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The International Association for the Evaluation of Educational Achievement has released the results of the quadrennial Trends in International Mathematics and Science Study (TIMSS).

There was not much change in the results for Taiwan, as students scored high in learning achievement, but low in learning attitude toward mathematics and science, and their sense of alienation toward mathematics and science was higher than the average.

Faced with the results, the Ministry of Education's K-12 Education Administration simply responded that "students in high-performing countries tend to feel a sense of alienation toward learning," without offering any further background analysis, which was a pity.

Taiwan participated in the study six times between 1999 and last year. During these 20 years, the reforms in Taiwan's curricula and educational system reached a climax. These involved reforms in the curriculum standards and guidelines, the replacement of the Nine-year Integrated Curriculum with new curriculum guidelines last year and switching the focus from "core competencies" to "competency-based instruction."

The system for advancement to higher-level education progressed from a joint entrance examination to the Basic Competence Test and the Comprehensive Assessment Program for junior-high school students.

The integration of examination and enrollment has been replaced with the separation of examination and enrollment, as well as adaptive enrollment based on a student's aptitude.

However, after making all these reform efforts, Taiwan has still failed to boost students' motivation to learn mathematics and science, so there must be some blind spots in its K-12 policy.

The first blind spot is a matter of over-rectification, as the government places excessive emphasis on social sciences and humanities at the cost of mathematics and science.

It cannot be denied that residues of the past authoritarian rule still existed in Taiwan's curriculum standards and textbooks at the end of the past century. As a result, in every reform of the curriculum, all sides focused mainly on the debate over social and language-related subjects.

Issues such as changes to the nation's historical view, the proportional adjustment between classical and vernacular Chinese, and required elective courses for local languages have received greater attention than the subjects of mathematics and science.

As a new curriculum guideline review committee is about to start operating, hopefully the over-rectification of, or imbalances in, Taiwan's curriculum reform will be reversed in a timely manner.

The second blind spot lies in outdated instruction, which has resulted in an inflexible response to a constantly changing situation, with the result that the government is stressing adjusting class hours over teaching innovation.

In every aspect of curriculum reform, there was not much change in the distribution of class hours for mathematics and science, and the only change was the adjustment of the required elective courses and the division of mathematics teaching materials.

For a course to meet its goal, it should prioritize efficacious teaching, diversified assessment and differentiated instruction.

However, no matter how the authorities adjust the curriculum guidelines for mathematics and science, they have continued to stick to traditional teaching methods. How will they boost learning motivation and competency using the same old tricks?

Taiwan's adoption of the US' "reform mathematics" teaching method, which sees mathematical calculations as a constructive activity, had failed due to bad communication skills, insufficient

teacher training and poor learning efficiency.

What would the new model for teaching innovation be, and would it change outdated classroom instruction? Such factors are likely to be the keys to success.

The last blind spot lies in self-contentment, as the government emphasizes cognitive performance over affective education. Past TIMSS results showed that the country's eighth-grade students' confidence, interest and appreciation of mathematics and science ranked at the bottom of the list, and their average score was even lower than that of fourth-grade students, showing that the older they get, the worse their learning attitude became.

From the perspective of learning psychology, without strong motivation or interest, it is difficult to sustain a learning activity for long.

The TIMSS results reveal why Taiwanese teenagers come out on top in prestigious international mathematics and science competitions, only to lose their competitiveness once they enter college or graduate school.

If the nation's students are self-contented with their academic performance without their passion for learning being awakened, students in other countries would quickly catch up, because self-contentment is the best sleeping pill.

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Translated by Eddy Chang

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