

Let's Talk Science - *Wings of Discovery*[®]
Summary of Year One and Year Two Evaluations, August 2005
Queen's University Assessment & Evaluation Group

Context

Let's Talk Science (LTS) is a national charitable organization that exists to improve Science literacy through leadership, innovative educational programs, research and advocacy. Since its inception, the organization has developed a broad range of programs and services for youth and educators, reaching well over 1.44 million Canadians.

LTS identified an opportunity to develop an early learning program that uses science inquiry as the learning platform, and created the *Wings of Discovery*[®] - Early Years program. It is an experiential learning program for young children, infant to 6 years, that inspires discovery and learning through hands-on, minds-on experiences. The program uses science inquiry as a learning platform to encourage children to discover their world and build: self-confidence and pride of accomplishment; positive attitudes; social skills; language and math skills and knowledge.

The complete *Wings of Discovery*[®] Early Years program includes a curriculum, user guide, and 8 comprehensive projects with parent resources. The curriculum provides the foundation and philosophical orientation for the program (available for free download at www.letstalkscience.ca). This framework can be applied to any early childhood education (ECE) or Kindergarten setting. Emphasis is placed on creating learning opportunities that are geared to the developmental needs of the different age groups: infant, toddler, preschool and Kindergarten.

Purpose of the Evaluation

During 2003/04 LTS, in cooperation with Queen's University, Faculty of Education, Assessment and Evaluation Group (AEG), initiated the first stage of a multiphase program evaluation. The first year evaluation had four purposes: (a) to provide developmental information during stages of program design that included early childhood educators at our partner site, The Butterfly Learning Centre (BLC), (b) to systematically gather empirical evidence about the infant, toddler, preschool and kindergarten programs in action, (c) to collect preliminary evidence of the program's products and outcomes and (d) to explore the factors that would facilitate the transfer of *Wings of Discovery*[®] to other settings.

Generating a deep understanding of program dynamics is a fundamental precursor to the assessment of quality in learning outcomes in early childhood education (Lee & Walsh, 2004). Therefore, the first year evaluation focused on learning about the veracity of the program (i.e., is the program implemented as intended by the developers?).

The second year of the evaluation in 2004/05 focused on extending this work in order to understand, in greater depth, how *Wings of Discovery*[®] works; specifically, how it influences the behaviours and thinking of children, early childhood educators and parents. As well, the team began to focus on collecting baseline data that could lead to assessing the impact of the program on children's growth and achievement over time. Finally, a site that recently implemented *Wings of Discovery*[®] was studied to determine the conditions under which *Wings of Discovery*[®] might be successfully adopted and adapted in other early years settings with minimal support from program developers.

Method

One distinctive feature of program development has been the close interaction between the LTS *Wings of Discovery*[®] developers and staff at the Butterfly Learning Centre. As a recently built early childhood setting, the BLC has provided an optimal environment for ongoing program testing and modification.

Working closely with educators, parents and program developers, in the first year the evaluation team used 25 classroom observations over 7 months, 2 parent focus groups and parent-described home observations of children's behaviour to gather multiple forms of evidence of how the program is perceived and how it operates at the BLC.

In the second year of the evaluation at BLC, the team used classroom observations, slide show discussions with children, educator debriefing, parent focus groups and teacher-developed "photo-folios" to gather evidence. Slide shows and "photo-folios" were created with the help of a digital camera and computer. A presentation (e.g. PowerPoint) was created to provide evidence of the various ways that children are able to demonstrate both how they are learning and what they are learning in various units.

Overview of Year One Findings

Educators at the BLC are quite familiar with *Wings of Discovery*[®] and work hard as a team to implement the program. They value highly their concept of the program and take pride in offering children a rich learning environment. Several educators also demonstrated their growing ability to:

- Model what it means to be a learner
- Support discovery
- Adapt the program to meet the needs and interests of children

Interestingly, however, the educators saw their primary role as creating a caring world for the children. This role was described as being distinct from fostering cognitive growth of the children, academic expectations and program delivery. Participating educators felt that the ongoing support offered by *Wings of Discovery*[®] developers was critical to their success.

