

**A Study of the Galileo Network/Andrew Sibbald School
Initiative to Promote Inquiry-Based Learning**

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I. INTRODUCTION

Questions generated by students and teachers are at the heart of inquiry learning. (Teacher, Andrew Sibbald School)

In the fall of 2001 the members of the Andrew Sibbald school community entered into a partnership with the Galileo Educational Network Association (GENA) to promote an inquiry-based approach to learning and teaching. It was agreed that GENA would provide expertise, support and assistance to the Andrew Sibbald School community over a three-year period in developing and implementing strategies and programs to promote the active and meaningful engagement of students in relevant and authentic learning experiences using inquiry-based learning as a model.

In February 2004 as the end of the three-year project was approaching, it was agreed that there would be merit in conducting a review of the initiative in order to determine what had been accomplished in terms of the original goals of the project as well as to identify recommendations for the future. The author entered into an agreement with GENA to undertake a study of the initiative.

A. The Guiding Questions

In consultation with the Galileo Team members and the Andrew Sibbald School Principal the following guiding questions were identified:

1. What was the impact of the work of the Galileo Team members with the Andrew Sibbald School staff over the three-year period?
2. What does engaged learning look like and is the school a community of engaged learners?
3. To what extent has the Galileo initiative, through the promotion of inquiry-based learning, promoted the growth of students and teachers as learners?
4. Have the Andrew Sibbald school staff members made any gains in regard to enhanced student learning and has the initiative been worth the extra effort?
5. How has the staff changed in terms of teaching strategies and practices from year one to year three and what has been the impact on students as learners?
6. Are the needs of all students being met?
7. Does the Andrew Sibbald school staff have the capacity to sustain the program which is currently in place as well as to continue to make enhancements?
8. What is working, what is not working and what are the next steps?

B. The Information Gathering Process

The information gathering process included the following:

1. Discussions with the Galileo Network (Ms. Brenda Gladstone, Dr. Sharon Friesen and Dr. Pat Clifford)
2. Discussions with the Andrew Sibbald School Principal (Ms. Bev Whitworth)
3. Interviews with parents who were available at the time of the school parent-teacher interviews
4. Interviews with class groups of grade four, five and six students
5. Interviews with individual Andrew Sibbald School teachers
6. Discussions with the Andrew Sibbald School Lead Team members
7. Reviews of grade six student papers describing their journey as learners
8. Reviews of relevant documents and artifacts.

C. Background Relating to the Galileo Initiative

Andrew Sibbald School serves 310 kindergarten-to-grade six students from the Lake Bonavista and Douglasdale communities in Calgary. There are 14 teaching staff members including the principal, assistant principal and resource teacher and four support staff members including the school secretary, a library assistant, an education assistant and a computer technician. In recent years due to demographic trends the enrollment has been dropping and it has been necessary to reduce teaching staff including those involved in the specialty areas of physical education, music and library. The current teaching staff members have taken on the responsibility for providing learning experiences in these specialty areas. In order to maintain smaller class sizes, staff members have elected to give up the non- instructional time, which would normally be made available by specialists. Through the use of AISI funding, Ms. Whitworth has been able to make planning time available for all teaching teams, as well as time for meetings of the Lead Team members and planning and mentoring time for Lead Team members who are working with teaching staff. AISI funding was also used for substitute teaching costs and registration fees for relevant professional development activities related to the renewal plan. Teachers are organized as teams for each grade level. The teaching teams work with large groups of students as well as providing more individualized instruction for smaller groups.

In the spring of 2000 in preparation for a change in the administration at Andrew Sibbald School, parents met with the Calgary Board of Education Area Director indicating that they wanted an administrator who would focus on enhanced learning experiences for their children by providing them with challenging programming. The parents expressed a desire to work with the staff members in taking Andrew Sibbald School from the point of being an excellent school to what they described as a “Wow” school. The parents had been involved in supporting an in-school, small-group mentoring program designed to challenge the students as learners. As this group was limited to two students from each classroom, there was some concern that the approach was somewhat elitist and was not meeting the needs of all students. Ms. Whitworth who was selected as the new principal of the school had a clear understanding of the parental expectations.

During her first year as principal, Ms. Whitworth had become aware of the involvement of the Galileo Network in promoting inquiry-based learning and enhancing the learning experiences of students through the use of technology through a partnership with Glendale, another Calgary Board of Education school. She made arrangements for representatives of the Glendale staff and for members of the Galileo team to make a presentation to the Andrew Sibbald school parents and staff members. Subsequently, the parents, through the school Council, enthusiastically offered to provide the financial commitment required for a three-year period and the staff members unanimously agreed to become involved in the Galileo/Inquiry-based Learning Initiative.

Galileo team members suggested that a foundation for the program be developed through a professional development activity for all staff members at the beginning of the school year focusing on the philosophy and guiding principles relating to inquiry-based learning. Although it was recognized it would be important to have this type of professional development activity, it was felt there were too many pressing demands on the time of staff members at the beginning of the school year and that the activity should instead be held sometime early in the fall. In the meantime, the main contact person, Dr. Sharon Friesen, began working with teachers who had expressed an interest in being the first to become involved. She spent time with the teaching team members in their classroom and helped them through guiding questions and sharing information and resources to begin making changes in their teaching practices and the organization of learning activities. The focus was on making learning activities relevant and on providing students with opportunities to pursue areas of interest and to take ownership for their learning. Dr. Friesen worked closely with four teachers in particular over an extended period of time during the first few months. It was understood that she and other Galileo Team members would make themselves available to work with any teachers who were interested and it was expected that ultimately all teachers would become involved to some extent in this mentorship arrangement by the end of the first year. The focus of the involvement of the Galileo Team members was working with staff members who requested their support. It was

anticipated that the enthusiasm of these teachers and their students would generate an interest among other teaching staff members.

With major change initiatives, it is not uncommon to experience what could be described as challenges. In January of the first year, the staff was informed that a significant portion of the funding for contracted services through the Galileo Network for the first year of the three year agreement had been utilized. As a result, Ms. Whitworth became concerned that there would not be enough time available for the Galileo team to work with all staff members. It was her goal to involve the entire teaching staff in the Initiative, whereas the focus of the Galileo Team members was to work with those who expressed an interest in becoming involved. There were also some communication problems regarding services that the Galileo Network would provide. School staff members felt they had received less than what had been promised, but Galileo Team members felt that they had significantly exceeded the budgetary allocation through all of the services they provided. However through open, direct communication Ms. Whitworth and the Galileo representatives addressed the misunderstandings and effectively dealt with the situation. Provision was made for the expectations of both partners to be clearly articulated for the remainder of the project.

In order to build teacher capacity and establish internal sustainability, Galileo team members, Ms. Whitworth and the four teachers who were the first to be involved, agreed that there would be merit in establishing what is referred to as the Lead Team. The Lead Team was made up of representatives of the teaching teams who had been actively involved in implementing changes in teaching practices and programs relating to inquiry-based learning. For the remainder of the first year of the Initiative and the entire second year, the Lead Team met every second week after school. In the third year of the project, Ms. Whitworth, through the utilization of Alberta Initiative for School Improvement (AIS) funding, was able to provide some time for Lead Team members to meet during the school day in addition to the time that they were taking to meet after school. Lead Team meetings provided a forum for sharing ideas, reflecting on personal experiences in working directly with students, and offering support and encouragement as well as positive reinforcement. Lead Team members took on responsibility for mentoring specific teachers who had been assigned to them. Dr. Friesen served in a key role as a resource person at the Lead Team meetings. In many ways the discussions that took place at Lead Team meetings reflected the philosophy of inquiry-based learning and, through the guidance of Dr. Friesen, the Lead Team became a model of a professional learning community. Over the next two years the significant role of the Lead Team continued to evolve and new members were added to the team to ensure that all grade levels were represented.

Through the work of the Lead Team and Dr. Friesen, more teachers became involved in making changes to their teaching practices and the organization of learning activities. For example, in keeping with the holistic philosophy of inquiry-based learning, learning experiences were organized on the basis of the integration of subject areas. In the third year of the Initiative all teachers were involved to varying degrees in inquiry-based learning. Through the years, a number of teachers elected to transfer to other schools because they did not feel comfortable with the changes in teaching philosophy and practices which had been implemented in Andrew Sibbald School.

Staff members responded enthusiastically to the Galileo Team's proposal to incorporate the newly mandated Information and Communication Technology (ICT) curricular expectations into the Inquiry Initiative. The development of student skills in regard to the use of ICT was a significant component of the Initiative. In order for students to pursue the questions which they raise in the context of real-life situations, it is important that they have access to current, relevant information. Inquiry emphasizes the development of information processing skills and the construction and production of knowledge and exploration. Through the inquiry-based learning approach, students are given learning activities that provide choice and allow them to pursue their own areas of interest. The focus is on making connections between their prior knowledge and experiences in real-life situations. Examples of the approach include the involvement of students in projects relating to the theme of stewardship in a study of the Fish Creek Park, the wetlands adjacent to Spruce Meadows and inner-city homelessness. Students, using information, which they gathered through the Internet, prepared presentations using word processing skills which they had developed and various presentation formats including PowerPoint and Hyper Studio. Students, through their project work and learning experiences relating to the use of technology, developed a high level of expertise in using Information and Communication Technology.

It was the desire of Galileo Team members that, through the development of a common philosophy and understanding and the introduction of effective teaching practices based on inquiry-based learning, and through the ongoing support of Intelligence On-line (I.O.) and the Lead Team members, the project at the school level would become self-sustaining. Ms. Whitworth described her aspirations for the three-year Galileo/Inquiry-based Learning Initiative as “putting in place good solid practices relating to inquiry, looking at the quality of the web site presence showcasing the work of the students, building teacher capacity, providing for sustainability of the change, providing challenging quality learning opportunities for all students with a focus on challenging the strongest learners as well supporting those who are struggling.”

II. The Student Perspective

I like the way we learn things at our school. We can go to the computer lab and library to get information and we can talk to our classmates and compare information. We have lots of field trips so instead of reading about it we can see and touch it. I think inquiry is a better way to learn because of the freedom you have. All of us have grown since we started. (Grade six students)

In keeping with the recognition of the significant role of the student at the centre of all learning, it is important to reflect on the views and experiences of the students. The grade four, five and six students, in the group interviews, were enthusiastic in discussing their experiences as learners. They used terms such as engaged, making connections, inquiry, hands-on learning activities and learning styles. They described inquiry as asking questions and learning in an integrated way. They made reference to asking good questions, making connections and being involved in learning activities that are interesting and challenging. They described their appreciation for opportunities to direct their own learning and to work independently as well as to be involved with partners and teams where they have opportunities to learn from others and to learn with others. Students who were new to the school expressed the realization that they were involved in a unique approach to learning which is different from what they had experienced in the past. Students expressed a genuine appreciation for their teachers and what their teachers were doing to involve them in meaningful learning activities. They described a love for learning and awareness that they are part of something unique and special in Andrew Sibbald School.

A. Student Interviews

Students were asked to reflect on their experiences as learners by responding to a number of questions. (Appendix A.) The following responses are representative of the feedback the grade four, five and six students shared:

1. Student Appreciation for Their Teachers

- Our teachers are great. They show us different ways to learn and they make learning fun.
- When you are struggling our teachers are there to give you help.

2. Indicators of Success as Learners

- You know that you are learning when you can explain to your parents what you have learned and when you can make connections to the real world.
- You know you are learning when you're able to help others learn.
- The teachers give us checklists and rubrics for the projects we are doing and we know what is expected.
- I know how I am doing as a learner from report cards, tests, teacher comments open houses where he show what we are learning and evaluation sheets and rubrics for our projects.

3. Student Understanding of Inquiry

- I like how the school is inquiry-based. You start with a topic and you do a lot of projects to help you learn.
- Inquiry is fun because you can be part of your own learning.
- I like to have choices on how I am going to learn and how I am going to present my information
- We get chances to do things in a creative way like the diorama for Alberta and Québec.

4. Student Appreciation for Meaningful Learning Activities

- I like to interact with others and to work in small groups and large groups.
- We learn a lot when we go on field trips and it would be good to have more of them.

- I like all of the activities like art and drama. There is always something worthwhile to do.
- I like the hands-on learning activities.
- I like to learn from fun activities like learning math from our shopping trip.
- I'm a visual interactive learner and I like to have charts on the wall that we have made ourselves that help us learn.
- I like to work with partners and groups and to have a chance to learn by discussing.
- I like getting to know other students through our group work and socializing in the school. Students and teachers are very respectful of each other.

5. Using Technology as a Learning Tool

- It is important to have computers to get the information we need. We need to have more computers in our school.
- We use PowerPoint, Hyper Studio, clipart and pictures from the Internet to present our projects.
- We use computers to present our information to get information from the Internet.

6. Feedback for Further Consideration

- We learn how to work with others. Sometimes when we are doing projects and there is too much talking, it is distracting.
- It is good to have assemblies and times when we share our projects so we can celebrate what we are learning.

B. Grade Six Written Reflections

The grade six students were asked by their teachers to share some insights in regard to their experiences as learners. As a framework for reflection, they were given the following guiding questions:

- What is special or unique about Andrew Sibbald School?
- How is learning in Andrew Sibbald different from the way students learn in other schools?
- Do you think that all students should learn like this?
- Do you think that there will be the same approach to learning in junior high school?
- How has the way you learn changed?

