Thinking Through the Inquiry Cycle for Young Learners

By Dr Carol A. Gordon

Any subject can be taught effectively in some intellectually honest way to any child at any stage of development – Jerome Bruner, 1961.

Is Jerome Bruner overstating his case? Are young children capable of learning any subject at any stage of their development? Really? Bruner explains:

> *To instruct someone . . . is not a matter of getting him to commit results to mind. Rather, it is to teach him to participate in the process that makes possible the establishment of knowledge. We teach a subject not to produce little living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to take part in the process of knowledge-getting. Knowing is a process not a product* (Bruner, 1966, p. 72).

It is the process of learning as learning occurs in the world outside of school that suggests an authentic mode of teaching, i.e., to help young learners understand history as an historian does. S/he needs the structure of historical understanding which is molded from the questions: What really happened in the past? How can we find out? Can we trust our sources? The scientist, on the other hand, asks: How does this work? How can we find out? Can we trust our experiment? School subjects taught solely through the lens of curriculum may lose sight of these basic questions that drive the pursuit of new knowledge in the disciplines. Bruner suggests that structure taken from the first principles of any discipline can support the inquiry-based learning of young people. Bruner's bold statement about early learning also takes into account that children must be ready and motivated to learn, driven by a healthy curiosity about the world around them. Finally, Bruner sees intuitive and analytical thinking as an essential part of the process of learning. It seems that learning through inquiry provides the structure and process that Bruner sees as essential for children to play an active role in learning through discovery and problem-solving.

Inquiry for researchers of all ages is a challenge, and it is a particular challenge for educators to provide the structure that helps young people to pose meaningful questions, navigate complex information landscapes, and create knowledge from the found information. Two teacher-librarians, Josianne Fitsgerald and Beth Gourley, stepped up to the challenge at the International School of Tianjin (IST), China, to help their students understand how they can be successful in interacting with information in order to learn from it. Using a whole-school approach, elementary school teachers were involved in devising an inquiry model that fits the needs of the school. A subcommittee consisting of the Primary Years Program (PYP) coordinator and a representative from each of the lower and upper elementary schools worked with the teacher-librarians to craft the model shown in Figure 1.
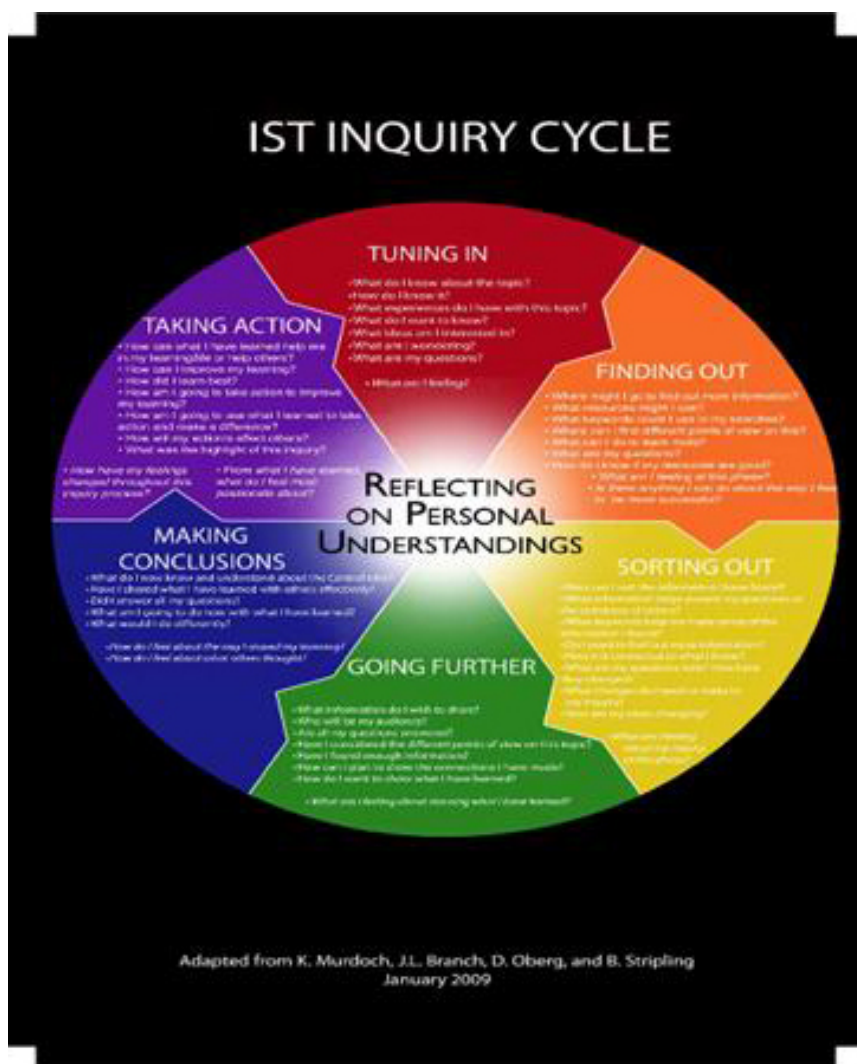
Figure 1: The Inquiry Cycle
Adapted from K. Murdoch, J.L. Branch & D. Oberg, and B. Stripling.

