

## **STRATEGIC ALLIANCES BETWEEN INDUSTRY AND EDUCATION**

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### **Our Vision**

The Canadian economy's reliance on resource-based industry is shifting toward science and technology-based industries. Yet projected enrollment of our young people in science and technology programs is not sufficient to meet future demand for the science and technology-based careers of tomorrow.

The challenge is fundamental: first, to ensure that our youth become advocates of science and secondly, to ensure that sufficient numbers of young people are attracted to careers in science. To do so, their interest must be kindled and nurtured from the very beginning of their academic lives.

Our children need to be encouraged to develop positive attitudes toward the learning and use of science, mathematics and technology. Our teachers must be provided with the knowledge, the training and the enthusiasm for science which they can pass on to their students. We must address this issue beginning at the elementary school level.

Elementary schoolchildren are natural scientists and explorers. They are so very curious about the world around them. Yet the task of keeping children in the classroom motivated in science by making it fun and practical is not always easy.

How can the scientific community strive to meet the challenge of encouraging positive attitudes toward the learning and use of science, mathematics and

technology? It seemed to me that what is required is a need for active involvement in our educational systems, either via curricular or extracurricular programs. This involvement needs to reach the classroom teacher who may be uncomfortable with teaching science.

One way to make this link between scientist and classroom teacher is by forming a strategic alliance between industry and education. What, exactly do I mean by a strategic alliance? This has been defined as the coming together of diverse organizations and individuals, from both the public and private sectors, with a common goal of encouraging and supporting science, mathematics and technology education at the pre-college level.

Strategic alliances between industry and education can have far-reaching implications in the arena of enhancing science and technology. Alliances allow the scientific community to develop networks within educational systems, to become active and responsible citizens, and to take an active part in promoting science and science education to young people.

The process of developing such a strategic alliance of Montreal area school boards, local industry, government, the scientific community, higher education, and telecommunications is the focus of this presentation today. This integrated approach includes a corporate focus or mandate on the need for involvement in educational outreach, the expertise of the educational system to give shape to the ideas, a government which is supportive, and the rich resources of dedicated scientists who can effectively deliver the new programs of educational interface.

Presented today will be the on-going experiences of our fledgling Montreal area alliance as it strives to develop a focus on developing a more positive attitude among elementary school teachers and students toward the learning and use of science, mathematics and technology. These efforts are designed to break the isolation many teachers feel, as well as provide support for the teachers as they take the risk to try more science.

Initiatives such as these need not be complex and they need not be expensive. They do, however, depend on the scientific community and individual scientists, who must be prepared to provide their presence, their time and their example. We

believe that personal relationships between scientists and the classroom teacher, above all else, will work to improve the quality of science education and encourage greater numbers of students to pursue science.

### **Background of the Alliance**

I'd like to take a step back here and tell you a little bit about how I became interested in this issue. I am employed by the Merck Frosst Centre for Therapeutic Research to design in-house programs to promote careers in science. I am always looking for information on what was already being accomplished across Canada and in the United States. I wanted to learn from the experiences of others and then design programs which were adaptable to our specific interests and needs.

One of the most exciting things I learned about was the notion of strategic alliances between industry and education. The Triangle Coalition for Science and Technology Education is a United States-based organization which assists interested groups in forming strategic alliances to promote the improvement and reform of science, mathematics and technology-based education.

I attended one of their conferences and learned what I could about how to go about developing an alliance. I was lucky enough to meet someone else from Canada who was also trying to start an alliance in the Toronto area. I learned a great deal from this organization as well and then began to take a look at the Montreal area and the resources available here.

This brings us to the first step: identifying potential members. I knew that I needed someone who could speak to industry and gather their support, so the first thing I had to do was to sell the idea within Merck Frosst. I found that our Public Affairs department was very supportive of the idea and so I had recruited the first alliance member. Then, in friendly discussion over the soccer field this past summer, I met another parent who had similar interests and that contact resulted in the school services division within Radio Quebec joining the group. This contact put me in touch with an impassioned educator, someone who could provide the vital link to the classroom. This impassioned educator sold the idea to her management at the Lakeshore School Board and that's how George Ladd, who will present here today, became involved. After that, I thought about who I had met in science education at

the university level and approached them for support. That's how Bob Cook, the other presenter today came on board. So, as you can see, alliance building is really a networking process.

