

SCIENCE EDUCATION

Stirring the Spirit of Inquiry

The spirit of inquiry is an important motivating factor in inquiry science. With science as a natural site for inquiry, science teachers have an added advantage in helping our students become spirited inquirers.

ARTICLE HIGHLIGHTS

- **Why use inquiry for science education?**
- **How can teachers become leaders of inquiry?**
- **How can the spirit of inquiry be developed in students?**

AN EFFECTIVE TEACHING TOOL

The late Dr Ruth Wong, NIE's founding director and a chief architect of Singapore's education system, once said:

A teacher who is not an inquirer nor a problem-solver is hardly likely to provide the right intellectual climate for his pupils to ask constructive questions or develop critical ability. (as cited in Ho & Wong, in press)

This aptly describes the core of Singapore's Science Curriculum Framework, which aims to make the "student as an inquirer" and the "teacher the leader of inquiry" (Ministry of Education, 2008, p. 2).

Inquiry-based learning, especially in science, is a potentially powerful tool to get students to learn. Assistant Professor Lee Yew Jin from NIE's Natural Sciences and Science Education Academic Group sees inquiry as "a powerful way of knowing science, knowing about science, and appreciating how scientists work."

"As a teaching tool, inquiry is effective because it encompasses a number of important pedagogies such as

group work/collaboration, challenge, motivation, raising questions, argument and reasoning in science. These significantly contribute to student learning," says Yew Jin.

How do we provide our students with the right intellectual climate for inquiry?

CREATING INQUIRING TEACHERS

Here's a novel outlook on teachers as leaders of inquiry:

If our aim is to help students become lifelong learners by cultivating a spirit of inquiry and the capacity for inquiry, then we must provide the same conditions for teachers. (Sergiovanni, as cited in Hord, 1997)

In order to get students to inquire, we first need to create those same conditions of cultivating a spirit of inquiry and the capacity for inquiry in teachers.

After all, science is all about discovering, exploring, experimenting and learning. For science teachers, it relates directly to teaching through inquiry.

Inquiry is also useful for the professional development of teachers, enabling them to identify student learning difficulties and evaluate teaching methods, for example.

But all this has to be driven by a teacher's curiosity. Without this motivating spirit, applying inquiry as a teaching and learning tool can be very difficult.

DEVELOPING INQUIRERS FOR LIFE

So how do we stir our students' desire for discovery?

The inquiring student should be able to do certain things by himself, such as make observations, define problems, form questions, investigate and state the expectations, carry out experiments, examine the results, reflect on the findings, and produce a solution.

The main problem is that our students aren't motivated to inquire about science; they learn only to pass exams.

Teachers as inquiry leaders will realize that the goal of inquiry science is not that students master the syllabus by themselves - while teachers become facilitators. The objective is to make them lifelong learners.

When we focus on ensuring that students see how the knowledge learnt in school is applicable to their lives, they will naturally become curious and interested to learn more.

But for them to engage in this learning process, the spirit of inquiry must be present to motivate them.

"NOT ALL INQUIRY IS HANDS-ON"

Simply using any hands-on activities is "not... necessarily indicative of an inquiry-based approach" (Rankin, 2000, p. 34).

Hands-on activities based on inquiry occur only when students "have opportunities to raise their own questions, and then plan, design, and conduct investigations to help them answer some of those questions" (p. 34).

To give them this opportunity, we can introduce the element of unpredictability into a pre-planned experiment of the syllabus. Instead of demonstrating the correct procedure, we can change an ingredient, omit a step, or introduce a foreign element that will distort the result. Then let them figure out what went wrong.

This lets them internalize the content in their own terms through the process inquiry. As they have hands-on experience of asking their own questions, students are imbued with the spirit of inquiry, to ask more so as to understand more.

As we provide the conditions of "cultivating a spirit of inquiry and the capacity for inquiry", we find that inquiry not only helps in subject learning but also in lifelong learning - both for ourselves and our students.

And though the use of inquiry in its true spirit may seem daunting, Yew Jin's encouragement is that "practice makes perfect". In the spirit of inquiry, you can start by discovering what interests your students and perfect it through experimentation.

References

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