The students were articulate and enthusiastic in their responses. Forty-one of the 58 students who responded were very enthusiastic in expressing their appreciation for the inquiry approach to learning. The following comments are representative of their descriptions of their learning experiences:

- You learn to do things by yourself and to answer the questions by looking for them.
- It is like you are on a mission. You get what you need and your task then is to go out and do it and even if you don't succeed, you still learn something.
- This method of learning has helped me achieve more in everything. Sometimes in marks, but mostly I've improved my overall self and I'm more confident than ever. I feel like I can step up to any challenge or task that teachers give me and I know that I can succeed. I've also noticed changes in other people too. Everyone seems more confident in every way; socially, mentally and physically.
- The differences of inquiry-based learning are noticed as soon as you walk into the classroom. To start with, you may notice that the students are not just working on one thing. They may be working on several things at one time. All of the assignments and their due dates are listed on the WOW (working on the work) board. If we get bored of one thing, we will move to another.
- I like going to Andrew Sibbald and doing inquiry-based learning. The way we do things is quite unique because we don't have just separate subjects. We do everything in one big project, and we seem more in charge of our learning. We can also expand our ideas and our teacher doesn't tell us what to do- she just gives us her opinion.

- I find the new program much better than what we were doing from kindergarten to grade three. I like it much better now because all of our subjects (or a lot of them) are incorporated into one big project. Before inquiry-based learning we would have a timetable and time limit to work on a certain subject. I like it better now because the subjects that I don't like are mixed with the ones that I do like.
- Things are so different here at our school. The way we learn is much different than that of other schools, I think that the way we learn affects how we act. The way we learn affects how we handle situations and problems. It is not our abilities that show us what we truly are, it is our choices. I think that inquiry is a better way to learn because of the freedom that you have. I think that all of us have grown since we first started.
- I think that inquiry-based learning really helps you learn almost by yourself! The group work is my favorite because you can ask your peers questions to get answers so that you don't have to go straight to the teacher every time. Also what I like about the way we learn at school is that there isn't a certain time for anything and if you get your work finished you don't have to wait until everyone else is done, you can just work on another project because most of the time, all of the subjects go into a topic.
- Our school is very special and unique because you have choices on how you want to do things and you have more than one task to do. You are allowed to study what topic you like best out of the tasks that you have. You can use organizational tools to help you with your studies.

The students in describing why they like this way of learning offer the following:

- We can work on a little bit of everything so that we don't have as much homework. I think that all grade sixes like the feeling of having choices.
- We have an advantage because we work as groups. This is more effective because instead of doing little pieces at a time, we get to learn about it all at once. Personally, I find it easier to study because you can have all of your information displayed in a poster or in a report instead of having sheets which eventually get lost.
- I like the new way we learn because we don't have to do one certain thing at a certain time. We get choices and get to pick what we want to do.
- The teachers expect us to learn at our own pace and they trust us to have self-discipline. The teachers get involved with our learning.
- I think that all schools should have this kind of learning because it seems so much easier to learn and more fun. When we work on one of our tasks, we don't just sit at our desks. We can go to the computer lab and library to get information. We can talk to our classmates and compare our information and we have lots of field trips, so instead of reading about it, we can see it and touch it. I like the way we learn things at our school. It is fun because we can learn with our friends. When we get a glossary, we have a test on it but instead of just reading it we act it out or draw a picture of it.
- When your parents ask you what you did at school, instead of saying nothing, you can actually answer them because you can remember what you have been learning.
- Our school is very special and unique because you have choices in how you want to do things. You are allowed to study what topics you like best out of the tasks that you have. You can use organizational tools to help you with your studies.
- Inquiry is one of the best learning systems because you are free to have a choice with your task and learn in a very good way. I hope that all students get a chance to learn like we do today. I even hope that junior high schools can have a little inquiry even in homeroom. Thank you Galileo.

All of the students who made reference to junior high expressed the belief that learning would be different for them in junior high and they expected not to be able to continue with the inquiry approach.

Of the 58 students who provided written responses, 45 (78%) could be described as being satisfied or very satisfied with the inquiry approach and the organization of their learning experiences. Six (10%) of the students described some drawbacks to the approach which they had experienced personally or noted in observing or working with their peers, and 7 (12%) indicated that they did not like the inquiry-based

approach to learning. The following comments are representative of those who noted drawbacks to this approach to learning or expressed significant concerns:

- The thing that I really don't like about the way that I learn is watching the students that aren't independent learners struggle. They are not getting the help that they need. The teachers have students doing different projects and assignments and it is hard for them to meet everyone's personal needs. Although, most of the time the teachers will sit down and work with you personally, they don't have time to sit down and work with 60 kids.
- My learning has actually changed quite a lot because at my old school, I did really, really good on tests and always got over 85%. Now I have been going really down on my tests and sometimes even failing them.
- This way of learning is not the best for me. I mean it's great and what we study is always fun, but getting it done is always a problem. It's always too noisy and nobody bothers to put enough effort into finishing a project.
- I can't focus anymore, there is a lot to do and think about and it is too noisy.
- I think that we should stop inquiry. It is very hard to be organized and you have so many assignments on the go that you get worried that you can't finish them. In other schools we had notebooks and folders, not just a binder. It is much easier to be organized with folders and stuff. The difference in other schools is that they do one subject for maybe an hour and then move on. To me, that is the right way to learn. So much has changed in my learning and it shows on my report card.
- I've just moved here and I hate inquiry learning. We don't ever know what is going to happen each day. You always learn mixed subjects. You can work on one thing all day, which should not happen. You may do Math on March 1 and not even hear about it until May 1. All of your work is projects, you should have textbooks and worksheets. I have gone from being organized to very confused because I can't change how much time I have for each assignment.
- I find that with inquiry learning that you are always busy and sometimes we are too busy with all of the work that we get. Sometimes we get a math sheet when we haven't done math for about two months. Sometimes inquiry can be horrible and it makes me sick to my stomach.
- I do not like our math because it fits in with our projects when we do it. In junior high, we will have a separate class for math, which I think will be better for me.

The student comments and written reflections demonstrate the importance of taking time to hear the student perspective. Students were overwhelmingly enthusiastic for the opportunities that they had had to become involved in meaningful learning activities through project work associated with the inquiry questions they were addressing. The students expressed an appreciation for having opportunities to work independently as well as learn with their peers through group work, conduct research work using the library and Internet sources, develop their skills and knowledge through an integrated holistic approach to learning, learn through hands-on experiences, projects and field trips, and demonstrate and celebrate their learning through the use of information and communication technology and displays. They identified the importance of having structure and good organizational skills, the ability to work independently as well as to work with others in teams, the ability to focus on a task as well as to integrate learning experiences and an appreciation for learning in a dynamic ever-changing environment with an emphasis on making connections to the real world.

Those students who expressed dissatisfaction with inquiry-based learning describe difficulties in dealing with complex tasks, working in a group, time management, organizational skills and learning in an environment in which the learning activities for developing knowledge and skills in the various subject areas are integrated rather than segregated. It is interesting to note that students who are new to the school expressed concerns and a desire to have what could be described as a traditional organization of learning on the basis of subject areas and the extensive use of worksheets and textbooks. Clearly, there is a need to address the concerns which were expressed by the students in order to ensure that the needs of all students are being adequately and appropriately addressed. There appears to be a need to have in place an orientation process and ongoing support for students who are new to the school and for those who are experiencing difficulty as learners. The focus of the orientation should include the development of

organizational and time management skills and the ability to work independently as well as collaboratively in problem solving and inquiry.

Overall, the enthusiasm of the students as learners, their meaningful involvement in significant learning activities closely connected to what could be described as real-life experiences and the articulate manner in which they described their journey as learners was impressive. Andrew Sibbald School students realize that they are involved in a unique approach to learning. They appreciate the leadership of their teachers in providing the opportunities for meaningful learning experiences and they have become actively engaged as learners.

In reflecting on the impact of the inquiry-based approach to learning in Andrew Sibbald School it is difficult to quantify what in many ways is unquantifiable. Certainly the response to inquiry-based learning has been very enthusiastic, but are the students learning more and are they developing the skills they require as lifelong learners? One quantifiable indicator is the degree of success the students are experiencing through the provincial grade three and six achievement tests. The staff established a goal of increasing the number of students who achieved a standard of excellence in the Provincial Achievement Tests. An analysis of the results for the time period of 1999 to 2003 (Appendix B) reflects a steady increase in the percentage of students achieving the acceptable standard and the standard of excellence at the grade three level in language arts and mathematics and the grade six level in language arts, mathematics, science and social studies. The improvement in the acceptable standard and the standard of excellence exceeded significantly the goals and targets that have been established by the school staff. Staff members take satisfaction in the fact that there is a very high participation rate in terms of the number of students writing the examinations and that there have been increasingly more special education students achieving at the acceptable level. In June 2003, 100% of the grade 3 students and 97.6% of the grade 6 students achieved the acceptable standard in language arts and mathematics significantly exceeding the provincial goal of 85%. The province establishes a target of 15% of students achieving the standard of excellence. The Andrew Sibbald students achieved a very impressive 46.0% in grade three language arts, 55.6% in grade 3 mathematics, 28.9% in grade 6 language arts and 39.8% in grade 6 mathematics in the standard of excellence.

III. The Parent Perspective

There is a progressive attitude in the school and the teachers are amazing. The administration and staff are approachable and the communication is great. Students ask more questions about what they are doing in school and they are learning to see the bigger picture. They are no longer looking to someone else to solve all the problems and they are beginning to generate their own possibilities. They are masterful with technology in getting information and making presentations. (Parent comments)

A. Parent General Observations in Regard to the Galileo Program

Parents of Andrew Sibbald School students are very supportive of the school and appreciative of all that teachers do to make learning interesting and worthwhile for the students. Parents were enthusiastic in their response to proposals to consider new approaches to learning and teaching which would provide greater challenges for the students as learners. The parents indicated they were pleased with what was being done in the school but they were looking for more. Some parents had learned about the involvement of the schools in Foothills School Division in the Galileo Initiative and were very supportive of proposals to enhance learning experiences of students through the use of technology. When Ms. Whitworth presented to the school council the possibility of entering into a partnership with the Galileo Network, council members, on behalf of parents, expressed strong support for the proposal. The school council solidified its support by offering to provide, through fundraising projects, the funding that would be required to contract the services of the Galileo Educational Network Association.

Andrew Sibbald School parents have typically been actively involved in the education of their children through enriched learning experiences they provide outside of the regular school program, as well as through their strong support for the school, including volunteering and participating in school activities. The fact that the participation rate of parents in parent-teacher interviews is typically significantly higher than 90% is a key indicator of parental involvement. The involvement of parents as volunteers and their participation in supporting learning activities of the school is seen by staff members as significantly impacting the performance of the students and the quality of education that can be provided through Andrew Sibbald School.

Sixteen parents were interviewed at the time of the parent-teacher interviews on March 25 and 26, 2004. The interview questions are attached (Appendix C). Participants were selected by inviting those interested to arrange for an appointment as well as by encouraging others available at the time to take part in an interview. Six key themes evolved from the general observations of the parents: appreciation for the work of the teachers, appreciation of opportunities to be involved as parents, appreciation for the nature of the learning experiences, indicators of a good understanding of inquiry-based learning; observations of students as engaged learners, and identification of contributors to the success of the Initiative.

1. Parent appreciation for the work of the teachers

The parents are most appreciative of the work of teaching staff members as is reflected in the following comments:

- The teachers have been amazing. The quality of teaching is very good. It is a genuine good staff that wants to see students succeed.
- The staff members seem to work very well together.
- The staff members have been very helpful, supportive and caring in working with students including those who are experiencing difficulty.
- There is a progressive attitude in the school and the staff members are innovative.

2. Appreciation for opportunities to be involved as parents

Parents described how they have benefited from opportunities to volunteer in the school and participate in field trips, presentations and special learning activities. They indicated that they feel welcome coming into the school and appreciate being kept informed.

- I appreciate the fact that parents are encouraged to become actively involved as volunteers.
- We made a special point of moving here because of the reputation of the school.
- The administration and staff are approachable and the communication is great.

3. Appreciation for the nature of the learning experiences

Parents interviewed reflected a good knowledge of the learning activities in which their children were involved and an appreciation for the positive impact of these learning activities.

- I appreciate special learning activities such as the field trips, project work and hands-on learning activities.
- The students are involved in very meaningful learning activities. Developing a plan for the community past present and future is one example. The students are learning at a more meaningful level and they enjoy learning.
- Guest presenters, such as the engineer who came to talk to the students, are very impressed with the type of questions the students are asking and their level of understanding.
- My child is happy to come to school and that is certainly a good indicator.

4. Indicators of parent understanding of inquiry-based learning

Parents were asked to describe what they understood about the Galileo Initiative or what is described as inquiry-based learning. They were very knowledgeable and articulate in their responses. Representative comments include the following:

- The student learning is more expanded and related to the world they live in.
- Students learn how to think and not what to think.
- Students learn how to understand the learning process.
- It is student-led learning where students ask questions about how the world works and they learn by being curious and making connections.
- It is about using computers for getting information, asking questions and relating the child's community experience to a larger perspective.
- Children learn through working together, doing group projects, going on field trips and being involved in other learning experiences that make their learning relevant.
- It involves higher-level thinking and questions and not just recall. We now see the students generating ideas, learning from hands-on experiences and building on their personal knowledge.
- It involves making meaning and taking learning to the next level. It involves looking at all aspects of life and asking the questions about relationships, cause-and-effect and being more conscious about the environment.
- There is a lot of focus on communities and students working toward answering questions in a variety of ways. The students get to ask questions and they have the freedom to direct their own learning.
- It is teaching students how to learn rather than memorize. They ask questions and plan research projects instead of being handed a worksheet.
- Students learn different ways of learning and different ways of doing. It is a lot better than the old way.
- You take the whole curriculum and reformat it into inquiry by asking more questions. Kids learn more from questions and ask more questions at home. They love it!

