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INTERNET AND THE GLOBAL THINKING PROJECT

by

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Abstract

Over the years, owing to a lack of concern for the environment amongst nations in their zeal to develop and modernise their economies, the global environment has been adversely impacted, directly or indirectly. The solutions to these problems have since increasingly become the concern of countries all over the world. We believe that the answer in reducing further damage to the health of Planet Earth lies in four main areas, namely : academic research, governmental cooperation, legislation and education. This paper outlines an attempt to contribute towards reducing the environmental problems through education by increasing students' awareness of the environment through the Global Thinking Project. This project, which is ongoing for nine months in a school year, consists of a few experiments, each of which is focused on one aspect of the environment, e.g. the air pollution, water pollution, etc. The students will then share their results with students from other schools in other parts of the world, who are also doing similar experiments. A very interesting feature about this project is the use of Internet to communicate with students from other schools in other parts of the world. This mode of communication is not only very well received by the students, but is also a very quick and efficient method of transmitting data and sharing information and experiences. Thus, through participation in this project, students not only become more aware of their environment but also broaden their perspectives in many aspects, including culture and technology.

History of the Global Thinking Project

According to many educators, the 90s will be the "environmental education" decade. This new awareness has prompted educators around the world to focus on environmental issues and problems from a global perspective. Students are learning that the problems and issues they tackle locally are similar to those of people around the globe, and that the actions of people everywhere have global consequences (Hassard and Weisberg, 1994).

The Global Thinking Project grew out of a series of trips to the (former) Soviet Union sponsored by the Association for Humanistic Psychology (AHP). With no official invitation, a group of 30 educators and psychologists visited Moscow, Leningrad (St. Petersburg), and Tbilisi for 17 days in September 1983. Rooted in the concern for the well-being of the planet, and for improving the relationships between the people of the United States and the Soviet Union, this delegation laid the groundwork for the development of the AHP Soviet Exchange Program.

From 1983 to 1990, the AHP sponsored 12 delegations to the USSR, and received nearly a half-dozen delegations of Soviet colleagues. These exchanges fostered official agreements between the USSR Academy of Pedagogical Sciences (now the Russian Academy of Education) and the AHP that focused on humanistic and creative teaching methods, cooperative learning, and teacher education. Through seminars, classroom visits, lab demonstrations, and other informal experiences, a powerful network was established.

Georgia State University (GSU) emerged as the focal point for the AHP's educational activities with Academy of Pedagogical Sciences (APS). An international conference on Soviet and American education led to an agreement between GSU and the APS that was signed in Moscow in May 1989. Both parties agreed to collaborate to develop strategies, methods, and teaching materials to help students think globally. These teaching materials aim to :

1. Empower students and teachers to get involved with important global problems and concerns.

2. Introduce students to collaborative methods and strategies of inquiry that can be used to solve problems locally, and provide the knowledge and technological means needed to deal with problems globally.
3. Develop computer literacy in students that will allow them to use microcomputers as a telecommunication tool to collaborate with counterparts in other nations.

The teaching materials and activities developed were field tested in the school year 1991/92. The teaching materials produced underwent trials in both American and Russian schools during the Northern Hemisphere school year of 1991-1992. All units of the teaching materials were linked to the dual themes of global thinking and environmental issues.

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The Global Thinking Philosophy

The major focus of the Global Thinking Project is to help students around the world understand that a sustainable planet is in the best interests of all nations. Education should provide experiences for students that develop attitudes and behaviours that are based on a worldview whose assumptions are rooted in connection with nature, participating with nature and others, accountability, interdependence and interconnection with others (Hassard and Weisberg, 1994).

The Global Thinking Curriculum

(i) Introduction to Global Thinking Project

The Global Thinking Project curriculum is project-based and the theme of this project is global environmental education.

Students learn, through these projects, how to monitor important physical and biological aspects of their local environment. This helps them to study topics such as weather and climate change, air pollution, water pollution, ozone depletion and solid waste management.