Gourley explains the process that institutionalised the Inquiry Cycle at the International School of Tianjing:

> *Consistent with the needs and goals of the library, the school, and the community, the information literacy program is under continuous modification and development. With full administration support, teacher workshops, and time for collaboration, our elementary team is devising an inquiry model that fits our school. Last year [2007] I headed a group that explored inquiry and information literacy models and presented them to the staff. The elementary staff agreed on a model, which included a combination of ideas from Barbara Stripling (2003), Jennifer Branch and Dianne Oberg (2005), and Kath Murdoch (2005). The language from Murdoch, the spiral of making personal meaning and understanding from Stripling, and the guiding questions from Branch and Oberg aligned with what our staff was already doing or attempting to do. This inquiry model is posted on all elementary classroom walls and is being practiced in each classroom. Our efforts have been primarily concentrated in the elementary school, with plans for focusing on the secondary school (grades 6-10) during the 2008-2009 school year (Gourley, 2008).*

The Inquiry Cycle uses the Information Search Process (ISP), developed by Kullthau (1986), as a foundation for understanding the cognitive, affective, and behavioural dimensions of information

seeking. Like the ISP, the Inquiry Cycle focuses on the personal understandings of individual students as they progress through stages of information seeking and handling. An explanation of the development of the Inquiry Cycle is provided in a PowerPoint presentation that can be viewed online (Gourley, n.d., http://www.slideshare.net/beahgo/inquiry-cycle-journey-12613545.)

The Primary School Experience

While the Information Search Process is used extensively and effectively with older students from upper elementary to middle and high school years, it is not generally applied to inquiry in the lower grades. In schools that use the Primary Years Program (PYP), a learning environment based on inquiry sets the stage for using the Inquiry Cycle. PYP was developed for students three through twelve years of age and ". . . focuses on the development of the whole child as inquirer, both in the classroom and in the world outside" (International Baccalaureate Organisation, 2005-2012, http://www.ibo.org/pyp/). The PYP curriculum revolves around six transdisciplinary themes:

Who we are;
Where we are in place and time;
How we express ourselves;
How the world works;
How we organise ourselves, and
Sharing the planet.

This transdisciplinary framework goes beyond learning within subject areas to learning in the context of global disciplinary themes which guide in-depth inquiry. The teachers identify important ideas that drive sustained investigations in which students take an active role. The assessed curriculum

. . . provides opportunities for students to reflect on what they know, understand, and can do. The teacher's feedback to students provides the guidance, the tools and the incentive for them to become more competent, more skillful and better at understanding how to learn (International Baccalaureate Organisation, 2005-2012, http://www.ibo.org/pyp/).

The Inquiry Cycle is an instructional tool that structures student reflection and the feedback provided by teachers and teacher-librarians so that students can successfully move through inquiry as a process.

