

**The Generalization of the Education on Abacus  
and Mental Arithmetic and the Improvement  
of the Teaching Method of the Education**

*By Lian Taiyu, Singapore*

**One Introduction**

In recent years, the excellent performance of Asians in the International Olympic Game on the Math has attracted great attention.

It is also true that there are several winners of international competitions who have been trained under the strict math education in Singapore. That attracts lots of educators and scholars to Singapore to learn experiences.

In 1991 when we introduced the education on abacus and mental arithmetic into Singapore at the first time, the audiences were shocked by the reflection on figures and the quick calculation of the little athletes; hence, I had been invited by the National Television Station to teach in an education unit named " How much do you know on abacus " twice every week for more than one year. Further more, I was invited to film educational discs and make special speeches in many universities, and so on. It was popular to learn abacus at that time.

The Ministry of Education of Singapore observed the welcome and the effectiveness of the abacus education later, so abacus education was included in the math classes of the Grade Two and Grade Three of primary schools only within five years and the abacus class was taught half an hour in a week. At the same time, the class on abacus and mental arithmetic became the most favorite out of school class of children and their parents.

Some smart merchants, who felt the heat of learning abacus, racked their brains to keep up with the business chance and held classes on abacus. Shortly, there were more than 300 education centers of abacus and mental arithmetic in Singapore. The education center was set up as the bamboo shoots in spring after a rain. But just in this heat, it lay a crisis that some of so many new teachers of abacus and mental arithmetic were not competent.

**Two Training Teachers is the Sticking Point**

In the requirement of the market, some professional staffs, in order to earn more profits in a least time, invited foreign teachers to teach after they were trained after taking the "Teachers Training Classes" for three or five days. In such situation, the quality of teaching could not reach a high level. Later, there were some negative reflections and some persons began to suspect the effective- ness of the education on abacus and mental arithmetic. Hence, the quantity of children learning abacus decreased. That is a good lesson for the countries that have not generalized the education on abacus and mental arithmetic. Now, I call on the teachers of abacus and mental arithmetic to pay attention to that phenomenon.

It is fortunate that there are also educators, who consider education the career of conscience. They work hard to train excellent teachers, and actively research and develop more

effective teaching methods. The Training Center of Flowers, a professional member of the Research Institute of Abacus and Mental Arithmetic of Singapore, was one of the best educators. Every teachers in "the Training Center of Flowers" must pass a one month and an half training of ten hours a day, five days a week, and must practice teaching performance for a month and a half, before they formally become the elementary level teachers of the Center; besides that, every teacher, whether he is young or old and whether he is a fresh teacher or a teacher with a long record, must accept an occupational training and a dissertation for half an day in every week. What is worth pointing out is that the occupational training and the dissertation have lasted for 11 years. Because the Center hires teachers with high quality and continually improves teaching methods to be more active and interesting, the Center has become one of children' favorite and wined the trust of their parents, so the Center becomes the leader of educators on abacus and mental arithmetic in its city.

### Three Opinions on teaching themes and methods

Now, I would like to list some teaching themes and methods of the Training Center of Flowers for the reference of abacus and mental arithmetic teachers.

#### A. The relation of abacus and mental arithmetic with the math class in schools

The parents of children often say to me: "To multiply figures, the teachers of schools teach students to multiply from the last digit, but the children are requested to multiply from the first digit in abacus and mental arithmetic calculation. It is easy for the children to be puzzled. How to solve such problem?"

As a matter of fact, to multiply figures, it is same to multiply from the last digit or from the first digit and there is convenient for both of the methods: to multiply from the first digit is consistent with reading the figure, can calculate first digits of the product and hold the major object, multiply more quickly, and leads less errors; to multiply from the last digit can add the carry figure to the former digit product. Students should learn both of them, then they can choose one of them freely in convenience.

Abacus is easier to reflect the theme of calculation and make children understand the main point of calculation.

