Geography for the nine-year compulsory school in 2000, the environment and democracy issues were emphasized more distinctly compared with the formulations of the year 1994. In the syllabus of 2000 stress is laid on the importance of the student's developing his/her capacity to perceive the possibilities, and to estimate the consequences of different action alternatives, and also to be able to take a stand and assume responsibility for the common environment to facilitate a sustainable development. Teaching in Geography should among other things aim at the student's "broadening his/her knowledge about the diverse financial, technical, political, social and cultural activities of man, and how these link together places and regions, and also his/her reflecting upon the consequences of such connections". Besides, stress is laid on "the ability to assess the consequences of different action alternatives for man and environment, to be able to make well-founded decisions in a democratic society".

### **Flooding**

The students were asked, why flooding come about. They could answer, "I agree", "I disagree" or "I do not know" to the following statements:

- A low pressure remains in the area during a longer period than normally
- A high pressure remains in the area during a longer period than normally
- It is too cold, and so the water does not evaporate

- It is too hot, and so the glaciers in the mountains melt
- Due to deforestation
- Due to regulation of the water flow, as waterpower is needed for electricity production
- Due to regulation of the water flow, as there is a need for more ground to cultivate

Four out of ten students (39%) can give a meteorological explanation for the increased precipitation (low pressure, not high pressure remains in the area for a longer period of time) as a direct reason for the flooding.

The indirect explanations caused by man are not just as evident to the students. Only 28 percent can see that deforestation or timber-cutting may influence the water-retaining capacity of the ground to cause flooding. Approximately as many (27%) can see that regulation of the watercourses in order to meet the energy production requirements may lead to flooding. One quarter (26%) of the students can see that regulation of the watercourses for agriculture's sake could have something to do with the water overflowing.

### **Results on the attitude questions of the test**

By attitude questions we imply the questions in the test where the students may take a stand to assertions by giving different answers depending on their standpoint. The attitude questions deal with the concept "sustainable development". The syllabus in Geography presents the concept under the heading "The subject's purpose and role in the education":

Issues about the distribution and use of resources, as well as other issues related to man and the environment, include a number of ethical considerations and standpoints. The education provides tools for analyses of the interaction between man and nature, and should lead to taking responsibility for the common environment and resource exploitation to make a long-term, sustainable development possible. (Skolverket, 1994b)

Under the heading "Goals to aim at" it is declared that the student "increases his understanding of the living conditions of man through widened knowledge about nature and society and about the connections between them in different parts of the world", "develops his ability to reflect upon, and to take a deliberate stand for diverse alternatives of use of resources from an ecological point of view", "widens his knowledge about man's different financial, technical, political, social and cultural activities, and how they link together places and regions and, besides, reflects upon the consequences of such connections", and also that the student "develops his capacity to formulate and work with problems related to local and global issues of survival.

The different formulations of the syllabus show an evident democracy/citizen perspective. Each student shall be able to evaluate different alternatives for the use of resources, to take a stand and responsibility, and also to assess the consequences of different action alternatives.

## **Sustainable Development**

The question is initiated by the assertion that a sustainable development is about how to solve problems on a global level and in the local environment, and that the solutions should be favourable to both people and environment in the long term. The students are requested to evaluate what they think about the importance of some different actions in the work for a sustainable development. They may choose between “Very important”, “Rather important”, “Not very important” or “Not important at all”. They consider the following actions:

- to let poor countries be exonerated from paying their debts
- to find peaceful solutions to conflicts
- to procure inexpensive HIV/AIDS medicines
- to cut down the rain forest to obtain more agricultural land
- to pump up more groundwater for irrigation in dry areas
- to improve recycling
- to purchase products cultivated locally
- to go by car to a lesser extent

Peace and health are the most important factors in the work for a sustainable development, in accordance with the opinion of the very majority of the students.

Over 80 percent did not agree that it would be a sustainable solution to increase the agricultural land by cutting down the rain forest. The students are also aware of the importance of preserving the rain forest. However, a big group (76%) does not see the short-term solution of pumping up groundwater for irrigation of dry areas.