5. Parent observations of children as engaged learners

Parents were asked to reflect on their child's learning experiences and the observations that they had made of their children as learners. Their responses reflect what could be described as indicators of engaged learning. Representative comments include the following:

- They ask more questions, talk about what they are doing in school and they are excited about their learning.
- I could see through the home journals that she brings on Fridays that doing the project with mealworms was causing her to ask more questions.
- School was a chore before and now she does her homework and she is more independent. She is enthused about learning because she feels she is in charge of her own learning and learning has become fun.
- Our son was in the program for two years and now that he is in junior high he sees the learning as more disjointed.
- He seems to have a more well-rounded perspective than if he were in a more structured situation learning through rote facts. He does like the exploration and he seems to do more on his own.
- The kids don't realize how much they are learning. It is like osmosis. The retention of learning is there because it is being applied.
- He has learned how to get information. It has forced him to do more thinking and to think outside of the box.
- Having an opportunity to volunteer and see what is happening through some of the projects like the City Hall school has changed how I look at things as a parent. You take what is real in the world and apply it to the curriculum.
- When we were on a trip, I was impressed at how our son looked at structures in a different way. We had a great discussion. He was applying his learning to what he was observing in the real world.
- As parents we do a lot of volunteering in the school. It is an excellent way of developing an understanding for this new approach to learning and to see the very positive impact it is having.
- When we talk to parents from other schools we feel that there is something different here.

6. Contributors to the success of the Initiative from the parent perspective

In reflecting on the contributors to the success of the program, a significant number of parents identified the leadership of the principal and the commitment of the teachers. The enthusiastic support of the teachers was described as being the factor that made the difference. Parents also acknowledged that there had been very strong support from the school council and parents financially and morally. Many parents also indicated that they had been actively involved through volunteering. Several parents described how they had been involved in some field trip experiences and how they themselves learned from the experience. Parents indicated that they talked a lot more about the learning experiences with their children.

As well a number of suggestions for improvement were offered, including the following:

- We would like to see smaller class sizes and smaller learning groups
- It would be good to have more information sessions for new parents as well as for all parents as a refresher in regard to inquiry-based learning rather than learning about it on the fly.
- We need to do something about the enrollment drop so that it doesn't affect programs that can be offered.
- It would be nice to have specialists for music and physical education.
- There should be more training and information sessions for parents so they can understand what is being done in the school and reinforce it at home.
- The approach is much more subjective. She seems to be doing well but I would like to see an objective test.
- We would like to see more standardized testing to know for sure how the students are doing.

- I would like to see more emphasis on teaching basic math skills.
- The children need training in how to work together in groups. Time is wasted in getting them all on the same wavelength.
- They need to be taught the basic math and language skills in order to be able to do the research.
- The teachers need to look at the amount of time that is spent in organizing the students for each activity. There is a lot of wasted time in the transitions from one activity to the next and in the movement of the students from one area to the next.

B. Reflections on Specific Aspects of the Learning Experiences

When asked to comment on the impact of inquiry-based learning on the development of fundamental academic skills, seventy-five percent of the parents interviewed indicated that they believe their child is stronger academically because of the learning experience. Several parents described how the students had grown academically and how they were making connections to real-life situations. They noted that the language arts, social studies and science skills had significantly improved, but there were some concerns in regard to mathematics. Forty-four percent of the parents interviewed indicated that they were concerned about basic math skill development and they saw the need for more emphasis on drill and mastery of the basic skills in mathematics.

Sixty-nine percent of parents interviewed indicated their belief that student organizational and management skills had improved as a result of their involvement in inquiry-based learning.

Parents described the emphasis on group work in the development of teamwork skills as a highlight of the Galileo/Inquiry-based Learning Program. They observed that when students are put into team situations they learn to show respect for each other and to work together. Overall, seventy-five percent of parents interviewed indicated a belief that the emphasis on teaming and group work was positive and that their children were benefiting from it.

All parents interviewed indicated that they believe their children have benefited significantly in regard to learning to appropriately use technology. Typical was a comment from a parent who said, "They are masterful with technology. The teachers are helping them develop their skills and they are learning how to use technology through the learning activities." They described how their children are using the Internet to get information and PowerPoint and Hyper Studio for presentations.

Seventy-five percent of parents interviewed indicated that they see their child as having a higher-level motivation and as experiencing more success as a learner as a result of the inquiry-based approach to learning. They described how students have developed stronger relationships and social skills through the experience and how they have been motivated by the learning experiences.

Forty-four percent of parents interviewed described their child as being more engaged as a learner. One parent observed, "He lives for school. He speaks the language and uses the words and we have to use the words."

Sixty-nine percent of parents interviewed expressed the belief that their child had improved in the ability to solve problems, make decisions and inquire. Typical is the observation, "They are learning to see the bigger picture. It is fun to discuss topics with them. They are no longer looking to someone else to solve the problems. They are beginning to generate their own possibilities."

Parents had difficulty responding to the interview question regarding the depth and breadth of learning achieved through inquiry. Sixty-three percent of the parents interviewed were not able to express an opinion. Several parents indicated that they would like to have more concrete information and measurements for the depth and breadth of the learning taking place.

Twenty-five percent of parents interviewed expressed the view that their child became more creative and innovative through the inquiry-based learning process. One parent noted that being a volunteer in the school enabled her to see on a first-hand basis how creative the students are in their work.

Many parents commented that their children are spending more time talking with them about their learning experiences. They expressed an appreciation for opportunities students have to display their learning and for special events celebrating student learning. Several parents interviewed brought their children with them to participate in the parent teacher interviews. They described the merits of having their child join them for the parent teacher interviews in order to share their views about their learning. Seventy-five percent of parents interviewed expressed the belief that their children had become more effective in communicating about their learning. One parent noted, "There now is a need for more skill development in making presentations through something like Toastmasters, because the students are ready to move on to the next level".

Forty-four percent of parents interviewed indicated that they believe they became more involved as parents in the learning experiences of their child through the Galileo/Inquiry-based Learning Initiative. Parents described how their children talk much more about their learning experiences. Several individuals suggested that parents should become involved as volunteers because, "it provides them with an opportunity to develop an understanding for this new approach to learning and the positive impact it is having on students".

Eighty-eight percent of parents interviewed indicated that they definitely would like to see the school continue to be involved in the Inquiry-based Learning Initiative. Several parents also indicated that if there was a need for more funding in order to continue with the Initiative it would be made available through the School Council.

When asked to provide suggestions for enhancing what is currently taking place, seventy-five percent of parents interviewed indicated that they had no suggestions to offer. Suggestions from those who responded include: giving more attention to students with special needs, emphasizing the basics more, making more efficient use of the time when students move from one activity to the next, considering what will happen to the students when they move to a different school at which a different approach to learning is used and giving more attention to working with parents to educate them about this approach to learning so that they become part of it and reinforce it when they are spending time with their children.

IV. The Teacher Perspective

*The quality of the student work and the change in attitude has been amazing. It reinforces what I believe about how children learn through making connections and the level of student engagement is incredible. The students take on personal ownership for the learning and the teacher becomes more of a mentor and a supporter. Inquiry-based learning involves connecting children's learning to the world in an authentic way. It is a way for teachers to address individual needs of students including academic and emotional and it involves a different focus on project work through the **integration of all subjects.** (Teacher comment)*

On April 13 and 14 2004, the author conducted individual interviews of the principal and ten teaching staff members (all of the teachers who were available) using the question format outlined in Appendix D. The teachers were clearly excited about the impact they had seen on students as learners through the Galileo Initiative and the implementation of inquiry-based learning. They described themselves as having been involved in a significant learning experience.

A. Becoming Involved in the Galileo /Inquiry-based Learning Initiative

In describing how the Galileo/Inquiry-based Learning Initiative had come about, the teachers offer the following comments:

- Bev asked the Galileo Network representatives to come to the school in response to feedback from parents that they wanted the school to go from “great to wow”. Bev provided excellent leadership in getting it all going. Bev had a vision for what the program could do for the school, and she worked hard to get the support from the staff.
- It was recognized that there was a need to do more to challenge all learners. An application was made to Galileo and information was gathered from Glenbrook School previously involved with Galileo. The Galileo team made a presentation to the staff and it was agreed to go ahead with this new approach to learning.
- We had a mentorship program in place to challenge high achieving students and students with high verbal skills. Galileo was seen as a better approach because it involves all learners.
- Galileo was seen as a good option to the mentorship program. The mentorship program in many ways was “elitist”, and Galileo was seen as something that would be good for all children.
- The idea of being involved with Galileo was presented to the staff and after a presentation by the Galileo team to the staff, it was decided to go ahead.
- We received funding from the parents and met with representatives of the Galileo team to contract their services.

B. Describing the Galileo/Inquiry-based Learning Initiative

Teachers were also asked to describe their perspective of what the Andrew Sibbald School Galileo/Inquiry-based Learning Initiative involved, as well as their expectations in regard to the Initiative. Their responses are reflected in the following comments:

- It involves making inquiry work in the classroom. To me Galileo represents inquiry-based learning.
- It is a different way of teaching, you adapt to the changing world. Teaming is a big part of the approach. You can't teach out of the box with set activities for September, October, and November.
- It involves connecting children's learning to the world in an authentic way. It involves making connections between the school and the real world. It is a way for teachers to address individual needs of students including academic and emotional. In the past we have done projects. Inquiry puts a different focus on project work and it involves the integration of all subjects.
- It is a part of the school development plan and our efforts to meet the needs of all students. It is a philosophical set of ideals.

- It is an opportunity to take a topic and enlighten children by asking key questions related to their learning. It is student directed and all learners are engaged in leading the discovery and making connections to real life topics.
- It takes project work a step further by allowing kids to interact with each other in a meaningful way.
- It involves getting children to learn in a different way.
- It is based on the first goal of the school development plan: creating a community of engaged learners.
- It is about providing children with resources and teaching them how to learn through inquiry embedded in a question, which is related to current life issues.

C. Teacher Expectations

When teachers were asked to describe their expectations in regard to the Galileo Initiative, the following comments represent their views:

- There were some misconceptions that needed to be clarified. At first we thought there would be Galileo teams working with each teacher. We expected that it would involve a different way of teaching.
- I expected that we would be given the philosophical background and a framework for inquiry-based learning. As a new member of staff, I would have appreciated an orientation session about Galileo. I found out informally by talking to the other teachers. Later the lead team member helped me as a mentor.
- I didn't expect it to be as all encompassing as it is. I didn't expect that we would be integrating all learning activities. It is hard to fit everything into inquiry.
- It is more than what I had expected. It is much more work, but it is well worth it. It has changed me as a teacher.
- I was in to engaging students as self-directed project-based learners. Galileo was a natural extension. It makes it possible for the students to pursue their interests. I am very comfortable with all that it represents.
- What we accomplished exceeded all expectations. We have come a long way as a school community since we started Galileo.
- I thought that I was doing a lot of it already, but through Galileo I have given inquiry a much stronger focus.

D. Personal Reflections on the Experience

There were different reactions to the experience from the perspective of each teacher. In describing the impact of the project on them personally as staff members, the teachers commented:

- It has been hard work. It has gotten easier with experience. One of the issues is learning to work with team partners.
- We have gone from a school in which no one was involved in inquiry based learning to one in which everyone is involved. It has been a huge change. It is phenomenal. The foundational beliefs and knowledge from Galileo got us going by showing us what it could look like.
- The children are excited about their learning and they are asking all kinds of questions. The parents are becoming actively involved as well. We are integrating all of the subjects together.
- There has been a fair bit of change. We do a lot less direct teaching and more small groups. In responding to the students' questions it is easy to go off on a tangent. The challenge is to make sure that you cover the curriculum. You need to know the curriculum well.
- I feel very comfortable with this approach because it promotes discovery learning.
- I went into I.O. I learned a lot from it. It is a great source for accessing information, but it is not user friendly for inputting information. It is very time consuming. It was one more add on for me when I needed to set limits on my time.

- My understanding of inquiry has been solidified and it is more internalized into all that I do. I know why I am doing what I am doing and that is fundamentally important.
- We have learned a lot from Sharon. She has supported the teachers and helped us understand what we are doing. I have felt valued as a teacher. It has been important to have the time for planning through A.I.S.I.
- There has been a huge paradigm shift in teaching. There was some resistance for the first two years, but now everyone buys in. Some individuals left the school because they didn't want to become involved in this approach. There was some division among the staff in the first two years, now everyone is working together pretty well.

E. Highlights of the Learning Experience

Teachers were asked to reflect on their experience and identify what they would consider to be some of the key highlights of the Galileo Initiative. Their responses include the following:

- Seeing the enthusiasm and the growth of teachers.
- It has been very exciting for us as teachers and we know that there is no turning back.
- The extra time that Bev built in for planning has helped us to become a professional learning community.
- I like what has happened with the students. I like to see the connections they are making with the real world, like in the water inquiry where they are creating a protective environment.
- The week that we spent in Fish Creek Park was an unbelievable learning experience.
- It has turned learning around for the children. They are actively involved in their learning, talking about their learning and involving parents.
- The Spruce Meadows wetland study was excellent and the students got involved in some real life issues.
- Through the Heroes program the students came up with the idea of helping homeless people.
- The quality of the student work and the change in attitude has been amazing.
- I am so impressed with the quality of the student writing as they describe their learning experiences to their parents through their journals. Galileo has raised the bar and we have seen that children have amazing powers of understanding
- The big celebration is seeing the impact on the individual child. I have seen the students blossom and not just the high flyers. It reinforces what I believe about how children learn through making connections. The level of student engagement is incredible. The students take on personal ownership for their learning and the teacher becomes more of a mentor and a supporter.
- Some of the projects have been amazing, as the students have demonstrated all that they have learned.
- The thoughtfulness of some of the questions that the students are asking is beyond what I would ever have expected.
- The Galileo team provided the framework and the hard work of the teachers made it all happen. It has been a dynamic, empowering, enabling learning experience for all students, even those with special needs.
- It was excellent how the lead team came together. This has been a key to the success of the project.