For example  $231 \times 2$ , the calculation with abacus reflects to add Figure 1 with Figure 2. In fact, the result is the same no matter adding from either of digits. So calculation with abacus is clear, reasonable, and feasible to use.

#### B. Abacus and mental arithmetic should be used to resolve math questions and have relations with routine lives.

Figure 1

Figure 2.

The main reason to obstacle the development of the education on abacus and mental arithmetic lies that the children have no motive to learn abacus and mental arithmetic .The parents may be shocked by the performance of athletes who calculate very quickly and accurately. But that cannot meet all of their requirements. They may further ask about: " It is good to calculate quickly and accurately, but is it more useful to solve Problem Sum either?" That care is common in the countries and regions, such as Taiwan Province, Singapore, and Malaysia, where parents pay more attention to get into a good senior high school after entrance examinations, but also happens in Indonesia. Hence, to make learning abacus and mental arithmetic more interesting, abacus and mental arithmetic studying should resolve math problems and have relation with routine lives.

[Sample] There was a king in the ancient Indian who would like to study under the direction of a philosopher of Brahmin, so he asked the philosopher how much his tuition should be. The philosopher was not willing b be the director of the king and at the same time not willing to offend the king, so he pointed to a chess-board nearby and said that please placed a grain of rice in the first square, placed two in the second square, placed four in the third, and so on (the rice in the next square is two times as the one in the former square) until the 64<sup>th</sup> square. The king considered the tuition was cheap and went back home happily to prepare the tuition. But the king did not come to pay the fees. Now is the question how much the tuition should be? And why the king did not come back?

That question is an ancient math puzzle. It, is very complicated to calculate on paper, but is much easier on abacus, and the calculation steps on abacus is like the followings:

If we assume that 1000 grains of rice weigh 31 grams, the total weight of the 64 squares reaches 30Z/1000000000 tons, more than 1000 billion tons. The quantity of the rice was more than that of all the grain deposit of the whole country .Of course; the king cannot pay so much rice.

Procedures of abacus

- (1)  $N = 1, G = 1, Z = 1$
- (2)  $N = N + 1$
- (3)  $G = G + G$  (add the same amount)
- (4)  $Z = Z + G$
- (5) When  $N < 64$ , come back to step (2)
- (6) Output, Z

	Example		
N	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 100px; height: 20px;"></td><td style="text-align: right;">5</td></tr></table> The fifth square		5
	5		
G	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 100px; height: 20px;"></td><td style="text-align: right;">16</td></tr></table> 16 grains in the fifth		16
	16		
Z	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 100px; height: 20px;"></td><td style="text-align: right;">31</td></tr></table> 31 grains in all the five squares		31
	31		

(When one abacus is not efficient, another abacus can be used in the left of the former one.)

What is the teaching theme that lies in the story we talked about just now? The theme is that the abacus and mental arithmetic not only can resolve routine problems in a quick way, but also can resolve any questions that need calculation. The theme can make the math education more simple and effective.

We are sure that most of teachers are willing to improve their teaching methods, but with the restriction of objective conditions, for example not knowing how to begin, lack of time, not knowing where to learn the methods, and satisfied with the current success, and etc., their good dream has not been realized yet. Of course, the difficulties can be resolved.

I have shared two examples with you. From the two examples, we introduce a question how to edit books on abacus and mental arithmetic. I hope to have chances to communicate with you on that problem in the future. Now in Singapore, children have attended the discussion on the teaching methods, and the discussion does good not only to strengthen the calculation ability of children but also to increase their interests in math; to apply the situation that more younger children begin to learn abacus and mental arithmetic, the improved teaching methods, which are suitable to the children psychology, active and interesting, and no pressures, are very important. I wish all of you pay more attention to the improvement of teaching methods and enhance the heat of abacus and mental arithmetic learning.

**Courtesy:**

*(The Author is Lian Daiyu, Secretary and Prime Director, Research Institute of Abacus and Mental Arithmetic, Singapore, Master)*