As a group, which also includes representation from the Quebec Ministry of Education, Industry Canada, Kahnawake and Kanésatake Education Centers, as well as Burroughs Wellcome and Pfizer, two other Montreal area pharmaceutical companies, we looked at what other alliances and science education programs were out there, and again picked out what we thought was the most interesting and adaptable to our needs.

The alliance which was forming in the Toronto area and The Triangle Coalition continued to share information with us. We spoke and corresponded with the Calgary Science Network and explored a whole myriad of adopt-a-school and classroom-visit programs.

Armed with a core group of people and their dedication to the idea of forming an alliance, we moved to become a formal organization and do what we set out to do: to develop a more positive attitude among elementary school teachers and pupils toward the learning and use of science, mathematics and technology within the context of the elementary school curriculum.

Exactly how the alliance proceeded with this will be discussed by George Ladd and, following his presentation, Bob Cook will identify and discuss some of the alliance initiatives, as well as our hope for the future.

## **PROCESS AND PLAYERS**

### **Introduction**

My part of today's presentation is to provide you with a sense of the process we experienced as we developed our Alliance, as well as a review of who were the players and what they brought to our group.

### **Process**

After Naomi Yergey approached Ms. Pat Deans informally, interestingly enough, the process stayed informal. Ms. Deans inquired in a telephone conversation with me if I would be willing to explore the potential of an alliance/partnership with Merck Frosst and other West Island pharmaceutical industries. Then we brainstormed potential activities/ideas of such a coming together of groups for the purpose of helping science education in the elementary classroom. Our own excitement had to be tempered until our Senior Management Team endorsed our project. Again, at an informal meeting with Ms. Yergey and another member of the Merck Frosst team, we realized that we could develop the energy to bring two different communities and two different cultures together.

It has not been part of the Lakeshore School Board culture to form partnerships with industry. This was for me the first time in my eight years as a Science Consultant that I believed we could make a dent in the challenges of teaching elementary science.

The Lakeshore School Board's commitment became clear. The Director General, the Director of Educational Services, and the Assistant Director of Elementary Education joined Ms. Deans and myself at the first large group meeting with industry and government. We went into that meeting with a willingness to commit about half of my working hours to this project.

At this point, there were four questions that needed to be addressed. They were:

1. What should be the size of our group?
2. What was the role of the Lakeshore School Board?
3. Where should our financial and human resources be directed?
4. Should we become a non-profit organization with the structures and rules that are defined for this type of organization?

### **What should be the size of our group?**

A wise decision, in my mind, was made at our very first meeting. We would not expand our size until later. We would pilot and explore to find out what we could

do and what we could become. This was necessary for two reasons. First, so that others would not participate at the expense of those already present. The second reason was that if we kept expanding we would expand forever and never do anything. It is my opinion that these were very wise decisions. Moral: don't expand early, do something positive first and when you do expand don't do it at the expense of one of your members. Or to use an idea from "In search of excellence" – Ready, Fire, Aim!

This also gave our Alliance time to develop a "shared vision".

### **What was the role of the Lakeshore School Board?**

We are one of three pilot school boards. The educational agenda is negotiated. However, the underling philosophy is supportive of the teaching/learning processes. Our focus is the classroom. Our teachers needs to feel support so that they will take the risk and teach more science. They also need to feel that it is OK if they do not know the answers. For many elementary science teachers, science has been an unpleasant experience when they were students and as professional educators.

### **Where should our financial and human resources be directed?**

First, the resources should and must be directed to the teacher. Second, these resources may be directed to the student. Remember, if you influence a teacher, you impact between 60 to 100 students. This multiplies your limited resources by a large factor.

This sounds like a simple suggestion. However, it is difficult to do. Each member of your starting group has an agenda and suggestions of where the resources should be directed. It takes time for two or three different members to develop a shared vision and decide that this type of alliance is important to their unique objectives. This vision is then the basis for an understanding of the decisions we must make. The level of trust must be raised so that important and difficult decisions that might lead to conflict between members can be problem-solved by all.