The parts of the Inquiry Cycle fit together like puzzle pieces, as shown in Fig. 1, and are described below, along with the key questions that prompt students to reflect on their learning.

Tuning In

Teachers 'tune in' to what the students know and this is where students activate their prior knowledge. This is the time for pre-assessment activities that will connect students' existing schemas about the topic to new information they encounter. Some examples of activities for the tuning in stage are concept maps, brainstorming charts, and gallery walks where students view and respond to artifacts.

The following questions guide the design of activities that will help students identify their prior knowledge:

> What do I know about the topic?
> How do I know it?
> What experiences do I have with this topic?
> What do I want to know?
> What ideas am I interested in?
> What are my questions?
> What am I feeling?

Finding Out

Students formulate questions and wonder about their topics. Teachers guide students to asking questions to start extending the background knowledge they already have. They lead students to building on what they already know. This is where 'front-loading' occurs. Some examples of activities for the finding out stage are brainstorming 'wonderings', writing the W section in a KWL chart, carrying out a survey, going to the library to locate books on the topic.

Students are guided by these questions:

> Where might I go to find more information?
> What resources might I use?
> What key words could I use in my searches?
> Where can I find different points of view on this?
> What can I do to learn more?
> What are my questions?
> How do I know whether my resources are good?
> What am I feeling at this phase?
> Is there anything I can do about the way I feel to be more successful?

Sorting Out

Students may already have started finding answers to their initial questions and they sort out those answers in order to make connections and start synthesising new understanding. This is where students ask, 'What do I know now and where do I go next?' Some examples of the sorting out activity are completing the L section on a KWL chart, graphing survey results, categorising notes on Post Its, and deciding on questions that are worthy of further inquiry.

Here are some questions for students to think about:

> How can I sort the information I have found?
> What information helps answer my questions or the questions of others?
> What key words help me make sense of the information I found?
> Do I need to find more information?
> How is the information connected to what I already know?
> What are my questions now?

How have my questions changed?
What changes do I need to make to my inquiry?
How are my ideas changing?
What am I feeling about my inquiry at this phase?

Going Further

Students look to deepen what they are learning. This stage may seem similar to the Finding Out stage but now students have a wider knowledge base generating during the Sorting Out activities. Some examples of this stage are conducting book and online research, reading literature and non-fiction with the view to supporting a viewpoint, continuing inquiries that began in the Sorting Out stage.

Students reflect on the following:

What information do I wish to share?
Who will be my audience?
Are all my questions answered?
Have I considered the different points of view on this topic?
Have I found enough information?
How can I plan to show the connections I have made?
What am I feeling about showing what I have learned?

Making Conclusions

Students synthesise what they've learned in the previous stages and reach conclusions. Some examples of the Making Conclusions stage are writing a report, preparing a presentation or a debate, publishing a story in print or through a performance.

Students think about:

What do I now understand about the central idea?
Have I shared what I have learned with others effectively?
Did I answer all my questions?
What am I going to do now with what I have learned?
What would I do differently?
How do I feel about the way I shared my learning?
How do I feel about what others thought?

Taking Action

Students, armed with new knowledge, seek to apply it. That application may mean new inquiries, in which case, the cycle starts again. When children are engaged in the Primary Years Program, action may be guided by the teacher but is initiated by the students.

Students think about:

How can what I learned help me in my learning/life or help others?
How can I improve my learning?
How did I learn best?
How am I going to take action to improve my learning?
How am I going to use what I learned to take action and make a difference?
How will my actions affect others?
What was the highlight of this inquiry?
How have my feelings changed throughout this inquiry process?
From what I have learned, what do I feel most passionate about?

Progress through the stages of the cycle is recursive: students revert to earlier stages and even jump ahead at times.