In the 1994/95 school year, students of ages 10 to 17 in schools from various countries including United States of America, Spain, Czech Republic, Scotland, Russia, Australia and Singapore are participating in this collaborative project.

To make the collaboration between schools more structured and systematic, schools involved in the Global Thinking Project are divided into Global Communities (GC). Each of these Global Communities is made up of about seven schools around the world. For the school year 1994/95, a total of fifty five schools from around the world were grouped into eight Global Communities. Victoria School formed part of Global Community 6, which included schools like Greenwood Secondary (Australia), Groveland Elementary School (USA), Model High (USA), O'Connor Catholic (Australia), Gymnasium School N157 (Russia) and Spirit Creek (USA).

(ii) Global Thinking Learning Model

The learning model that underlies the Global Thinking Project is based on constructivist learning (Von Glasersfeld, 1989) :

- (a) knowledge is not passively received but actively constructed by the students.
- (b) the function of cognition is adaptive and it organises the experiential world.

By using co-operative learning to teach Global Thinking, students will work in small co-operative teams to collaborate with each other, as well as with students in other schools. The essence of co-operative learning is establishing an environment within teams that fosters interdependence as well as responsibility.

The curriculum of the Global Thinking Project is organised into a sequence of projects. This sequence comprises a year-long learning cycle and involves the following steps :

- Step 1 : **Prior Knowledge**
Any previous experiences and knowledge about global thinking is elicited from students through discussions.
- Step 2 : **Exploration**
Based on their prior knowledge, students would then explore concepts about environmental education which can cover topics such as water quality and air quality.
- Step 3 : **Development**
Students then develop the concepts and the solution to the problem about the environmental topic explored in step 2 above.
- Step 4 : **Application**
Students apply what they have learned about global thinking and environmental education by participating in action taking projects.

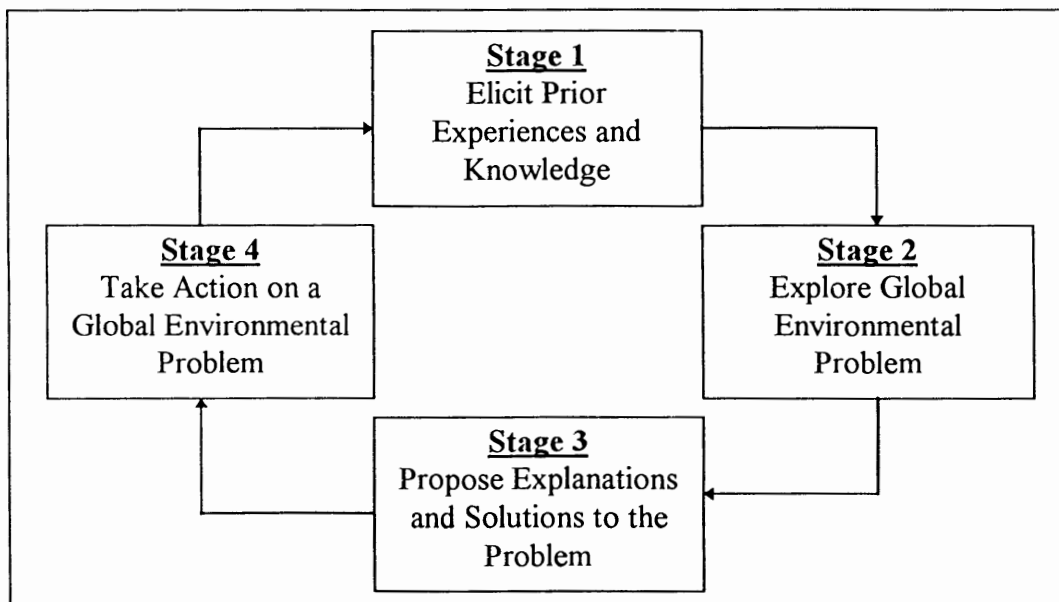


Figure 1 : Global Thinking Learning Cycle

(iii) Annual Schedule of Projects

The sequence of this project is a year-long learning cycle, divided into three phases. The onset of Phase I starts from September and ends in December. During this phase, students would try to establish the Global Thinking Community. They embark on two core projects : Project Hello and Project Clean Air.

