Reflections on the Aims and Objectives of Teaching Mathematics: A Word to Mathematics Teachers at the Beginning of the Semester

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Every year at the beginning of the semester I ask my group of student-teachers, “Why do we teach mathematics? What do we want to achieve in our mathematics lessons?”

These were the questions which I asked myself in joining the career of a mathematics teacher. In fact they are good questions which all teachers should ask themselves from time to time in their daily practice.

Different teachers may have different answers to these questions. Some possible answers to first question are: “Mathematics is important and useful in our daily life”, “Mathematics is the basics for other subjects such as science and engineering”, “Mathematics help us develop logical thinking” and “Mathematics help us find the right way to solve problems”. Some even says, “I like mathematics, so I would like to help my students appreciate the subject.” Each of these answers suggests a reason for the importance of mathematics or school mathematics in the teachers’ mind. Nevertheless, each answer is only a partial answer to the question.

To look for a comprehensive answer, we inevitably need to address the question why mathematics is essential in our world. For the latter, it is stated in Guide to the Secondary 1 to 5 Curriculum (Education Department, Hong Kong, 1993) the following:

> There is little argument on the position of Mathematics as a part of the school curriculum. Understanding mathematics is an important part of understanding our world. The subject and its applications in science, commerce and technology are important if students are to understand and appreciate the relationships and patterns of both number and space in their daily life and be able to express them

> clearly and concisely. It will also help students to develop their capacity of reasoning so that they will think more logically and independently in making rational decisions. It is recommended therefore that all students should take Mathematics.

In less than 100 words, the writer of the document explains the power of mathematics in terms of many facets: understanding the world around us, a service subject to other disciplines and developing students' capacity of reasoning, thus providing a guarantee for the essential position of mathematics in the school curriculum. Subsumed in these lines are the promises stated in the aims of the mathematics curriculum which answer the second question what we want to achieve in our mathematics lessons (Curriculum Development Committee, Hong Kong, 1999):

> To enable students to cope confidently with the mathematics needed in their future studies, workplaces or daily life in a technological and information-rich society, the curriculum aims at developing students':
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> - the ability to conceptualize, inquire, reason and communicate mathematically, and to use mathematics to formulate and solve problems in daily life as well as in mathematical contexts;
> - the ability to manipulate numbers, symbols and other mathematical objects;
> - the number sense, symbol sense, spatial sense and a sense of measurement as well as the capability in appreciating structures and patterns;
> - a positive attitude towards mathematics and the capability in appreciating the aesthetic nature and cultural aspect of mathematics.

Very few people would query these "tautology statements" till one teacher commented honestly, "My pupils are Band five. They never use mathematics in their daily life. There are no ways to arouse their interest in the subject." Such an outcry speaks the frustration in many teachers' mind. However, it unnecessarily misleads people to follow the argument that the power of

mathematics can be explained by its daily life usage only. If we examine the daily routine of students, it is not difficult to convince that they usually use very little mathematics. If there are neither mathematics lessons nor homework, they will probably not be aware of the existence of mathematics at all. In a "practical" society such as Hong Kong, how to help students appreciate the power and existence of mathematics around us is indeed important.

At this point, I would like to share with readers an experience. One evening after a long day of work I was walking on the podium in the campus preoccupied with the teacher's comment. The podium was a part of a group of buildings built of red bricks. The red-brick design created a harmonious tone for environment. I realized that I too had not used any mathematics during the day, thus looking round for some inspiration. Suddenly, a question came to my mind, "How many pieces of bricks are needed for this building?" Following this question, many questions followed, "Can we count the bricks? Can we make estimation instead of counting? How can we estimate the area of the podium? What will be the costs? Can we use other shapes besides rectangles? Can we give this problem to our students? What levels? When? Which topics? How many different solutions will they think of?" There seemed to be no end to the list of questions. Then I smiled because I knew that I had an answer for the frustration of my student-teachers.

In reality, the appreciation of the power of mathematics never comes without effort. Nevertheless, it plays a role implicitly or explicitly in the world around us. What we need is to keep a curiosity in the world around us. In searching for an understanding of the world around us, we formulate problems more than solutions. In searching for solutions, we use mathematics and inevitably realize that we have never learnt enough mathematics. Instead of saying how important mathematics is, a more effective way to maintain an awareness that mathematics is a lived object in our world is probably to have a curiosity in the world around us and the perseverance to satisfy our curiosity.

Reference

Curriculum Development Committee, Hong Kong. (1999). *Syllabus for secondary schools: mathematics (secondary 1 – 5)*. Hong Kong.

Education Department, Hong Kong. (1993). *Guide to the Secondary 1 to 5 Curriculum*. Hong Kong.