During this time, two things happened. The representative from the culture of education and the representative from the culture of industry needed to develop an understanding of each other's way of being. A new culture for the group evolves so that both groups may interact in an open and frank manner.

The other members of the group form a support for this focus on the teacher in the classroom.

I would like to share an analogy that I have found useful. We are building a bridge between industry and education. What is the direction of that bridge? What is the size of that bridge? What is the role of each member or our Alliance in building that bridge?

The direction of the bridge is to the teachers in the classroom. How is this defined? Each member of the initial group has their idea of what that means. Should the direction of the bridge be directed to them? No. The bridge is to the classroom teacher as directly as possible. How do we help build the bridge as wide as possible so that the maximum amount of resources can be focused on the teachers and on the students? Some members of the initial group started to realize that their role was to make the bridge stronger or wider so that more interactions between industry and teachers might occur. This helped sort out the roles of each member of the Alliance.

**Should we become a non-profit organization with the structures and rules that are defined for this type of organization?**

Yes. This is a must. There is a need to be independent of all members. This will allow companies to support this broadly based program. The industries would not feel that they are placing their resources in one school board. Industries have many employees whose children attend many different schools. An independent, non-profit organization answers these needs.

## **REFLECTIONS**

Our process was flawed. We spent a great deal of energy trying to advance individual agendas. As a result, individuals were not thinking of the others as we developed the Alliance. We needed time to learn to function as a team. How to you

respond to your own needs and respect the needs of others? That was our challenge. I suspect it will remain a challenge for the future.

### **Players**

Our group is small yet from a broad base of our community. Industry provided our Alliance with Merck Frosst, Burroughs Wellcome, and Pfizer. The Ministry of Education is represented by Direction des services éducatifs aux anglophones. Para-government organizations Radio Quebec and Société pour la promotion de la science et de la technologie provide valuable input and suggestions for Alliance activities. Post-secondary education is represented by Bishop's University. Three elementary education groups are represented by in the Alliance. The Kahnawake Education Centre, Kanasatake Education Centre, and Lakeshore School Board provide educational expertise and the teachers for pilot activities.

**Moral:** Never disadvantage a member for any new people or groups you add.

### **Strategic Alliances between Industry and Education**

You have now been presented with a short history of why the Quebec Science Education Alliance has been formed as well as some details as to its structure and participants and to its future plans. The success of alliances of this type are, however, intricately related to the types of projects it puts in place in order to meet the needs of its target group. As has been mentioned, the initial target group of the Alliance are the elementary school teachers and the goal is to lower their discomfort level in the classroom when they are presenting the science, technology and mathematics part of their curriculum. What I would like to do in the remaining part of the time allowed is to describe the projects which are in the process of being planned as well as some which have been presented as future possibilities.

The first of these projects with a hope for a Fall, 1994 starting time is a science hot line. The science hot line will be an information service for the elementary school teachers. An 800 number will be established for the Province of Quebec; teachers in need of help in preparing for a given subject area will be able to telephone to ask for materials which will help them in the classroom or they will be able to receive

on-line help from the coordinator or one of the scientific advisors. The person responsible for the hot line, as part of his or her mandate, will gather material for a data bank related to the topics of the elementary school curriculum. The individual will start a resource center for the teachers and will coordinate the translation of documents so that they will be available in the two official languages. The individual will also have the responsibility to solicit materials for the resource center and to request permission to translate the documents and to obtain the right to photocopy and distribute them throughout Quebec. Each year, schools will obtain lists of available materials and will eventually be able to create their own resource centers. The Alliance believes that it is important to help individual schools build up resource centers for their teachers.

Associated with the science hot line will be the Alliance newsletter. It is planned to have a quarterly publication, in both languages, for all elementary school teachers. The coordinator of the science hot line will also be a co-editor of the newsletter. The newsletter will contain articles of interest to the elementary school teachers especially in those areas where there have been many calls on the hot line requesting information. It will be via the newsletter that the schoolteachers, will be kept informed of the new resources available in the Alliance's resource center as well as listings of contacts for the other services of the Science Alliance. The editors will also solicit articles by the elementary school teachers describing innovative teaching techniques that they have been using in their classroom.