F. Challenges for Teachers as Learners

There is no question that the Galileo Initiative was a very complex undertaking. Teachers were asked to reflect on their experiences in terms of challenges, areas of concern and factors which had a negative impact on the Galileo Initiative. The implementation of the changes in teaching strategy associated with inquiry-based learning is complex. Several teachers noted that they themselves had been involved in a challenging learning experience not unlike the challenges they had been presenting to their students. They observed that similar to the students they were at various points along the continuum of learning.

A significant number of teachers interviewed identified the time commitment, including time for planning and preparation, as a major challenge. They also identified challenges associated with the integration of subject area content and in particular concerns with teaching basic skills in mathematics in the context of integrated learning experiences. Some saw a need to involve students in learning activities from the textbook and the use of worksheets and direct instructional techniques to deal with basic skill development, but they felt uneasy about deviating from the philosophy of fully integrating subject areas through holistic learning experiences.

Teachers recognized the importance of having in place a common understanding of what the Initiative was all about. They saw the need for information sharing programs for parents and teachers who are new to the staff, and a need for reinforcement of the fundamentals of inquiry for all staff and students on an ongoing basis. Several teachers made reference to what could be described as the human element of the change process. They recognized that teachers are at different points along the learning continuum. Also, they described the importance of recognizing the dynamics of coming together as teams and of understanding that individuals had been taken out of their comfort zones. They described how they had to learn new approaches to assessing student learning and identified the need for dialogue and professional development activities related to performance-based assessment of student learning. A common feeling that was expressed is that inquiry learning is effortful, unpredictable and ever changing. These challenges and areas of concern are reflected in the following teacher comments:

1. The issue of time

- The time commitment issue was raised by eight of the respondents.
- Time is a huge issue. We need time to meet with the team partners and time to plan and time to make sure that we are covering the curriculum. Shared preparation time for team members would make a huge difference.
- It takes a lot of time to do inquiry well. It is important to have preparation time for planning and reflection.
- You need time to gather resources and time to reflect.

2. The importance of having clearly understood expectations

- There were some misunderstandings, especially during the first year, in regard to what the Galileo team would be providing but it was dealt with and it got better when everyone understood what could be expected.
- There was pressure on teachers to comply with the goal of integrating all learning experiences and this was a concern for some.
- It is important to have clearly understood expectations, a common vocabulary and shared meaning.

3. Challenges associated with the integration of subjects

- Dealing with Math skills became a concern. How do you make sure you are covering all of the concepts? I felt guilty about using the textbook, because this wasn't a part of integrating the experiences.
- There is a major concern with integrating Math and ensuring that the students are developing all of the skills that they need. I feel guilty about taking 30 minutes to teach the skills.
- Sometimes it is difficult to find information at the appropriate grade level e.g. global warming. This is a huge issue because the reading levels of information on the Internet are not appropriate for elementary students. The sites that have been developed for students of this age do not have the quality of information needed for the nature of the authentic inquiry. Even library books do not have the level of information required for the level of research that is being conducted through inquiry.

4. Establishing a foundation of common understanding

- We need to explain to new people and parents what Galileo is all about. Sometimes it is hard for them to understand because they are accustomed to a more traditional approach.
- We need to educate parents about this new approach to learning.

5. Recognizing the human element in the change process

- Not everyone was ready to go in that first year, but there was a lot of pressure to do it. It certainly moved people out of their comfort zone.
- We needed to realize that the learning of the teachers was along a continuum and that not everyone was at the same point of commitment to inquiry based learning.

6. Understanding the dynamics of teamwork

- Teams are an important part of the initiative and there were some problems with team members getting along and agreeing with each other.
- Students needed to learn about group work and teamwork and how to work with different individuals.

7. Challenges associated with the assessment of learning

- The assessment of student learning became much more complicated with this approach.

8. Dealing with an increased workload

- It is hard work. There is some stress related to meeting the expectations of parents, administrators, lead team members and colleagues in implementing the inquiry based learning approach.
- The workload was much heavier; for example, with the Wetlands study it was necessary to do a lot of background preparation in a short time.
- Everyone on staff started from different places and different frames of mind. It can be divisive and some staff left because of it.

9. Access to technology

- There aren't enough computers to meet the needs of all the students and often the students were spread out in three or four areas in the school making it difficult to keep track of all that the students were doing.
- There are some real limitations with access to computer time.

10. Concerns related to the use of the Galileo Intelligence Online (I.O.)

- There is a major time commitment to use I.O. It is not easy to input information.
- I.O. is useful in terms of sharing resources but time is a big issue.

11. Taking time to celebrate

- We need to take time to celebrate the accomplishments of the students and the teachers

G. Contributors to the Success of the Inquiry-based Learning Initiative

Although there were significant challenges and obstacles to overcome, the prevailing feeling based on staff comments is that the Galileo/Inquiry-based Learning Initiative has exceeded all expectations and has proven to be very successful. In reflecting on the contributing factors to the success of the Initiative, the staff members identified the following:

1. Staff commitment

- The commitment of the teachers has been incredible. We need to recognize that they are learning, as well they are at different stages. We need to honor the teachers as learners, as well as the students.
- The staff has made it work. They were strongly encouraged to become involved, but once they did they became committed and most people wouldn't go back.
- It has gotten easier through the years. Teachers want to be the best they can be.
- You don't know what it is until you are in it. You have to live it and breathe it.
- The staff members are committed to inquiry-based learning. People are most willing to share time and to help others. There is a very supportive climate.
- The teachers have been phenomenal. They are perfectionists and they like to do the best job they can.
- The success of the program comes down to the positive attitude and personal initiative of the teachers who have made it work.

2. Student involvement

- The students have been excellent. They have a very positive attitude toward learning and they have flourished

3. Parental Support and Involvement

- The parental support and the funding they provided was a big help.
- We had strong support of parents financially and morally through their involvement with their children.

4. Leadership, Galileo Team and Lead Team Support

- The lead team has definitely had a very positive impact. I enjoyed the meetings and the opportunity to bounce ideas off of each other. The team has shown the way.
- The Initiative has done huge things for teacher self-esteem. The teachers have seen what they are capable of doing
- Sharon has been excellent. She makes me think. She is a very smart person and she thinks in the inquiry way. She was always providing resources and web sites to help us out when we needed it.
- It has been very important to have the assistance of the technician so the teachers are not spending their time with technical problems.
- This is an exceptional school. Bev has been a great leader and has been instrumental in bringing it all about

H. Evidence of Success in Addressing the Key Goals of the Initiative

Up to this point, much of what has been shared would be described as perceptions and opinions. This is a very important aspect of the study because every effort was made to hear the voice of the individuals involved in this undertaking. The teachers were asked to share their insights and provide evidence in regard to the success of the Galileo Initiative in addressing key goals that had been identified in the Galileo project proposal. These goals included growth in the following areas: fundamental academic skills; personal organizational and self-management skills; teamwork skills; the appropriate use of technology to choose specific outcomes; enhancement of the motivational level and success experienced by the students as learners; engagement of students as learners; problem-solving ability of the students, ability to pose

problems, make decisions and inquire; depth and breadth of learning achieved and demonstrated through inquiry; development of innovation skills; and the ability of students to communicate their learning to a variety of audiences.

The following is a summary of the teachers' responses to each of these key indicators and some descriptors they offered as evidence in support of their comments:

1. Fundamental academic skills

Nine of the eleven teachers interviewed indicated a belief that there had been significant growth of students in general in regard to fundamental academic skills. One teacher was uncertain and the other indicated a belief that there had not been a significant growth in academic skills. The evidence of significant growth that was cited includes the following:

- I see the difference in the levels of thinking; the students are discussing not regurgitating.
- They have developed a real excitement for learning as part of the process of inquiry.
- The big change is that the students take personal ownership for their learning.
- The students have really grown in their critical thinking skills and their ability to see other points of view.
- The provincial achievement test scores have been excellent and that is certainly an indicator. We established the goal of increasing by 5% the number of students in the standard of excellence.
- It has changed the way students think.

On the other hand it was noted that there are some special challenges associated with special needs students and those who require a more structured environment for learning.

- The IPP students need a lot of support. Unfortunately there are not enough appropriate resources for the special needs students.
- It doesn't work well for all students. Some need more structure. They are not all independent learners.
- We recognize there still is a place for textbooks and thoughtful worksheets. They need the skills like phonics in whole language.

2. Development of student organizational and self-management skills

There is no clear indication that students' personal organizational and self-management skills were enhanced as a result of involvement in the Galileo Initiative. Six teachers indicated they believe that it had made a difference, three indicated that had not and two were uncertain. Their views are reflected in the following comments:

- A lot of students already had good skills in this area.
- It depends on the student.
- We teach good organization through how we organize learning activities.
- The students are much better organized because they are given checklists and rubrics and they're taught how to manage their day.
- They may be more organized in their minds and how they think, but less organized in keeping track of their materials. We still have disorganized students.
- The children who are good organizers continue to be good organizers. It doesn't help those who have poor organizational skills.

3. Development of teamwork skills

The teachers were unanimous in expressing their belief that the teamwork skills of students have improved as a result of their involvement in the Galileo/Inquiry-based Learning Initiative. Teamwork is seen as a major component of the Initiative as well as the nature of the organization of teaching in Andrew Sibbald School. Teachers work in teams and the organization of learning activities is centred on the concept of bringing students together as teams. Teacher comments regarding student involvement in teamwork include the following:

- They are seasoned pros in group work.
- Teamwork is what inquiry is all about.
- They're finding that it isn't always easy and they need to learn how to work in teams.
- They learn to work with different types of students and it is a good experience for them. They get to be a leader sometimes and sometimes they are a follower.
- The children are very good in working in groups. They are kind, helpful and considerate.
- They work well together most of the time. Some want to work independently even in groups, and some don't help out as much as group members.

4. The appropriate use of technology

Initially, there may have been a perception that Galileo is primarily about using technology. It is clear from the feedback that has been received through this study that technology is seen as an important tool in support of the process of inquiry based learning. As the students are to be involved in the study of real-life situations, they require up-to-date information such as that which is available through the Internet. Technology also serves as a useful tool in providing a number of options for students for presenting information and describing their learning experiences. All of the teachers agreed that Andrew Sibbald School students had developed very good skills regarding the appropriate use of technology to achieve specific outcomes. One area of concern identified was access to technology when the students required it. Several teachers described having students in various locations of the school in order to have them access available computers. Comments relating to the use of technology include the following:

- Technology has been a focus of the school for many years. We had a good base to build on. The students are very computer literate
- The students are very skilled in research skills, word processing and presentation skills such as Hyper Studio.
- The students are very advanced in their technology skills and it is a challenge to keep up with them as a teacher.
- They're doing more and more at home and they are helping their parents as learners in the use of technology.
- Students are using computer technology a great deal to gather information because it is important in inquiry to have up-to-date information.
- The use is often limited by the availability. Inquiry learning is so time specific. It is important that the students have access to the most recent information through the Internet.

5. Student motivation and success as learners

All teachers were also in agreement with the observation that there had been a significant impact on the level of motivation and the success students experienced as learners. Comments relating to motivation include:

- The weaker students still get bogged down easily. They need more structure. It would be good if we had time to bookmark the sites for the weaker students but we don't really have the time.

- It is important for the teacher to keep the learning activities exciting and to recognize good work. Praise is important as long as it is sincere.
- The students are motivated because the learning is relevant and they are more interested.
- The students are motivated because they're bringing in the information like the Sable Island Project

6. Student engagement as learners

A key question identified in the project outline is related to the degree of engagement of the students as learners. All teachers interviewed indicated their belief that students were engaged as learners and they offered the following comments in support of this observation:

- The students understand the language like self-directed learning and engagement.
- They are engaged because they have ownership and they are the ones who ask the questions.
- They're very engaged in pursuing areas of interest such as the study of rocks.
- You know they are engaged because of the body language, which is open, the rich conversation and the expressive language.
- They are engaged because the activities are current and meaningful. A good example is the Heroes project.
- They feel ownership for their learning. They bring in current events articles everyday and they're very aware of what is taking place in the world.

7. Ability to problem solve, pose problems, make decisions and inquire

All teachers also agreed with the observation that the students' ability to problem solve, pose problems, make decisions and inquire had been enhanced through their learning experiences. They offered as evidence the following:

- They've grown in their ability to problem-solve and they have learned through group work.
- The work they did in the Spruce Meadows project is an example of where they had to make a decision based on facts they had gathered.
- It is interesting that the teachers have gotten better at it as well as the students.
- They know how to find the information and how to make decisions.
- Problem solving is very much part of inquiry and it gives it more meaning.
- It is a matter of awareness and perspective. Students are asking questions and they have developed better decision-making skills.

8. Depth and breadth of learning experiences

In describing the amount of detail students were going into through their learning experiences and the scope of their learning overall, all teachers agreed that the depth and breadth of learning experiences demonstrated through inquiry had been enhanced. They offered the following:

- We give students the knowledge and we say now you have to go and change the world. The Hero's Project is a good example of how the students have learned to go beyond simply learning about the situation. They have gone out to help the homeless. They are learning to become aware of the world at an academic level and to respond at an emotional level.
- I am really pleased with inquiry. When you look deeper you need to go broader.
- It depends on the interest level. If something sparks their interest they go into great detail.