A kindergarten teacher reports that in the Early Years program at IST each unit of inquiry is structured around the Inquiry Cycle:

> *We have a large poster (Figure 1) of the Inquiry Cycle on display in our classroom. The colour coding of each stage of the inquiry cycle has been an extremely useful feature, particularly for our younger students, to help them know exactly where they are. Any labels or titles we attach to our work are always colour-coded to correspond with the stage of the cycle we are working on. For example, Tuning In activities will always be labeled in red* (Personal communication, 25 April 2012).

The teacher reported that the children are very familiar with each of the stages of the Inquiry Cycle; the poster is referenced by teachers each time the children begin a new activity:

> *We have also incorporated each stage of the Inquiry Cycle in our planning documents to help us map out the activities and tasks. This has proven to be an excellent way to guide us in our planning* (Personal communication, 25 April 2012).

Figure 2 displays materials assembled for kindergarten children in the Finding Out stage of the cycle as they inquire into their city and its landmarks.
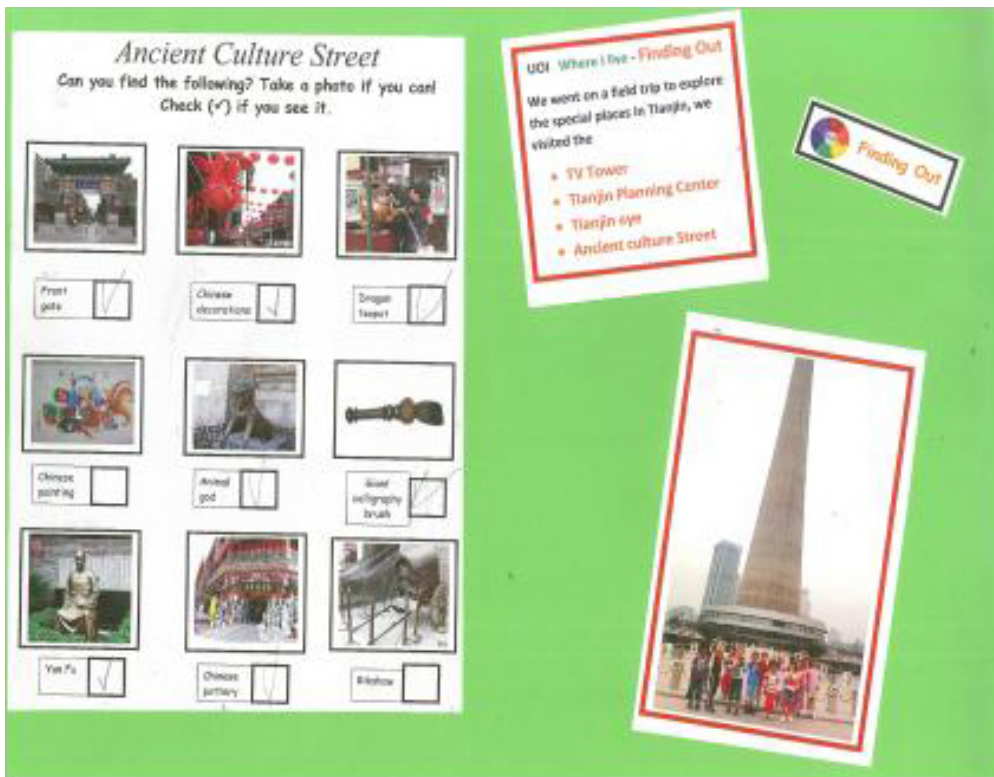
Figure 2: Activating and building knowledge in the Finding Out Stage