Upon completion of these two projects, students would enter Phase II of the cycle. Phase II is shorter than Phase I and lasts from January to February. The theme of this phase is : “Collaborating Globally in Environmental Projects”. Students can choose to do one project from any of the following : Project Solid Waste, Project Water Watch and Project Ozone.

Phase III marks the end of the learning cycle. It is an application-based phase and students are encouraged to think and act globally by applying whatever knowledge they have learnt during the initial two phases. Project Earthmonth would be the conclusive project and this usually lasts from March to May. The summary of the time schedule for the learning cycle is shown in Table 1.

The nature of the GTP project is designed for students to work together in small co-operative teams to collaborate with each other, as well as with peers in other schools, using telecommunication. An important part of the project is self-assessment through student journals and logs.

Table 1 : The Global Thinking Project Year-Long Learning Cycle

Phase I September - December	Phase II January - February	Phase III March - May
Establishing the Global Thinking Community	Collaborating Globally in Environmental Projects	Thinking Locally; Acting Globally
Project Hello Project Clean Air	Choose One Project From : Project Solid Waste Project Water Watch Project Ozone	Project Earthmonth

(iv) The Global Journal

The Global Thinking Project headquarters publishes a newsletter, The Global Journal, as an educational service and sent it to each of its members. It is a bi-monthly publication and contains :

- ♥ a letter from the Director, Jack Hassard.
- ♥ information concerning the project currently being worked on by the schools.
- ♥ news about conferences or other happenings that might be of interest.

Telecommunication Network

Schools within and between Global Communities communicate and exchange results and findings using the Internet. Communication tools include e-mail, a GTP mailing list, electronic bulletin boards (gopher and world wide web). This information highway provides a fast and efficient way of sending and receiving results of various Global Communities' monitoring activities.

The Global Thinking Project links schools together using the Institute for Global Communications (IGC) telecommunications system. Schools in USA are linked via the EcoNet, a sub-network within IGC. GlasNet links all schools in Russia while GreenNet links schools in Europe. Schools in Australia are linked via Pegasus and TechNet links all schools in Singapore.

By using the various network systems or a valid Internet address, teachers and students from all over the world can send electronic mail to any user in the system.

The IGC host computer maintains a Global Thinking Project List to which Global Thinking Project teachers can subscribe to. Messages that are sent to this list are automatically received by all subscribers. This list can be used as a help tool as well as a means of sharing ideas and keeping in touch with each other as colleagues. In addition, this list also creates an electronic environment that enables teachers and students engaged in the GTP projects to interact publicly with each other.

The IGC host computer also maintains a GTP World Wide Web Homepage in the Internet. In this page, useful information about the Global Thinking Project can be obtained by users and this provides another source of material. The address of this homepage is : <http://www.igc.apc.org/gtp/>

Students' Feedback On The Project

The students' feedback on the project is presented in two parts, namely Part I and Part II. Part I shows the students' feedback on the project in terms of their experimental results. Part II shows the students' feedback on how they feel about the project.

Part I : Students' Experimental Results

The students carried out a series of sub-projects to learn more about the local environment. A summary of the activities carried out by the students for the school year 1994/95 is given in Table 2 below :

Table 2 : Summary of activities that the students participated

	Activities
Project Hello	1. Discuss what is Global Thinking.
	2. Using telecommunication to send e-mail messages.
	3. Investigate how green is the classroom.
Project Clean Air	1. Monitor the air.
	2. Monitor the particulates in the air.
	3. Investigate whether a room ventilated by fresh air is more dusty than a room which is air-conditioned.
	4. Investigate which brand of cigarettes gives off the most number of particles.