9. Innovativeness and creativity

Innovativeness and creativity is promoted through the inquiry-based approach. Ten of the eleven teachers interviewed indicated they felt students had grown in their innovation skills and in support they offered the following comments:

- They are becoming more creative and more confident in what they're doing. I've seen a big difference from grade three to grade four.
- They're bringing in things on their own and they're making connections.
- Through inquiry they look at things in new ways.
- They are creative and innovative and they're able to demonstrate understanding.
- They are creative in their PowerPoint presentations and the use of technology.
- An example of their innovativeness is their work in designing hybrid vehicles.

10. Communicating learning to a variety of audiences

An important element of inquiry-based learning is demonstrating and communicating to others what you have learned. All teachers interviewed indicated they believe the students were learning how to communicate to a variety of audiences. Their positive observations about the skills the students have developed are reflected in the following comments:

- They have become much more articulate in expressing themselves.
- They enjoy demonstrating their learning.
- They have learned to use different ways of communicating to demonstrate what they are learning.
- The inquiry assembly, which we had for the students to share their learning and celebrate what they had done, was excellent.
- I know that parents are very impressed with what the students are communicating about their learning.
- We are using the web page to communicate with parents and even grandparents about what the students are learning. The response has been very positive.
- The students have been outstanding in presenting information about their learning.

I. Indicators of Success of the Galileo/Inquiry-based Learning Initiative

In response to a series of questions relating to indicators of success of the Galileo Inquiry-based Learning Initiative, all of the teachers either agreed or strongly agreed with the following observations:

- Everyone does inquiry work in the classroom.
- Everyone supports each other in the inquiry work they do.
- Teachers and students are critical thinkers.
- Students do work that contributes to society.
- Students are able to discern their own learning.
- Parents are engaged with their children's inquiries.
- Parents are supportive and understanding of the Galileo Initiative.
- Assessment is used to support continuous learning and development.

Two teachers disagreed with the statement that everyone understands inquiry work. Other comments, raised in the information gathering process, indicated the need to clearly articulate the meaning of inquiry and provide ongoing reinforcement of the concept and the language used to describe the process.

There were also two teachers who were uncertain about and one who disagreed with the statement that every student and teacher at Andrew Sibbald School was deeply engaged in meaningful authentic learning.

One teacher also expressed uncertainty in regard to the statement that students are deeply engaged in authentic investigations. All other teachers were in agreement with that statement.

J. The Impact on Teachers of the Galileo/Inquiry-based Initiative

An important question in the study centred around the impact of the Galileo Initiative on teachers as learners. The teachers described how they had been challenged as learners and forced to work outside of their “comfort zone”. In the third year of the initiative they believed that they are now working together in what could be described as a learning community. Observations related to the impact on teachers as learners include the following:

- Teachers have had to learn more themselves. The inquiry approach takes much more time for planning and assessing. It is burning some teachers out. It's much more work when you're inventing all of the time.
- The conversations with colleagues are very rich. The teachers look at things from a different perspective. It is very stimulating.
- The talk among teachers is different. You look at how issues will fit into what the students are doing as learners.
- I know teachers who used the textbook approach and wouldn't go back. They read a lot and they're talking about what they're doing.
- This is a learning community. There is a lot of sharing.
- There has been a huge learning curve and we are all still learning.
- Teachers are sharing books and sharing experiences and there are great discussions in the Lead Team meetings.
- There are significant differences in how teachers talk about what they're doing and the language they use.

K. Changes in Teaching Practices

When teachers were asked to reflect on changes that had been made in teaching practices, they responded with the following observations:

- I believe that teaching practices are much different as a result of inquiry-based learning. I would like to get into some of the other classes and observe what teachers are doing.
- Yes inquiry forces you to change.
- We have gone beyond worksheets and we're focusing on how to engage students. There has been more change in teaching practices this year than any other year.
- There is much more group work throughout the school.
- You don't see students sitting in rows in desks.
- You see more use of computers.
- With inquiry teaching practices are changing every year.
- There is more research going on.
- There have been some significant changes in teaching practices. There still is a place for direct teaching, drill and novel study in inquiry although there is real pressure to say that we don't do worksheets and drill and skill development.
- There is a lot more group work, differentiated interest activities and self-directed learning.
- We're spending much more time with small groups and it allows for more differentiation.
- With inquiry you need to be more structured and to be well planned. You need to use different approaches.
- There is a strong focus on teamwork and creating a sense of community.
- There is a lot more group work.
- There have been some big changes. There's more differentiation of instruction.

L. Changes in Student Assessment Practices

It was noted that the focus on inquiry-based learning created the need for teachers to change their approach to assessing student learning. Teachers described how they spend much more time in assessing student learning on an ongoing basis and how there was less emphasis on subject specific unit testing. In describing the change in assessment practices the following observations were offered:

- There has been a big change in regard to student assessment. There is a lot more walking around anecdotal, note-taking and providing instant feedback to students.
- As a teacher I am looking at assessment through a different window.
- We have dealt with ideas in regard to assessment as a staff and we've had professional development days dealing with assessment.
- We're doing conferencing, observations, developing our own rubrics and developing an assessment binder.
- We are doing more anecdotal assessments.
- We are using rubrics more.
- We are connecting the report card to the Quality Learning document.
- We are now assessing skills and overall development using the Calgary Board of Education Educational Ends document.
- We still have a lot more to learn in regard to the assessment of student learning.

M. Teacher Satisfaction and Efficacy

It is interesting to note how teachers feel about themselves and their perceptions in regard to the level of satisfaction they are experiencing and their overall efficacy as professionals. The response from teachers was overwhelmingly positive; however, there are comments making reference to the amount of physical and emotional effort required and the human costs associated with this new approach to teaching. Representative comments include the following:

- I find teaching much more rewarding now.
- Teachers are exhausted. This approach is much more demanding emotionally and you have to think outside of the box.
- I generally feel it is working well for students. There is a concern about how hard we are being on ourselves. The teaming helps because we can plan together and offset the workload.
- Personally I feel very good about my teaching. Some teachers are stressed out because of the time demands and the pressure to get into inquiry before they were ready. We need to honor the perspective of each teacher and work with them where they are along the continuum.
- Most teachers are thrilled with the work of the students and the satisfaction they get from teaching them.
- I am concerned with the number of teachers who are away for health reasons.
- Teachers are working long days. We need to have preparation time just for a break. We need to have time to breathe.
- I feel very good as a teacher about what I'm doing.
- Teachers are thrilled with what is happening in the classroom. The price you pay is time commitment.
- Yes I am very satisfied with my teaching but I need to get rejuvenated.
- Inquiry takes a lot of physical and emotional effort.

N. Suggestions for Improvement

A number of suggestions for improvement based on the experience over the three-year period were offered including the following:

1. Pilot focus

- It is good to start small and then expand. It has progressed as it should progress. Ann and Renee were models for others. Having the Lead Team was good.
- Go slow and care for the people in the building.
- It would have been good to have started with a pilot group the first year rather than trying to involve the whole staff. The Galileo team didn't have time for all of the teachers.

2. Professional development activities

- You need a good deal of professional development and information sharing to understand what inquiry is all about.
- There should be an intensive workshop experience for new teachers who come on staff.
- I would ensure that there was more professional development support right from the beginning.

3. Outside support

- It is important to have the outside perspective that Sharon brought through the professional development and planning. She brought in a lot of good ideas and provided the support we needed.
- We needed to have more of Sharon's time and more people who think like Sharon to help out.
- There is an absolute need for ongoing support.

4. Support through the Lead Team

- Teachers should be encouraged to become part of the lead team and the makeup of the team should be dynamic.
- New people should have a chance to join the Lead Team so they can see that it is not a mystery. Those who are not on the Lead Team may feel inferior.

5. Time for planning and preparation

- We needed to have more time for planning and preparation.
- It is very important to have a solid understanding and foundation in place before you try to move too far into inquiry. It is important to learn and understand before you begin working with the students.

6. Celebrating successes

- We need to celebrate more, because there is so much good going on.

O. Sustainability of the Initiative

When the teachers were asked whether they could carry on this Initiative without any support from the Galileo Network and whether the Initiative was sustainable, they offered the following insights:

1. The importance of key leaders and mentorship

- Bev had the vision and she created the structure, allocated the time that was needed for the lead team, organized the teaching teams based on their strengths and what she has done in three years has been amazing.
- We will be okay if the key players don't leave.
- There would be a real concern if people transfer out of the school because you need that body of experience and knowledge.
- We will continue with inquiry for sure.
- I survived because I had a strong mentor and I did a lot of research on my own.
- Ms. Whitworth indicated that all teachers have the opportunity and invitation to be part of the Lead Team and they will continue to have an opportunity to participate in the Lead Team.

2. Time for preparation and planning

- Time is still a major issue. We need more time for preparation because it is a much more laborious approach to teaching. It is more time-consuming to research, plan and dedicate yourself to each individual learner. You need to consider the needs of each student and how you can make connections and provide more structure where it is needed. Inquiry is open-ended but it also requires a great deal of structure to make it happen and do things like having learning contracts in place. The work is much more cumbersome until you learn to manage it well.
- The loss of planning time is an issue.

3. Providing ongoing support

- Teachers really need to be supported.
- We got a lot to help from the lead team members and mentors.
- Inservice is critical.

4. The impact of the Galileo Team

- The Galileo team members have done a lot for our school. I have learned a lot from Sharon.
- Yes we can keep it going because this is not like a fad.

5. The active involvement of students

- The students are unbelievable. They are strong learners.

6. The support of parents

- The parent support has been outstanding

7. General observations

- Yes I would continue to use inquiry even if I were in another school. It's hard to go back to the old way.
- I have some doubts. The concern is not with the merit of what we're doing, it's a question of at what price.
- It has been a very positive experience overall

P. Insights from the Lead Team Members

Ten teaching staff members of the Lead Team, including principal Bev Whitworth, met on the afternoon of April 13, 2004 for the regularly scheduled discussion and update relating to the Galileo/inquiry based learning Initiative. The author was able to join the group from 2:00 p.m. to 3:30 p.m. for part of the discussion. At the time of the author's arrival, the lead team members were involved in a discussion, facilitated by the principal, of issues relating to teaching math and the integration of learning experiences in mathematics with the other inquiry-based learning activities. It was noted that in the integration of the other subject areas the focus is on divergent thinking, whereas mathematics is a subject area which is based more on convergent thinking. There was very good discussion about different approaches to teaching mathematics and the overall philosophy of inquiry based learning as a related to integration of mathematics into the learning experiences. It was agreed that the topic would be examined further in developing the school renewal plan.

The remainder of the time the Lead Team members were involved in a discussion of questions relating to the Galileo/Inquiry-based Learning Initiative.

1. Background to the formation of the Lead Team

- The Galileo team members proposed the formation of a support group or lead team in the school to increase access to individuals who had developed a significant level of expertise in inquiry-based learning.
- The formation of the Lead Team in the second half of the first year of the project was described as a very positive development. The goal of the Lead Team was to promote open communication as well as to provide ongoing support and assistance to teaching staff members.

2. Contributions of the Galileo Team

- Some of the staff members were very involved in working with Dr. Friesen and they appreciated the guidance and support she provided. They described how she challenged them to think and to pursue meaningful questions.
- Several staff members had been involved in taking a university course instructed by Dr. Clifford and Dr. Friesen which provided a strong theoretical and philosophical base for the implementation of inquiry-based learning. As well, several staff members were involved in conducting action research relating to inquiry-based learning in the school. These individuals assumed a significant leadership role as members of the Lead Team
- The Galileo Team provided the framework for the Inquiry-based Learning Initiative. Dr. Friesen was involved in working directly with teachers by offering assistance with the planning and challenging them to explore new approaches to teaching in keeping with the inquiry-based learning philosophy. She was seen as being a key resource. She was viewed as an individual who asked the right questions to stimulate thinking and offered ideas and resources to support the teacher's efforts in exploring new ways of learning and teaching.

- The Lead Team members enthusiastically described Dr. Friesen's positive impact in bringing people together and getting people to share, dialogue, and move in the right direction. Comments relating to Dr. Friesen's contributions include the following:
 - She has a wealth of knowledge, which she willingly shares with others.
 - She is extremely positive and helpful in her orientation..
 - She brings the philosophical foundation, which is needed.
 - She raises the deeper questions.
 - She is reassuring and she always has something worthwhile to offer.
 - She brings the outside perspective, which is extremely important.

3. Developing a common understanding

- The Lead Team members identified the importance of developing a common understanding of the philosophy and framework for teaching practices associated with the inquiry-based learning model. It was agreed that there would have been a great deal of merit in beginning the school year with an in-depth orientation facilitated by the Galileo staff for all members of the Andrew Sibbald School staff. Ms. Whitworth pointed out that the Galileo team had offered to begin the year with a professional development activity. However, at that time the staff had felt there were too many other demands associated with the organization of the beginning of the school year needing to be addressed. It had been suggested that the session be held later in the fall. Unfortunately, a time was never designated for the professional development activity needed to establish the framework for the project.
- It was suggested that there would be a great deal of merit in Galileo having a school entry plan for sharing ideas and information in regard to inquiry-based learning and for ensuring there is a shared understanding and a commonly understood and accepted framework in place.