A sample of student work (Figure 3) shows how a Grade One student found information about a person in the school community and used the information to write a riddle. This illustrates the emphasis on information interaction, when students begin to apply the information they have found in any stage of the cycle.
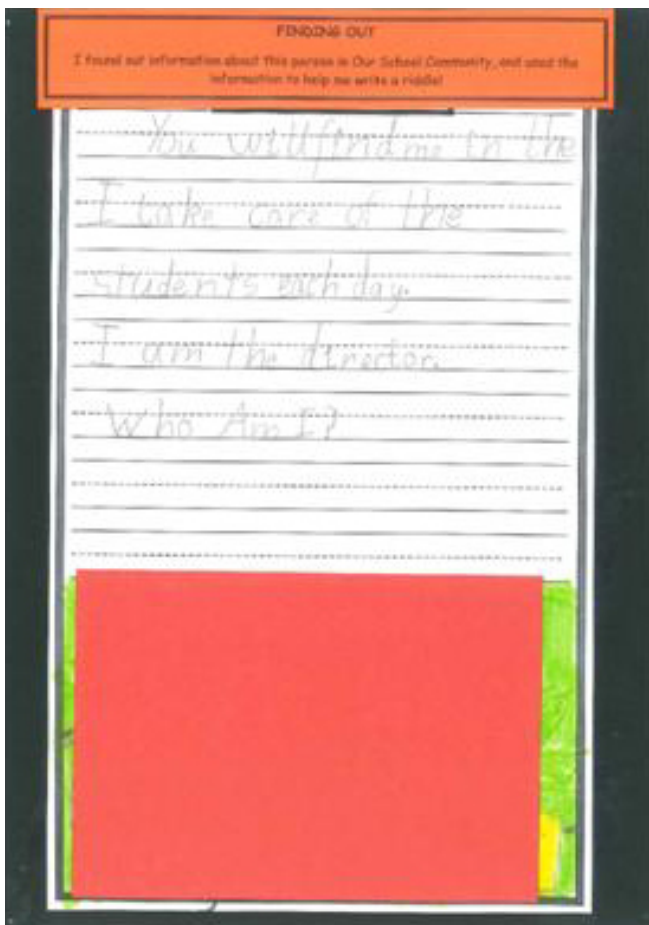
Figure 3: Using the found information to create a riddle in the Finding Out Stage (Grade One)

Figure 4 shows the Reading Corner of books for Kindergarten students that serve for both Tuning In and Finding Out stages. Reading serves to motivate and focus students, as well as to provide information.

Figure 4: Kindergarten Reading Corner

To support reflection that helps students move through inquiry as a process, students create portfolios (Figure 5) that include tagging. They attach labels to the portfolio pages to highlight the relevant Inquiry Cycle stage.

Figure 5: Materials for portfolio preparation (Grade One)

Students also report their progress on blogs and label displays to chart the inquiry process (Personal communication, 25 April 2012).

Figure 6 shows an Inquiry Cycle that has been modified by Grade Five students in their exhibition group to show what they did in each stage. The teacher-librarian notes that it is interesting that they did this on their own, without her knowledge, in preparation for the exhibition.

Figure 6: Grade 5 Students modify the Inquiry Cycle to represent their experiences

This self-directed learning indicates that students have taken ownership of the process.

A Grade Four teacher agrees that the Inquiry Cycle is useful in guiding her planning:

> *I have a six week Unit of Inquiry (UOI) cycleand each week the librarian and the grade level teachers take a piece of the cycle to guide our planning and design for student learning. It's an orderly progression . . . [that] helps scaffold the students' learning* (Personal communication, 25 April 2012).

She notes that the cycle starts slowly and gains momentum as students find their own pace and become more independent. "It leaves room for the students to wonder and take action on their own."

Figure 7 illustrates a display board containing student work organised around the Inquiry Cycle poster for a PYP Exhibition Group. The elementary librarian explains how the exhibition features process as well as product.

The PYP Exhibition is the culminating experience for elementary students in their final year of the PYP. The intent of the Exhibition is to give students the opportunity to synthesise all aspects of the PYP program: concepts, knowledge, skills, attitudes, and action, through an in-depth inquiry into a topic of local and global relevance for the students. While guided by teachers, students are meant to work collaboratively on their inquiries and present their results, as well as the process they followed, in a whole class exhibition at the end of their unit. The Inquiry Cycle is one of the pieces that must be included in each group's display at our school, and students can choose to organise their display board showing the work they did at each stage (Personal communication, 29 April 2012).