Table 2 continued

Project Water Watch	1. Observe the physical and chemical characteristics of a stream.
	2. Analyse the observations obtained in activity 1.
	3. Observe and identify aquatic macroinvertebrates present in the stream.
	4. Using macroinvertebrates as bioindicators of organic pollution of the stream.
Project Earthmonth	1. Setting up a mini-exhibition in school on environmental awareness and the Global Thinking Project.

Some of the students' experimental results are highlighted below :

Project Clean Air

(1) Report #1 :

How clean is the air in our school ? Well, that's what we decided to do in our "Clean Air Project" !

We used the sticky tape air monitoring Particulate Collectors and placed them in various parts of our school for a period of three days and two nights from 12/12/94 to 15/12/94, and the results are as follows :

Table 3 : Number of particles of different sizes present at the various locations

Location	Number of particles			Total
	Small	Medium	Large	
School entrance	33 (78.57%)	6 (14.29%)	3 (7.14%)	42 (100%)
Trees between the entrance and the school	82 (86.32%)	12 (12.63%)	1 (1.05%)	95 (100%)
Trees behind the school	85 (89.47%)	8 (8.42%)	2 (2.11%)	95 (100%)
At the sports gallery	285 (92.53%)	14 (4.55%)	9 (2.92%)	308 (100%)
Canteen	51 (89.47%)	4 (7.02%)	2 (3.51%)	57 (100%)
Beside the expressway	105 (96.33%)	3 (2.75%)	1 (0.92%)	109 (100%)

We found that the sports gallery was the dirtiest place in the school but the particulates could have come from the tree on to which it got stuck due to the wind. The cleanest place was the school entrance. We also found that the canteen was quite clean. This is quite a relief because it is here that we have our break every day. We also found that in all the locations investigated, the number of small particles present greatly exceed that of medium and large particles. The number of medium particles in turn is greater than the number of large particles. This is probably because the small particles are the lightest and can move around most easily.

From our report, we found that places further from human activities has cleaner air when compared to places with a lot of human activities. For example, the school entrance and the trees behind the school have relatively clean air because students hardly carry out any activities at these places. On the other hand, the sports gallery is always bursting with activities and thus have the greatest number of particles. The canteen is an exception probably because the canteen vendors clean the place regularly.

(2) **Report #2:**

“Which brand of cigarettes gives off the most number of particles ?”

We used the sticky air monitoring Particulate Collectors to investigate the number of particles present in the smoke given off by different brands of cigarettes. The brands of cigarettes tested included the following :

1. Consulate
2. Benson and Hedges
3. Dunhill
4. Salem
5. Peter Stuyvesant
6. Winston
7. Marlboro
8. Kent

The findings of the experiment are summarised in Table 4 as follows :

Table 4 : Number of particles present in the smoke from cigarettes of different brands

Brand of cigarette	Number of particles	Rank
Consulate	39	4
Benson and Hedges	14	2
Dunhill	16	3
Salem	39	4
Peter Stuyvesant	39	4
Winston	42	7
Marlboro	13	1
Kent	72	8

From our experiment, we found that of the 8 brands of cigarettes tested, Marlboro produced the least number of particles and Kent produced the most number of particles. There was no difference in size between the two types of cigarettes, the diameter of a cigarette being 0.7 cm and the total length of a cigarette being 8.25 cm (including its filter) or 5.7 cm (excluding its filter). In our experiment, although it was found that Marlboro cigarettes produced the least number of particles, we feel that cigarettes are still bad for health.

Project Water Watch

We conducted a field trip to a stream and made some observations on the physical characteristics of it like the pH of the water and the amount of dissolved oxygen. Below is a poem written by the students to summarise the results they obtained :

The Crimson Sky is now at rest,
The setting sun continues its motion.
We think your message is the best, the greatest,
Now the time has come for our information.

Chocolates taste milky,
While sweets are nice.
They are the things from the Earth,
Don't let them go to the mice.

8% is the oxygen content,
In our stream so refreshing & clear.
Organisms, there are plenty,
Living in no necessary fear.