4. Recommendations for further consideration

Lead Team members were asked to identify steps that could be taken to address the issues and concerns which they had raised. They offered the following suggestions:

- Begin with an entry plan for professional development and establishing a foundation for the program
- Have a contract in place which clearly outlines the services that will be provided by the Galileo Network as well as expectations relating to the school staff
- Provide individualized assistance in developing the needed readiness level among teaching staff members
- Begin working with two or three teaching teams which can serve as models and mentors for others
- Provide ongoing support through a group similar to the Lead Team
- Inform the Lead Team members of the amount of time that has been budgeted for them to spend working with other teachers outside of their own classroom teaching responsibilities
- Address issues relating to the use of the inquiry-based approach to learning such as the integration of mathematics and the use of meaningful assessment processes
- Explore further the possibility of involving University of Calgary Master of Teaching students and teachers from other schools in working collaboratively with the Lead Team and teaching teams in developing a better understanding of inquiry-based learning
- Review the role of the Lead Team on an ongoing basis and make provision for new members to join the team.

V. Facilitators

In any change initiative there are factors which support and enable the process. The following have been identified as facilitators in the implementation of inquiry-based learning in Andrew Sibbald School:

1. In initiating change involving inquiry-based learning, there is merit in working with a small group of individuals interested in becoming involved in changing their teaching practices and using these individuals as models and mentors for others as the change initiative expands. At the same time, it was the expectation of Ms. Whitworth that everyone would be involved in inquiry to some extent by the end of the first year and she believed that this was crucial in terms of establishing a common direction for the school.
2. The formation of the Lead Team had a very positive impact on the Initiative. The Lead Team members provided a forum for sharing ideas, reflecting on personal experiences and offering support, encouragement and positive reinforcement.
3. Dr. Friesen served in a key role in establishing the framework for inquiry, modeling processes and teaching strategies and providing resources, ongoing support and encouragement to individual teachers and to the Lead Team members.
4. Ms. Whitworth, as principal, had a vision for a new approach to learning and teaching based on inquiry learning. She demonstrated strong leadership in exploring opportunities for becoming involved with the Galileo Network and in establishing the necessary conditions in Andrew Sibbald School for the successful implementation. She had a vision for what the initiative could do for the school and she worked hard to get the support of the staff and parents.
5. The students embraced the opportunity to become actively involved in this new approach to learning and teaching. Their enthusiastic response as learners served as a motivator for the teachers.
6. Opportunities were provided for students to become meaningfully involved in learning through the organization of learning experiences which included independent learning, working with partners and teams and being involved in hands-on real-life learning experiences which they found interesting and challenging.
7. Parent support of the school and the work of teachers had a significantly positive impact on the Initiative. Parents appreciated the school while at the same time they were very supportive of proposals to take the students to higher levels of challenge and involvement as learners.
8. Parents not only provided moral support, but they also became actively involved in fundraising, through the school council, and made sufficient funds available to enter into an agreement with the Galileo Network.
9. The active involvement of parents as volunteers had a positive impact in terms of supporting the work of teachers and also providing opportunities for parents to develop a firsthand understanding of inquiry-based learning through their volunteer work with students.
10. Parents, through their interactions with their children at home and through family activities such as trips, supported the work of the school by showing interest in their child's learning activities and by reinforcing the key elements of inquiry-based learning through questioning and providing appropriate resources for learning opportunities outside of the regular school program.
11. The parents made a special point of developing an understanding of inquiry-based learning.

12. It is important for teachers to have time to reflect and interact with others. The staff had elected to eliminate non-instructional time in order to have smaller class sizes, but lack of time for planning, preparation and collaboration became a concern. However, Ms. Whitworth was able to make some time available, through AISI funding, for all teachers for team planning and professional development and for the Lead Team for the mentorship of individual teachers.
13. Involvement of teaching staff in organizing activities that connected learning objectives in the curriculum to real-life situations (such as the Spruce Meadows wetland study) was instrumental in motivating the students as learners.
14. Teacher commitment was a very significant factor. Teachers approached this initiative as learners, recognizing that they, like the students, were at different stages along the continuum of learning.
15. Staff members were committed to inquiry-based learning and were very open to working with others and creating a positive supportive climate.
16. The availability of the services of a technician was helpful in freeing teachers up from dealing with technical problems.
17. The willingness of the teachers to make changes in student assessment practices which corresponded to the change in teaching strategies and philosophy was important.
18. The availability of professional development activities and support through the Galileo team, the Lead Team and other activities was instrumental to the success of the Initiative.
19. Provision made to provide a positive setting for relationship building and the development of open communication and rapport among staff members had a significant impact.
20. The availability of AISI funding was very significant in terms of providing time for staff to meet during the school day.
21. Developing a common language that was understood by teachers, students and parents was helpful in making the link between philosophy and practice.

VI. Inhibitors

Factors identified as having a negative impact on the change process include the following:

1. Although it was discussed, arrangements were not made to begin the school year in the first year of the Initiative with a comprehensive professional development activity for all staff members focusing on the philosophy and guiding principles of inquiry-based learning
2. It would have been helpful to have sources of information and training programs available to new teachers and students as well as to parents on an ongoing basis.
3. Attempting to work with all staff members in initiating the change to inquiry-based learning was not feasible either in terms of the readiness level of staff members or the availability of adequate support from the Galileo Team in order to work with all staff members.
4. It was important to acknowledge from the beginning of the Initiative that not all teachers were committed to the new Initiative and their levels of readiness could be described in terms of different points along a continuum.
5. There were misconceptions that needed to be clarified. The expectations of the staff in regard to the assistance and resources that would be provided by the Galileo Team were not consistent with what the team members, in reality, were able to provide.
6. The introduction of inquiry-based learning, through the integration of courses and a holistic approach to learning, was much more comprehensive and complex than what had been anticipated by a number of the teaching staff members.
7. There were challenges for some teachers associated with working with team partners and coming to an understanding of what they would be doing in implementing inquiry-based learning.
8. There is much more work involved in this new approach to learning than what had been anticipated.
9. The availability of time for planning, gathering resources, reflecting, preparation and adapting to changing circumstances was a matter of major concern. Since teachers had given up their planning and professional collaboration time, a great deal of additional time outside the regular school day was required.
10. Some teachers felt there was significant pressure on them to comply with the goal of integrating all learning experiences. This was a concern especially for those who felt the need to provide time for the development of basic skills outside of the integrated learning experiences.

VII. Commendations

Commendations are extended to:

1. The Galileo Network for providing through Dr. Sharon Friesen and other members of the Galileo team a philosophical base and foundation for inquiry-based learning and the resources, assistance and ongoing support that was required for the successful implementation of the Initiative.
2. Ms. Whitworth for her leadership in articulating a vision and facilitating the involvement of the Andrew Sibbald School community in a partnership with the Galileo Foundation to promote inquiry-based learning.
3. The Andrew Sibbald School teaching staff members for their willingness to explore new approaches to learning and teaching and their outstanding dedication in significantly changing teaching practices and the organization of integrated learning experiences in keeping with the philosophy of inquiry-based learning.
4. Teaching staff members for developing new approaches to student assessment in keeping with the inquiry-based philosophy and making connections with the Calgary Board of Education Quality Learning document.
5. Dr. Sharon Friesen and Galileo Network Team members and members of the teaching staff for their innovativeness and creativity in developing meaningful learning experiences for the students and providing opportunities for students to explore their areas of interest and make connections between their learning and the real world.
6. The school staff for their efforts in organizing special celebrations of student learning and providing opportunities for students to demonstrate their learning and celebrate their accomplishments.
7. The Andrew Sibbald School students for their enthusiastic involvement in exploring the new approaches to learning associated with inquiry-based learning.
8. The parents of Andrew Sibbald School for their strong support of the school administration and teaching staff in their efforts to promote a new approach to learning and teaching through an inquiry-based learning philosophy.
9. The members of the Lead Team and individuals involved in mentoring and supporting members of the teaching staff in the implementation of the inquiry-based philosophy of learning throughout the school
10. The school principal, Ms. Whitworth for her ongoing support and leadership in the implementation of inquiry-based learning and her efforts to make time available for professional development, planning, preparation, sharing, supporting and celebrating.

VIII. Recommendations

A. Building on the Foundation of Success

1. In recognition of the very positive support for the Inquiry-Based Learning Initiative, expressed by teachers students and parents and the academic achievements and accomplishments of the students exhibited over the three-year period, it is recommended that Andrew Sibbald School build on the foundation of success which has been established and highlighted in this report and continue to be involved in promoting inquiry-based learning.
2. In recognition of the significant impact of the Galileo Network in providing the philosophical framework, resources, ideas and ongoing support and assistance, it is recommended that arrangements be made to continue to access the Galileo Network resources.

B. Ensuring there is a Framework of Shared Meaning and a Common Philosophy

3. In recognition of the importance of having a philosophical base, common language and guiding principles in place to guide practice it is recommended that the staff members develop resources and information sharing processes which would be made available on an ongoing basis to staff, students and parents.

C. Making Provision for Ongoing Support

4. In recognition of the significant role of the Lead Team in providing leadership, mentorship support and encouragement, it is recommended that provision be made for members of the teaching staff with special interest and expertise to participate on the Lead Team and that specific allocations be made for time for the Lead Teachers to provide leadership in the continued implementation of inquiry-based learning and to provide support and assistance to teachers as mentors.
5. In recognition of the benefits of the external perspective and the support, resources and clearly articulated philosophical foundation developed by the Galileo Network, it is recommended that provision be made to access through the Galileo Network some consulting time as well as opportunities to increase networking and professional dialogue beyond the school.
6. In recognition of the very important role of parents as partners in the education of their children, it is recommended that orientation and training programs in regard to inquiry-based learning be made available to parents to enhance their contributions as volunteers in the school and their ability to promote inquiry-based learning through their interactions with their children.
7. In recognition of the amount of time that is required to effectively plan, prepare and organize appropriate meaningful integrated learning activities, it is recommended that as much team planning and professional collaboration time as appropriate be allocated to teaching staff members.
8. In recognition of the importance of being able to access information through the Internet and to have available Information and Communication Technology to present information and ideas, it is recommended that a priority be placed on increasing the access to computer technology and ensuring that appropriate technical services are available.
9. In recognition of all that has been accomplished, it is recommended that the Andrew Sibbald School staff continue to build on the foundation as a professional learning community which has been established.

D. Reflecting on Teaching Practices

10. In recognition of the challenges associated with the development of integrated learning experiences while appropriately addressing curricular expectations outlined in the Program of Studies, it is recommended that teaching teams work collaboratively in developing rubrics and checklists which can be used to ensure that curricular expectations are being met through project work.
11. In recognition of the feedback of the students describing what they perceive as highlights of their learning experiences related to inquiry-based learning, it is recommended that staff members continue to develop and enhance existing teaching practices which focus on the key areas identified in the report.
12. In recognition of the concerns expressed by students who experience difficulty with the inquiry-based approach to learning, it is recommended that teachers consider the feedback and identify strategies for addressing the concerns and striving to ensure that the needs of all students are being met.
13. In recognition of the concerns expressed by some students, parents and teachers in regard to the development of basic skills in mathematics, it is recommended that teachers review the current practices in regard to the development of basic skills in mathematics.
14. In recognition of the concern that was expressed by some students in regard to making the transition from one learning group or activity to the next, it is recommended that teachers review the procedures that are in place and implement programs reinforcing organizational strategies and practices that contribute to a safe and orderly environment.
15. In recognition of concerns expressed by the students in regard to what they anticipate as a significant change in approach in teaching practices as they move into junior high school, it is recommended that the administration of Andrew Sibbald School meet with the administration of the junior high schools the students will be attending to share information in regard to the inquiry-based approach to learning and making a smooth transition from elementary to junior high school.
16. In recognition of the importance of the use of appropriate student assessment practices in keeping with the inquiry-based philosophy and in response to the desire from parents to have more test information in regard to basic skill development, it is recommended that teachers address the issue of testing and standards and establish a common philosophy and processes in regard to the assessment of student learning based on best practices and research.

E. Establishing an Inquiry-based Approach to Learning

17. In recognition of the feedback received from the staff members it is recommended that the Galileo Network continue to make enhancements to Intelligence Online.
18. In recognition of the value of learning from the experience of the partnership between the Galileo Network and Andrew Sibbald School in implementing the Inquiry-based approach to learning, it is recommended that careful consideration be given to information presented in this report and that in particular, provision be made to have a contract in place which clearly outlines expectations. Initially teachers who express an interest in piloting the process should be involved and a lead team of teachers should be established in order to provide support and assistance in addition to what is provided by the Galileo Network.

IX. Some Observations from the Author of the Report

As an educator with 35 years experience in teaching and administration at the school and school system levels including 21 years as a superintendent of schools, I have had the opportunity to develop an appreciation for learning and teaching from various perspectives. I was very impressed with what I observed and learned through the study of the impact of the Inquiry-based Learning Initiative on learning and teaching in Andrew Sibbald School. I believe that the Galileo Network team, and the Andrew Sibbald School staff, students and parents have come together as a learning community and have brought about a remarkable transformation in learning and teaching. In writing this report, it was my goal to describe through the information gathered the voice or perspective of those who have been involved and impacted by this Initiative. I offer as well some personal observations.

I enjoyed having the opportunity to spend several days in Andrew Sibbald Elementary School interviewing parents, teachers and students, visiting classrooms and developing a feeling for the school. I found the students to be friendly and outgoing. They seemed to be enjoying themselves in their learning activities and in their informal interactions during the recess and noon hour breaks. I have the impression the students enjoy being in Andrew Sibbald School and realize they have become involved in a unique approach to learning and teaching.