Figure 7: A display board for a PYP exhibition group (Grade Five)

Teachers use formative assessments, or activities that generate student work that is used as feedback for the teacher and teacher-librarian who gauge student understanding through the Finding Out, Sorting Out, and Going Further stages. The Making Conclusions and Taking Action stages are usually where the summative assessment takes place, i.e., students receive a grade for their work. However, it is important to note that these are not clear cut steps, but broad descriptions of the process that is occurring. For example, in preparing their final projects that will be graded, students may engage in peer review to help each other revise their work. This formative activity offers every child the chance to revise.

The process described in this Inquiry Cycle can be sustained over several weeks, or it can be swift, particularly for younger children in the Early Childhood Program (ECY) where an inquiry could be a couple of hours or a couple days. For other primary grades the PYP restricts teacher-librarians to six week cycles because six cycles must be completed within a given year of the PYP program. Each of these cycles cover transdisciplinary themes, but within each unit, one could complete the cycle several times or only go through it once.

The elementary teacher-librarian at IST is considering revisiting the cycle in order to promote it to a new generation of teachers because of the usual high turnover rate in international schools. She plans to keep the structure of the Inquiry Cycle, but would like to simplify and streamline the text in each of the puzzle pieces.

The IST elementary and secondary librarians agreed that the value of the IST Inquiry Cycle in their school has been in helping them to consciously move through the stages and help students see the recursive nature of inquiry. The elementary librarian noted that she found it interesting

> . . . to see that when teachers first are introduced to it, the cycle is mostly used for identifying the stage that the class is engaged in. For example, teachers focused on the stage in which they and their students were immersed: 'We are doing a survey, so we are in the Finding Out stage.' However, as they become more familiar with its use, the Inquiry Cycle becomes a tool for teachers and students to plan the next step. 'We have all this information from our survey. What can we do with this information? Let's see what the Inquiry Cycle suggests for the Sorting Out stage.'

The Inquiry Cycle effect on secondary school students

The secondary school librarian at IST viewed the Inquiry Cycle, as it is methodically used in the elementary school, as a framework for her secondary students who build on the inquiry-focused mindset of their elementary school experience as they make the transition to the secondary grades. Inquiry Cycle posters are used in each homeroom class so that students and teachers could continue their explicit reference to the Cycle. Some teachers have incorporated the Inquiry Cycle into student assignments. Even though the initial look of the Inquiry Cycle may change, the same questions and thinking patterns are encouraged. As high school students work on the IB Extended Essays, they are reminded of the stages of inquiry, as illustrated in a wiki maintained to support their research (http://researchstory.wikispaces.com/Research+Models). Before students start their research, they are asked, 'What does the research process mean to you?' The wallwisher (http://wallwisher.com/wall/) works well for students to reply to this question and share their thoughts. Examples can be viewed at http://researchstory.wikispaces.com/Introduction. Students are then given an envelope with words and phrases describing the elements of the research process. These phrases come from *The Elements of Library Research* (George, 2008). Students, placed in groups, are asked to order the items, and then they are instructed to explain what the individual steps entail and justify the sequence of the stages as they determined them. Following the George model, students discuss their progress on a research wiki.

Conclusion

Inquiry as a focus for teaching and learning can improve learning outcomes beyond the expectations that we have for young learners engaged in traditional instruction. The Inquiry Cycle provides explicit structure and teaching practices to support an inquiry mindset for the learner. The Inquiry Cycle gives students and teachers an accessible language to talk about learning as process, and it serves as a scaffolding tool to address intuitive and analytical thinking. Because

the cycle poses questions students can answer, it encourages them to take control of their inquiry. The questions also promote motivation and engagement.

Perhaps Bruner was not overstating his case: Any subject can be taught effectively in some intellectually honest way to any child in any stage of development. However, learners need structure in order to view learning through inquiry as a process that they can control as they become aware of their personal understandings about how they learn, as well as what they learn.

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Dr Carol Gordon *is Associate Professor in the School of Communication and Information at Rutgers, The State University of New Jersey and a Co-Director of the Center for International Scholarship in School Libraries at Rutgers, The State University of New Jersey.*

email: carol.gordon@rutgers.edu