Mud in our socks,
Water in our shoes,
But still we had a lot of fun,
Under the sky so blue.

Neutral water with pH 7, thank God it is,
13.9 cm/s is the everlasting water flow,
That is all for our experiments,
In a stream so low.

Gabriel, Malcolm and Simon are Chinese,
While Hendri and Husni are Malays.
Yes! We are definitely human beings,
And we also like to run and play.

Happy 15th year old Birthday, Patricia,
Hope I am spelling it correctly,
We hope that everybody would have a fun life,
And would study intellectually.

Part II : Students' Feelings About The Project

At the end of the school year 1994/95, a survey was conducted on the students who participated in the Global Thinking Project. From the results of the survey, some of the things that the students said they learned from and what they liked most about the Global Thinking Project are shown in Table 5 and Table 6 :

Table 5 : Concepts learned by students from the Global Thinking Project

From the Global Thinking Project, students learned :
<ul style="list-style-type: none">• the need to care for the earth.• the serious threats faced by the environment and our beloved planet.• to work together as a team.• the need to work together to save the environment.• to realise that our resources are being depleted.

Table 6 : Aspects of the Global Thinking Project which students liked.

Students liked the Global Thinking Project because of the following :
<ul style="list-style-type: none">• they could participate in the experiments involving the environment themselves instead of relying on data provided by books.• they had the chance to save the earth.• they had the opportunity to interact with others who are concerned about the earth using Internet.• they got to learn more about other students in the world and also about their countries.

Teachers' Feedback About The Project

Personally, the first author who was also the teacher in this project feels that the use of Internet as a telecommunication tool to share views and findings of the project amongst students in different countries is a very good choice because the students were very thrilled and excited about the use of e-mail to communicate with others. They were particularly happy when they received mail from buddy Global Thinking Project members. The telecommunication component made it possible for the students to get immediate feedback and thus kept up their enthusiasm. The teacher believes this adds to the project because it makes the subject of environmental education an active person-to-person exchange, not mere passive imbibing of textbook material.

After the completion of the whole project, the teacher feels that the students became more aware of the environment and the activities which can pollute it. They are also more aware of the effects of pollution and the urgency to reduce if not stop the pollution of the environment. As such, they will be more committed to pass the green message to those around them like their friends and family members and thus act as catalysts in the global move towards a greener society. Furthermore, the teacher also noticed that, to a certain extent, the students developed the ability to ask higher order questions and also the competence to answer these questions with some guidance. This was demonstrated by the activity in Project Clean Air where they put forth the question of whether a room without air-condition was more dusty than a room with air-condition and the procedure of how to go about finding the answer.

Findings from interviews with Global Thinking Project teachers indicated that the most important learning lies in the communication with other students around the world via the Internet. This learning outcome was expressed in many ways :

Realisation that :

- * students in other countries are environmentally aware and concerned.
- * kids are very much alike in different countries.
- * students in other countries are interested in studying together on issues.

Global Thinking Project teachers also felt that students learn about the environment and how to go about finding out about the environment, including the following :

- * how pollution can be measured.
- * designing scientific experiments to find out about the environment.
- * developing an awareness of local water conditions.

- * learning how to make observations about our local study site.
- * importance / effect of what we do locally on the environment globally.
- * everyone has a part in protecting the environment.

Conclusion

Global problems have local causes. Even though problems like ozone depletion, climate change and acid rain can be traced to actions and activities at the local level (including households), the effects of these problems are global. Indeed, the causes can be traced to global systems. Thus, it is important that students be helped to understand and cope with problems in this way because we live in a world that is global.

The Global Thinking Project helps students to develop the ability to “think globally and act locally” and also to develop an increased awareness of the interrelatedness of the environment. After the completion of the project, students who had participated should develop a heightened sense of personal responsibility for planetary conditions and also a greater sense of self.

In conclusion, we think the students in general have benefited from participation in this project and we would strongly recommend it to other schools who are interested. We are sure it will be a very fulfilling and enriching experience.

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