There are many examples that came to my attention of students connecting their learning to real-life situations. One example is the involvement of a group of students in preparing and presenting an announcement to the entire school about a duck which had decided to make its nest in the shrubs along the walkway entrance to the school. The students had obviously done some research in preparing background information which supported the request to avoid going near the nest and frightening the duck. There are many other examples to be found in the descriptions of the student learning activities which demonstrate the impact of students taking on a leadership roles in addressing societal issues and connecting their learning experiences to the real world. Some examples include students raising funds to send soccer balls to the African country of Arusha, student involvement in investigating the societal and ecological issues associated with the wetlands adjacent to Spruce Meadows, student involvement in learning about local government through the City Hall school experience, and initiatives to help the homeless in downtown Calgary as an extension of a study of heroes.

I enjoyed having an opportunity to meet with a number of parents who were in the school for parent teacher interviews. The parents were very knowledgeable and enthusiastic in describing the involvement of their children in inquiry-based learning. Based on the very high participation rate in parent teacher interviews and comments of the parents I interviewed, parents clearly value very highly the educational opportunities being provided their children and are most appreciative of the hard work and dedication of the teachers. Parental commitment to providing the best possible educational experiences for their children is reflected as well in their involvement in organizing an after-school mentoring program, spending a significant amount of time volunteering in the school, participating in field trips, and attending special activities as well as their enthusiastic response to the proposal to become involved in the Galileo/Inquiry-based Learning initiative.

Through the interviews, the parents without exception expressed the belief that inquiry-based learning had positively impacted the quality of the educational experiences of their children. Parents described how through their involvement as volunteers in the school and on field trips and through their interactions with their children in family activities they see their children as being more motivated and engaged as learners. Some parents described how their children had caused them to reflect on their own actions such as the negative impact on the environment of washing their car in the driveway.

I believe the strong parental support of the Initiative and the active involvement of parents in school activities and in meaningful interactions with their children contributed significantly to its success. There is tremendous potential in continuing to provide ongoing opportunities for parents to develop a good working knowledge of inquiry-based learning and in encouraging them to reinforce it through their interactions with their children. Parents can also significantly support the school through participation as

volunteers and in addressing some of the needs which were identified in the study. For example, parents could be of great assistance to teachers in identifying web sites and resources for student projects. As well, with appropriate training they would have a great deal to offer as volunteers, increasing the adult to student ratio in the classroom learning activities.

I enjoyed spending some time in the classrooms and having opportunities to see examples of project work and the integrated learning activities in which students were involved. For example, I observed a group of grade four students who were enthusiastically involved in researching and designing hybrid vehicles. Although I had only a short period of time to invite feedback from the grade four, five and six students through group interviews, I was overwhelmed with the students' knowledgeable, enthusiastic responses relating to their involvement in inquiry-based learning.

In reviewing the papers written by the grade six students, I found that close to 90% of the students indicated that they appreciate opportunities to work independently as well as in groups as team members in integrated project-oriented learning experiences. The students had been asked to reflect on the pros and cons of the inquiry approach to learning. They provided some interesting insights which should be carefully considered. Overall, students were most appreciative of opportunities to be involved in inquiry-based learning. There were some students who observed that while it worked well for them it might not be the best approach for others. Some indicated that they were frustrated with the integrated approach to learning and that they longed for a return to the use of worksheets and textbooks and specifically scheduled time slots for each course. These concerns expressed by students need to be taken seriously. I believe that every student has a story to tell and every effort needs to be made to address the unique needs and to build on the special talents and abilities of each student. To some extent concerns can be addressed through sharing information with students in regard to this new approach to learning, and by providing training sessions in time management, organizational skills and the ability to work effectively as team members in problem-solving activities. It may be necessary to make provision for more time to be spent with individuals who have concerns and to place a greater emphasis on ensuring that they have the basic academic skills (in mathematics and language arts in particular) to benefit from the opportunities for a more holistic approach to learning. The student feedback certainly highlights the importance of maintaining ongoing dialogue and making provision for the differentiation of instruction to ensure that the needs of all students are being met.

I was impressed with the dedication and commitment of the teachers. They are working very hard and they believe that the enthusiastic involvement of the students makes it all worthwhile. Teachers describe how they have been involved in a challenging learning experience. They recognize that they like the students are at different points along their journey as learners. It certainly has not been easy. They have committed a great deal of extra time in responding to emerging learning opportunities, identifying appropriate resources, planning meaningful learning activities and ensuring that the provincial curricular requirements in each subject area are being adequately and appropriately addressed. On the surface inquiry-based learning may appear to be a more unstructured situation in which students explore areas of interest through project work. However, the teachers have found that a great deal of structure through the development of guidelines and assessment rubrics is required for the learning experiences to be productive and successful. Understandably, teachers identified the desire to have more time for planning, preparation and collaboration with colleagues.

Teachers recognize with appreciation, the guidance and ongoing support which they received from Dr. Friesen and the Galileo Team members. It has also been very helpful to have the Lead Team providing leadership mentorship and encouragement. The incredibly enthusiastic student response has been the greatest motivator for the teachers. They take great satisfaction in what their students have accomplished as learners. There are other indicators of success such as the outstanding Provincial Achievement Test results in which the Andrew Sibbald students have exceeded all expectations. Ms. Whitworth describes positive comments made by her fellow administrators and their interest in learning more about inquiry-based learning because the Andrew Sibbald School students have done so well on the Provincial Achievement Tests. Although the Provincial Achievement Test results reflect that the students have done very well in the development of skills in the key curricular areas, the greatest source of satisfaction for the teachers is the enthusiastic response of their students as engaged learners.

I would identify the assessment of student learning as one of the major challenges which will require further attention from the members of the teaching staff. The parents have expressed a desire to have more information regarding the development of basic academic skills in addition to what is available through the Provincial Achievement Test results. In keeping with the nature of the learning activities, teachers have begun to develop rubrics and performance assessment strategies. There may be merit in using the Classroom Assessment Materials Project (CAMP) resources which have been designed to determine the level of achievement for each grade level. I would also suggest that teachers work together to share ideas in regard to the assessment of student learning, develop a common language and outline guiding principles for student assessment for the school.

I believe that the leadership support and resources provided through the Galileo Network has been key to the success of the Inquiry-based Learning Initiative. The Galileo Network provided the framework and philosophical base for inquiry-based learning. The Galileo team members demonstrated how information can be accessed using computer technology to address the inquiry questions and how technology can be used effectively to present ideas and information. However, the emphasis is not on technology. The Galileo team promoted a new way of thinking about learning and teaching. Dr. Friesen's involvement in working directly with teams of teachers and the Lead Team in providing ideas, resources, support and encouragement on an ongoing basis throughout the three-year term was of fundamental importance to the success of the Initiative. By keeping a focus on the vision and the philosophical framework of inquiry-based learning, Ms. Whitworth demonstrated the significance of the leader's role in introducing innovations and providing the conditions for sustainable change. When she came to the staff and parents with a proposal to enter into partnership with the Galileo Network to promote inquiry-based learning on a school-wide basis, she probably did not anticipate the complexity of the undertaking. However through her skillful leadership and ongoing support a great deal has been accomplished over the three-year period.

In reflecting on the feedback from parents, students, staff, the Lead Team and the Galileo team I would conclude that the Initiative has been a tremendous success. I believe that through this Initiative and with the active involvement of parents, students, staff and the Galileo Network, Andrew Sibbald School has demonstrated what can be achieved by working together as a professional learning community. It is my hope that they will continue to build on what has been accomplished as documented in this report and that they find the information presented including the commendations and recommendations helpful as they continue to move forward based on all that has been accomplished. As well, I would hope that this report is used by educators in other settings who wish to explore the tremendous potential of inquiry-based learning as a framework for learning and teaching. The project is not over, the journey continues and I applaud everyone who has been involved in this significant learning experience.

X. Executive Summary

In September 2001, the members of the Andrew Sibbald School Community entered into a partnership with the Galileo Education Network Association to promote an inquiry-based approach to learning and teaching. The Galileo Network was to provide expertise, support and assistance to the Andrew Sibbald School community over a three-year period in implementing strategies and programs to promote the active and meaningful involvement of students in relevant, authentic, inquiry-based learning experiences. In February 2004, as the end of the three-year initiative was approaching, a review of the initiative was undertaken in order to determine what had been accomplished in terms of the original goals of the project as well to identify recommendations for the future. The author entered into an agreement with the Galileo Network to carry out a study of the initiative.

Over a two-month period, information was gathered through discussions with the Galileo Network leaders (Ms. Brenda Gladstone, Dr. Sharon Friesen, and Dr. Patricia Clifford), Andrew Sibbald School principal, Ms. Beverly Whitworth, and members of the Lead Team. Teaching staff members, students and parents were interviewed. In addition to feedback from interviews with class groups from grade four, five and six, written reflections by grade six students on their experiences as learners were reviewed. Other sources of information relating to the Initiative including Provincial Achievement Test results were also utilized in describing the impact of the Initiative on students and teachers as engaged, lifelong learners.

Dr. Sharon Friesen, a Galileo Network Team member worked with teachers individually and with a group of teachers known as the Lead Team. She was described by the teachers and Lead Team members she worked with, as playing a key role in providing resources, asking the right questions to stimulate thinking, offering ideas providing support and encouragement and being an outstanding model and mentor. The Lead Team, formed in the second half of the first year, willingly took on responsibility for overseeing the Initiative and providing support and assistance to their colleagues as models and mentors. It was the goal of the Galileo Team and Ms. Whitworth that through the work with teachers and the Lead Team ultimately all teachers would be actively involved in providing integrated learning experiences in keeping with the inquiry-based approach to learning. The goal of the Galileo Network was that through the development of a common philosophy and understanding and the introduction of effective teaching practices based on inquiry-based learning, and through the ongoing support of the Lead Team, the project at the school level would become self-sustaining..

The principal describes the initiative as empowering students and teachers to move beyond the walls of the classroom to connect learning to what really matters in the world. She observes that in this endeavor each child's unique strengths, abilities and talents must be nurtured and their individual learning needs addressed in order for them to become responsible citizens, self-directed learners, collaborative team players, effective communicators and creative thinkers. The teachers were encouraged to provide authentic learning situations such as a study of the Spruce Meadows wetlands issue that lead students to research the ecological and political ramifications, and the study of the qualities of heroes which resulted in the students being involved in a project to help the homeless in downtown Calgary. This approach to learning is very challenging for teachers because of the evolving nature of the learning experiences as students are encouraged to make connections to real-life situations. The teachers organize field trips and guest presentations to provide background information and they teach students to access information sources using their skills in Information and Communication Technology. Students are encouraged to use a problem-solving approach in addressing the inquiry questions. To ensure that the provincial curricular expectations are being met, teachers provide students with a learning contract outlining learner expectations to guide them in their learning experiences. At the same time, students are given freedom and independence to explore particular areas of interest. They are given opportunities to enhance their learning experiences and the quality of their work through interacting with their peers as members of a learning team. Teachers guide students in the group learning activities by having them work with different group configurations and students with varying backgrounds, academic skills and interests.

Teachers found the new approach to learning and teaching to be very challenging, demanding, and time-consuming. A great deal of time was spent in preparation, organization, and setting up meaningful group

learning activities which appropriately address the Alberta Learning Program of Studies. The new approach to teaching also necessitated new strategies for student performance assessment such as the use of rubrics. In reflecting on the impact of the Initiative, teachers describe the enthusiastic response of the students and marvel at all that they are accomplishing as learners. They also comment that students have grown in their fundamental academic skills, enhanced their organizational skills, developed teamwork skills, learned how to use technology effectively, increased their level of motivation, become more engaged as learners, increased in their problem-solving ability, improved in their innovativeness and developed new skills in communicating learning to various audiences. Representative of the commitment of the teachers to inquiry-based learning is the observation, "when I see the response of the students I realize that it is all worthwhile and I would never go back".

The students enthusiastically described how they have become part of their own learning through deciding on their own projects and learning activities related to a particular topic. Students expressed appreciation for the teachers who provided them with opportunities for a different way to learn. One student observed, "you know you are learning when you can explain to your parents what you have learned and when you can make connections to the real world". On the other hand about ten percent of the students describe frustration with this new approach to learning and indicate a desire to move away from the integrated approach to learning to having subjects at a specific time and using worksheets and textbooks as the primary mode of instruction. These students describe how they have difficulty in being organized, working independently and thinking globally. Although they are a small percentage of the students overall, it is important that their needs and concerns are addressed by the teachers and that every effort is made to ensure that all learners experience success. As well, many grade six students expressed concern in regard to the transition they would be making to junior high school. They anticipate that they will not be able to learn in the same way in junior high school.

The parents have been outstanding in support of the work of the school. When the principal came to them with a proposal to promote inquiry-based learning in Andrew Sibbald School, the parents enthusiastically embraced the idea and through the school council provided funding for the three-year partnership with the Galileo Network. They are actively involved in volunteering and report increased involvement in their children's learning at home and in family activities. Parents express appreciation for the hard work of the teachers, opportunities to be involved as volunteers and the very positive impact they have seen on their children as a result of their involvement in projects and learning activities which are meaningful and connected to the real world.