Children at the BLC consistently exhibited the ability to; focus & pay attention, follow directions, share with others, play safely & cooperatively, listen & observe, grow confident & independent, build language skills, and build a general knowledge base. At the same time, the children:

- Showed an enthusiasm for science
- Responded thoughtfully to questions
- Acquired science vocabulary & ideas

Parents confirmed these findings by providing examples of how their children's experiences at the BLC were carrying over into the home environment. For example, a preschool child began talking to his parents about submarines as a form of transportation. One of the toddlers related to her parents that there weren't any bugs yet because it was too cold. These occurred after the children had been exposed to elements of *Wings of Discovery*[®]. Focus groups held with parents confirmed that the quality of the *Wings of Discovery*[®] program is a real benefit to the BLC. The quality of the physical environment, however, was also a key feature noted by the parents.

With respect to **transferability**, *Wings of Discovery*[®] meets an increasing need identified by a number of early childhood centres – the need to support cognitive growth and the development of science literacy within the early education system. This finding is consistent with the 2004 OECD report on the status of child care in Canada. Ensuring successful transfer to other settings, however, will require that the early childhood educators have appropriate training and a supportive community of practice. This will ensure that the distinctive features of *Wings of Discovery*[®] and the integrity of the program are maintained.

Overview of Year Two Findings

Educators at the BLC recognized the importance of focusing on children's cognitive development during curriculum implementation. Debriefing interviews with teachers indicated that they reflect

effectively on their instructional decisions and value the role of adaptation, in addition to adoption of the curriculum. Continued observations from Year 1 research revealed that educators are:

- asking different types of questions
- asking further questions of children
- modelling how to find answers
- prioritizing children's responses over the curriculum guideline

Children at the BLC continued to exhibit skill development as well as a strong interest in the world around them. Based on interviews and observations, it was noted that the children at BLC request more science time and actively connect science concepts to their own experiences. Researchers indicated that children communicate science concepts to one another, make connections between prior science activities, explain events to one another, make connections to home experiences and use science vocabulary to accurately express ideas. Use of photo-folios for revisiting science lessons two weeks after the fact indicated depth and quality of learning. Children recalled vocabulary and materials and recognized science concepts.

Educators using the *Wings of Discovery*[®] program indicated that children in the program exhibit school readiness behaviours.

Parents of children at the BLC provided further examples of the knowledge and skill transference from the *Wings of Discovery*[®] program to the home environment. In particular, parents valued the cognitive and social skills development related to the program and the ability to question. Parents expressed a realization of how to support the program at home and noted the following areas of child development based on involvement in the *Wings of Discovery*[®] program: connections; curiosity; language and social skills.

The **transferability** of the *Wings of Discovery*[®] program is being examined through introduction of the program to Bayridge Drive Childcare Centre in Kingston, ON. Research began in 2005 and results are still being evaluated. Early results indicated a positive implementation experience for parents, children and teachers. Research results should provide information on appropriate teacher training and development of a supportive community of practice.

Next Steps

Given the maturity of the program and the research base on implementation and transferability which has been done to date, we believe that the *Wings of Discovery*[®] program is ready for a controlled, longitudinal program evaluation. Further research could allow for a better understanding of the transferability of the *Wings of Discovery*[®] program, with special focus on supporting the professional learning of the early childhood educator since they are critical to the successful implementation of any program or curriculum. Other areas of research into *Wings of Discovery*[®] include further examination of the program's impact on school 'readiness' factors and the impact of the complementary *Wings of Discovery*[®] Kindergarten program on student attitudes and achievement. Research instruments have been developed and baseline data has been collected that could lead to assessing the impact of the program on children's growth and achievement over time.

The Assessment and Evaluation Group (AEG), Faculty of Education, Queen's University

AEG is a group of faculty members with expertise in assessment, classroom and evaluation practices. Situated in the Faculty of Education at Queen's University, AEG is committed to the process of evaluative inquiry, whereby the practice of evaluation is encouraged to continue long after the formal evaluation has been completed. This approach ensures that throughout the evaluation participants have opportunities to learn the logic and discipline of evaluation reasoning. Moreover, a participatory process ensures that the evaluation will be informative, relevant and timely. AEG also believes that developing expertise is an important part of the consistent progress of program evaluation as a field of professional practice. Therefore, AEG is committed to creating opportunities to train students in the practice of evaluation.