Recycling is an important measure for a sustainable development according to eight out of ten students (80%), whereas 75 percent of the students consider it important with reduced car driving. Seven out of ten students (72%) are of the opinion that the choices of locally grown products further a sustainable development. Approximately as many students (69%) think that poor countries should be able to write off their debts as a link in the work for a sustainable development. This suggestion is backed up rather poorly, considering the fact that it is presented as the most important factor by the developing countries at each environmental conference on a global level.

## **Attitudes of different students towards a sustainable development**

The answers of the students show that, apart from good will, the students need knowledge to be able to contribute to a sustainable development. This becomes most evident when three quarters of the students (76%) reply that it is very, or rather important to pump up more groundwater for irrigation of dry areas, thereby disregarding the danger of salinification and groundwater lowering in areas with deficiency of water.

### **Attitudes of different student groups towards individual actions for a sustainable development**

Three of the questions refer to measures that the students themselves or their families can take, viz. refuse screening, car driving and purchasing. Three other questions relate to actions that are made on a national level by a national or supranational participant, viz. peace, HIV/AIDS medicines and writing off debts. It is a common feature in all the students that they regard the social measures as more important for a sustainable development than the actions that each individual can make.

### **Results from the attitude questions in relation to the goal of the syllabus in Geography**

The attitude questions of the test are well backed up by the formulations of the syllabus. The results show that the students are familiar with the concept sustainable development, but that they are more inclined to place the responsibility on a national and international level than on a personal level. In the light of this, the results are not entirely satisfactory.

### **Conclusions and development possibilities**

#### **Make complexities evident and understandable for our pupils**

The national evaluation in 1998, theme "State of the world" (Skolverket, 1999), show that the very majority of the students have a problem explaining phenomena by means of scientific notions, although things become better with increasing age.

By means of the multidimensional knowledge questions in the students' test we wish to bring out the thinking of the students with respect to cause and effect, i.e. their explanations to why flooding take place, for instance. Four out of ten students were able to give meteorological explanations of flooding. We know from experience that concepts such as low pressure and high pressure are very difficult and complicated to understand. One can ask oneself, if the students who have answered correctly really understand the relationship between low pressure and inundations, or if they only superficially know that low pressure and precipitation go together. The indirect explanations of inundations, e.g. deforestation and regulation of watercourses are even more difficult and complicated for the students to grasp, and this is emphasized by the fact that only a good quarter of the students answer these questions correctly.

In the newspaper articles related to the extensive flooding in the summer of 2002, there were detailed descriptions of the consequences of the disasters, but not one single article that we read gave any explanation of the connection between cause and affect.

We believe that these types of questions, which deal with complex relations, are seldom discussed thoroughly in the teaching process so that they become concrete and real to the students. One way to reach an understanding could be to have the students work with concrete examples connected to the local environment and the students' everyday life.

#### **Make use of the students' commitment to survival and environmental issues**

The students consistently show a good awareness and willingness to take a stand in relation to the action alternatives that further a sustainable development. The students' answers demonstrate that they realize the importance of actively supporting efforts

directed towards a long-term sustainable development in a democratic and global perspective. Almost all students emphasize society's responsibility to guarantee a sustainable development.

On the other hand, the students consider the value of their own individual efforts in the work for a sustainable development as somewhat less important than the efforts that could be made on a common, social level. Three quarters of the students are of the opinion that their own contributions in the form of recycling, reduced car-driving and purchase of locally grown products are vital in the work for a sustainable development. The circumstance that there are less students who emphasize the value of their own contribution could, on the one hand, be explained by the fact that the students find it difficult to understand that an ordinary human being's choice of action alternative may have an effect on the course of events in a wider sense and, on the other, be due to the fact that media often focus on events on a national level.

### **Make use of the potential of the subject Geography to teach about sustainable development**

In a poll with future teachers for grades 1-7 the following question was asked "What do you think that the school subject Geography is about?". The answers demonstrated that the future teachers neither prioritize the process and consequence oriented geography, nor the environmentally oriented, ecological geography. (Ojanne, 1999) That is to say, exactly those areas where this national evaluation discloses that many students of the nine-year compulsory school show a lack of knowledge. The idea of what the subject Geography stands for does not always agree with what the school's syllabus in Geography expresses. This could be an explanation of our result, but most of all it emphasizes the importance of challenging the prevailing idea of what the subject Geography stands for.

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