One significant indicator of the development of academic skills and achievement of the expectations of the provincial curriculum is the outstanding achievement of students on the Provincial Achievement Tests. Over the three-year period there has been a steady increase in the percentage of students achieving the acceptable standard and the standard of excellence in grade three language arts and mathematics and grade six language arts, mathematics, science and social studies. In June 2003, 100% of the grade 3 students and 97.6% of the grade six students achieved the acceptable standard in language arts and mathematics significantly exceeding the provincial goal of 85%. The province establishes a target of 15% of students achieving the standard of excellence. The percentage of Andrew Sibbald students achieving the standard of excellence is an impressive 46.0% in grade three language arts, 55.6% in grade 3 mathematics, 28.9% in grade six language arts and 39.8% in grade 6 mathematics. In reviewing the information gathered through the study the following commendations and recommendations were identified:

Commendations

Commendations are extended to:

1. The Galileo Network for providing through Dr. Sharon Friesen and other members of the Galileo team a philosophical base and foundation for inquiry-based learning and the resources, assistance and ongoing support that was required for the successful implementation of the Initiative.
2. Ms. Whitworth for her leadership in articulating a vision and facilitating the involvement of the Andrew Sibbald School community in a partnership with the Galileo Foundation to promote inquiry-based learning.
3. The Andrew Sibbald School teaching staff members for their willingness to explore new approaches to learning and teaching and their outstanding dedication in significantly changing teaching practices and the organization of integrated learning experiences in keeping with the philosophy of inquiry-based learning.
4. Teaching staff members for developing new approaches to student assessment in keeping with the inquiry-based philosophy and making connections with the Calgary Board of Education Quality Learning document.
5. Dr. Sharon Friesen and Galileo Network Team members and members of the teaching staff for their innovativeness and creativity in developing meaningful learning experiences for the students and providing opportunities for students to explore their areas of interest and make connections between their learning and the real world.
6. The school staff for their efforts in organizing special celebrations of student learning and providing opportunities for students to demonstrate their learning and celebrate their accomplishments.
7. The Andrew Sibbald School students for their enthusiastic involvement in exploring the new approaches to learning associated with inquiry-based learning.
8. The parents of Andrew Sibbald School for their strong support of the school administration and teaching staff in their efforts to promote a new approach to learning and teaching through an inquiry-based learning philosophy.
9. The members of the Lead Team and individuals involved in mentoring and supporting members of the teaching staff in the implementation of the inquiry-based philosophy of learning throughout the school
10. The school principal, Ms. Whitworth for her ongoing support and leadership in the implementation of inquiry-based learning and her efforts to make time available for professional development, planning, preparation, sharing, supporting and celebrating.

Recommendations

A. Building on the Foundation of Success

1. In recognition of the very positive support for the Inquiry-Based Learning Initiative, expressed by teachers students and parents and the academic achievements and accomplishments of the students exhibited over the three-year period, it is recommended that Andrew Sibbald School build on the foundation of success which has been established and highlighted in this report and continue to be involved in promoting inquiry-based learning.
2. In recognition of the significant impact of the Galileo Network in providing the philosophical framework, resources, ideas and ongoing support and assistance, it is recommended that arrangements be made to continue to access the Galileo Network resources.

B. Ensuring there is a Framework of Shared Meaning and a Common Philosophy

3. In recognition of the importance of having a philosophical base, common language and guiding principles in place to guide practice it is recommended that the staff members develop resources and information sharing processes which would be made available on an ongoing basis to staff, students and parents.

C. Making Provisions for Ongoing Support

4. In recognition of the significant role of the Lead Team in providing leadership, mentorship support and encouragement, it is recommended that provision be made for members of the teaching staff with special interest and expertise to participate on the Lead Team and that specific allocations be made for time for the Lead Teachers to provide leadership in the continued implementation of inquiry-based learning and to provide support and assistance to teachers as mentors.
5. In recognition of the benefits of the external perspective and the support, resources and clearly articulated philosophical foundation developed by the Galileo Network, it is recommended that provision be made to access through the Galileo Network some consulting time as well as opportunities to increase networking and professional dialogue beyond the school.
6. In recognition of the very important role of parents as partners in the education of their children, it is recommended that orientation and training programs in regard to inquiry-based learning be made available to parents to enhance their contributions as volunteers in the school and their ability to promote inquiry-based learning through their interactions with their children.
7. In recognition of the amount of time that is required to effectively plan, prepare and organize appropriate meaningful integrated learning activities, it is recommended that as much team planning and professional collaboration time as appropriate be allocated to teaching staff members.
8. In recognition of the importance of being able to access information through the Internet and to have available Information and Communication Technology to present information and ideas, it is recommended that a priority be placed on increasing the access to computer technology and ensuring that appropriate technical services are available.
9. In recognition of all that has been accomplished, it is recommended that the Andrew Sibbald School staff continue to build on the foundation as a professional learning community which has been established.

D. Reflecting on Teaching Practices

10. In recognition of the challenges associated with the development of integrated learning experiences while appropriately addressing curricular expectations outlined in the Program of Studies, it is recommended that teaching teams work collaboratively in developing rubrics and checklists which can be used to ensure that curricular expectations are being met through project work.
11. In recognition of the feedback of the students describing what they perceive as highlights of their learning experiences related to inquiry-based learning, it is recommended that staff members continue to develop and enhance existing teaching practices which focus on the key areas identified in the report.
12. In recognition of the concerns expressed by students who experience difficulty with the inquiry-based approach to learning, it is recommended that teachers consider the feedback and identify strategies for addressing the concerns and striving to ensure that the needs of all students are being met.
13. In recognition of the concerns expressed by some students, parents and teachers in regard to the development of basic skills in mathematics, it is recommended that teachers review the current practices in regard to the development of basic skills in mathematics.
14. In recognition of the concern that was expressed by some students in regard to making the transition from one learning group or activity to the next, it is recommended that teachers review the procedures that are in place and implement programs reinforcing organizational strategies and practices that contribute to a safe and orderly environment.
15. In recognition of concerns expressed by the students in regard to what they anticipate as a significant change in approach in teaching practices as they move into junior high school, it is recommended that the administration of Andrew Sibbald School meet with the administration of the junior high schools the students will be attending to share information in regard to the inquiry-based approach to learning and making a smooth transition from elementary to junior high school.
16. In recognition of the importance of the use of appropriate student assessment practices in keeping with the inquiry-based philosophy and in response to the desire from parents to have more test information in regard to basic skill development, it is recommended that teachers address the issue of testing and standards and establish a common philosophy and processes in regard to the assessment of student learning based on best practices and research.

E. Establishing an Inquiry-based Approach to Learning

17. In recognition of the feedback received from the staff members it is recommended that the Galileo Network continue to make enhancements to Intelligence Online.
18. In recognition of the value of learning from the experience of the partnership between the Galileo Network and Andrew Sibbald School in implementing the Inquiry-based approach to learning, it is recommended that careful consideration be given to information presented in this report and that in particular, provision be made to have a contract in place which clearly outlines expectations. Initially teachers who express an interest in piloting the process should be involved and a lead team of teachers should be established in order to provide support and assistance in addition to what is provided by the Galileo Network.

A detailed overview of the study is outlined in a report, which is available through Andrew Sibbald School and the Galileo Educational Network Association.

Appendix A
Student Group Interview Questions

1. What causes you to believe that Andrew Sibbald is a very good school?
2. What suggestions would you offer for making it an even better school?
3. How do you learn best?
4. What do teachers do that help you learn?
5. How do you know if you are doing well as a learner?
6. What excites you as a learner and causes you to really want to learn?
7. How has the way that you learn changed through the years?
8. What has helped you to become a better learner?
9. How do you use computers and other forms of technology as a learner?
10. What suggestions do you have for your teachers to help you become an even better learner?

Appendix B

2.1 Recognition of Student Achievement and Success

Andrew Sibbald Elementary School

| Grade/Test | 1998-1999 | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 |
|---------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Grade 3 Language Arts | | | | | |
| % of Student Participation | 95.2 | 96.6 | 96.7 | 100.0 | 98.4 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 97.5 | 95.2 | 98.3 | 100.0 | 100.0 |
| % of Students Achieving Excellence | 12.5 | 35.7 | 47.5 | 35.6 | 46.0 |
| Grade 3 Mathematics | | | | | |
| % of Student Participation | 95.2 | 96.6 | 100.0 | 100.0 | 98.4 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 95.0 | 96.4 | 96.7 | 100.0 | 100.0 |
| % of Students Achieving Excellence | 30.0 | 57.1 | 47.5 | 51.1 | 55.6 |
| Grade 6 Language Arts | | | | | |
| % of Student Participation | 98.7 | 97.4 | 98.8 | 98.8 | 97.6 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 93.2 | 90.5 | 91.4 | 95.0 | 97.6 |
| % of Students Achieving Excellence | 27.0 | 24.3 | 18.5 | 17.5 | 28.9 |
| Grade 6 Mathematics | | | | | |
| % of Student Participation | 97.3 | 100.0 | 98.8 | 98.8 | 97.6 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 90.4 | 89.5 | 97.5 | 90.0 | 98.8 |
| % of Students Achieving Excellence | 26.0 | 15.8 | 28.4 | 15.0 | 39.8 |
| Grade 6 Science | | | | | |
| % of Student Participation | 98.7 | 98.7 | 98.8 | 98.8 | 97.6 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 90.5 | 93.3 | 98.8 | 91.3 | 100.0 |
| % of Students Achieving Excellence | 35.1 | 34.7 | 43.2 | 25.0 | 41.0 |
| Grade 6 Social Studies | | | | | |
| % of Student Participation | 98.7 | 100.0 | 98.8 | 97.5 | 97.6 |
| Total Test: | | | | | |
| % of Students Achieving Acceptable Standard | 91.9 | 92.1 | 95.1 | 93.7 | 97.6 |
| % of Students Achieving Excellence | 24.3 | 17.1 | 21.0 | 10.1 | 42.2 |

Andrew Sibbald Elementary Targets:

1998 – 1999 and 1999 – 2000: No targets available

2000 – 2001: 1) All Grade 3 and 6 students will score in the acceptable range on the provincial Language Arts Achievement Test

2) Strive toward a 5% increase of grade 3 and 6 students scoring at the Standard of Excellence on the provincial Language Arts achievement test.

2001 – 2002: 1) All Grade 3 and 6 students will score at the acceptable Standard in Math and Grade 6 in Science.

2) A greater percentage of students will score at the Standard of Excellence on the PAT's

2002 – 2003: 1) We will continue to improve Grade 3 and 6 PAT results in all core subject areas

Appendix C.

Parent Interview Questions-March 25, 2004

1. What causes you to believe that Andrew Sibbald is a very good school?
2. What suggestions would you offer for making it an even better school?
3. What do you know about the Galileo Initiative (inquiry based learning) in Andrew Sibbald School?
4. In reflecting on your child's learning experiences and your observations in regard to the Galileo Initiative how would you describe what has taken place?
5. What would you identify as some of the key highlights of the Galileo initiative?
6. What would you identify as challenges, areas of concern, or factors, which had a negative impact on the Galileo initiative?
7. What has contributed to the success of the Galileo initiative?
8. Specifically what evidence would you offer in support of your observations of the impact of the Galileo initiative on your child and/or other students you have observed in regard to the following:
 - (1) Fundamental academic skills
 - (2) Personal organizational and self- management skills
 - (3) Teamwork skills
 - (4) The appropriate use of technology to achieve specific outcomes
 - (5) Motivation and experiencing success as learners
 - (6) Engagement as learners
 - (7) Ability to problem solve, pose problems, make decisions and inquire
 - (8) Depth and breadth of learning achieved and demonstrated through inquiry
 - (9) Innovation skills
 - (10) Ability to communicate what they are learning to a variety of audiences

9. How have you become involved as a parent in the learning experiences of your child, through the Galileo Initiative?
10. Would you like to see Andrew Sibbald School continue to be involved in the Galileo Initiative?
11. What suggestions for enhancement to what is currently taking place would you offer?
12. Are there any other comments that you would like to offer?

Appendix D

Interview Questions (school staff and Galileo team members)

1. What is the Andrew Sibbald Elementary School Galileo Initiative?
2. How did it all begin?
3. What were your expectations in regard to the Galileo Initiative?
4. In reflecting on your personal experiences and observations in regard to the Galileo Initiative, how would you describe what has taken place?
5. What would you identify as some of the key highlights of the Galileo Initiative?
6. What would you identify as challenges, areas of concern or factors, which had a negative impact on the Galileo Initiative?
7. What has contributed to the success of the Galileo Initiative?
8. Specifically what evidence would you offer in support of your observations of the impact of the Galileo Initiative on students in regard to the following:
 - (1) Fundamental academic skills
 - (2) Personal organizational and self-management skills
 - (3) Teamwork skills
 - (4) The appropriate use of technology to achieve specific outcomes
 - (5) Motivation and experiencing success as learners
 - (6) Engagement as learners
 - (7) Ability to problem solve, pose problems, make decisions and inquiry
 - (8) Depth and breadth of learning achieved and demonstrated through Inquiry
 - (9) Innovation skills
 - (10) Ability to communicate what they are learning to a variety of audiences

9. Using the indicators (strongly disagree, disagree, uncertain, agree, strongly agree) please respond to the following:

- (1) Everyone understands inquiry work
- (2) Everyone does inquiry work in the classroom
- (3) Everyone supports each other in the inquiry work they do
- (4) Every student and teacher at Andrew Sibbald School is deeply engaged in meaningful authentic learning
- (5) The students are deeply engaged in authentic investigations
- (6) Teachers and students are critical thinkers
- (7) Students do work that contributes to society
- (8) Students are able to discern their own learning
- (9) Parents are engaged with their children's inquiries
- (10) Parents are supportive and understanding of the Galileo Initiative
- (11) Assessment is used to support continuous learning and development

10. Specifically what evidence would you offer in support of your observations of the impact of the Galileo initiative in the following areas?

- (1) The impact on teachers as learners
- (2) Changes in teaching practices
- (3) The organization of student learning activities
- (4) The assessment of student learning
- (5) Teacher satisfaction and sense of efficacy

11. If you were to do it all again, what suggestions for improvement would you offer?

12. As a school staff could you now continue this initiative on your own?

13. Are there any other comments that you would like to offer?