Another project in the experimental stage at this time is the science buddy. The concept involves the establishment of a working relationship between a scientist from industry and a teacher in an elementary school. The goal would be to give to the teacher a resource person who would not only make occasional visits to the classroom to make presentations but, more importantly, would be someone the teacher could contact on an on-going basis to help in the preparation of a given subject area for the program. The relationship thus established would go a long way towards reducing any discomfort a teacher may have about presenting science topics in class.

The Science Alliance also wishes to promote teacher training programs which would reduce their discomfort level in the classroom. The two main vehicles for

accomplishing this are in-service training workshops and summer professional development courses. This January, an in-service training workshop for teachers was held in the Lakeshore school board on a professional development day. The topic of the workshop was bubble technology. A booklet reprinted with permission from GEMS (Great Explorations in Math and Science, University of California at Berkeley) on this subject was translated into French by the Alliance. The English and French versions were used in the running of this workshop, which was a tremendous success. Other workshops are planned; each workshop will generate its own manual and the manuals will then be available for other school districts so that they can run their own workshops.

A one-week professional development course was scheduled for this coming June. The course was to be funded jointly by the Science Alliance, the Quebec Ministry of Education, and the individual school boards. Unfortunately, the program has been pushed back to the summer of 1995. The program that has been developed is quite innovative. In the five-day program, the teachers will work on modules related to the senses, space, biology, chemistry, physics and geology. The emphasis is on hands-on activities for the teachers and on the development of modules that the teachers can take back and implement in their classrooms. At the end of the course, a manual will be produced which summarizes all the projects undertaken or developed and this manual can be a source book for other teachers throughout Quebec.

All of the above projects are directed towards the elementary school teacher. The Alliance is also considering projects of interest to the elementary school pupils and their parents. Science camps for pupils in grade 5 and 6 have been proposed as one way to increase their interest in science. The three-day camps would be held at a university during the months of May and June. Students and their teachers would participate in a series of hands-on activities in the same areas as mentioned in the professional development course above. The emphasis, as far as it is possible, will be on projects which are transferable back to the elementary schools.

The Alliance is looking into translating a booklet on science in everyday life which is directed towards parents. The goal of the publication is to help parents understand and communicate with their children the importance of science.

In summary, The Quebec Science Education Alliance has been born from the concern of a number of institutions and individuals for the future needs of our country in the area of science and technology. It is the conviction of this group that one must start early in the education of our children in order to develop in them an appreciation and interest in science. Therefore, the experimental programs that have been developed have been directed towards the elementary schools and especially towards the teachers for reasons which were presented earlier. The structures we now have in place will allow us to enlarge the projects to cover all of Quebec. It is the goal of the Alliance to have a broad industrial participation, as well as interaction with every school board and every university in the province. We are working very hard on the initial projects because quite simply, if we can not interact in an effective and positive way with our target group, then the Alliance, no matter how elaborate or broadly based the structure is, would have failed. It is with this in mind that the present members of the Alliance are making every effort possible to have in place for this fall two other pilot projects, the province-wide hot line and newsletter.

### Biographical Data on Presenters

- Naomi S. Yergey: Born in Somers Point, New Jersey; A. B. (Psychology) in 1979 from Muhlenberg College, Allentown Pennsylvania; M.A.(Counseling and Personnel Services) in 1981 from the University of Maryland; currently Manager of Educational Affairs for The Merck Frosst Centre for Therapeutic Research in Kirkland, Québec.
- George Ladd: Born in Shawinigan, Québec; B.Sc. in 1974 and a B. Ed. in 1975 from the University of New Brunswick, currently pursuing a Master's degree at McGill University in Curriculum and Instruction; has been employed with the Lakeshore School Board for the past 20 years, first as a Chemistry Teacher for 12 years and for the past 8 as a Learning Consultant in Science Education.
- Robert D. Cook: Born in Montréal in 1941; B. Sc. (hons. chem.) in 1962 from Loyola College, Montréal; Ph. D. in 1967 from U.C.L.A.; currently Professor of Chemistry and Dean of Natural Sciences and Mathematics at Bishop's University, Lennoxville, Québec.