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Jotham Lim / The Edge Malaysia

August 23, 2021 00:00 am +08



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PUTRA
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— THE PEOPLE'S CHOICE —

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Learning mathematics is more than just becoming a human calculator; it is also about understanding the abstract science of numbers, quantities, space and change. It is a language that is almost exclusively spoken in numbers, however, and the ability to mentally calculate quickly certainly helps.

This serves as the underlying philosophy for SoroTouch, a Japan-based EduTech company with several partner learning institutions in Malaysia. The SoroTouch app teaches young children how to calculate even complex multiplications and divisions in a matter of seconds without using a calculator.

Its president Yasunobu Hashimoto tells Digital Edge that mental calculation is more like an acquired skill built on practice, rather than knowledge that is learnt. He says teaching students how to do rapid mental calculations gives them confidence in numbers, which will have a compounding effect on other aspects of their learning journey.

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2021 marks a century since the founding of China's Communist Party, and the country has widely celebrated its remarkable recovery from the Covid-19 pandemic and rapid transformation into a global superpower. China was the first country to overcome the pandemic and restart its economy. It was also the only major economy in the world that experienced growth in 2020.

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“Through SoroTouch, students who could only mentally calculate additions can now do complex multiplications. This gives them a sense of achievement and promotes a growth mindset. To reach a certain level in SoroTouch, students also need to practise regularly, which teaches perseverance and grit,” says Hashimoto.

“Perseverance and a growth mindset are important in cultivating a passion for learning. We do not expect students to [venture] into computer science or STEM [Science, Technology, Engineering and Mathematics] subjects, but the foundation SoroTouch builds can maximise their learning outcomes if they do. That is our mission.”



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for more than 500 years. Modern calculators have relegated soroban mainly to private afterschool programmes as a form of mental arithmetic training, but it is still taught in elementary schools in Japan.



Despite its historical origins, SoroTouch implements several twists that made it practical for the modern age — such as an invisible mode that compels students to visualise an abacus mentally and the two-hands technique, which cuts down the calculating steps needed by more than half.

Abacus-based methods are still the fastest form of mental calculation, says Hashimoto, in the same way the “front crawl” is still the most popular swimming technique used in Olympic freestyle competitions as the fastest way for swimmers to propel themselves forward.

“We do not expect students to [venture] into computer science or STEM subjects, but the foundation SoroTouch builds can maximise their learning outcomes if they do. That is our mission.”

Hashimoto

In fact, SoroTouch started out as a typical Japanese abacus school. It turned to technology and developed SoroTouch after encountering difficulties with conventional methods of teaching the abacus.

“When we took away the abacus from students, they struggled to calculate,” says Hashimoto. “Their abacus skills had improved, but not their mental calculation capabilities.

“When we first taught using only the abacus, only 6% of students achieved the target level of mental calculation after four years of training. Maybe 15 years later, when they entered the workforce, they would probably never use the abacus again.



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VSWM is the capacity to maintain visuospatial information — such as shapes, colours, locations and movement — for a brief period in the mind. It is used during many different cognitive tasks, such as reading, writing or even the tying of shoelaces and dancing.

and improved it day by day. In 2018, 62% of students had achieved the same level of mental calculation [ability] in only two years. This is revolutionary — 10 times the effectiveness in

half the duration.”

Recent studies have shown that abacus training does indeed improve a person’s arithmetic ability over control groups, with potentially positive effects on VSWM. More research is being done on similar types of training and their impact on brain plasticity.

Malaysians are no stranger to advanced forms of abacus training, with several local centres and associations offering similar imaginary abacus and two-hand programmes. What sets SoroTouch apart is not just the gamification of the learning process but also the big data machine that drives the entire SoroTouch syllabus.

The company receives and analyses about 590,000 correct answers through its servers every day. These answers are used to generate adaptive and personalised questions suited to each student’s capacity in real-time.

This is done through a machine learning process called matrix factorisation — the same system that powers Netflix’s recommendation algorithms. In fact, SoroTouch had the idea when Netflix Prize, a discontinued open contest aimed at improving Netflix’s recommender system, proved that matrix factorisation models were vastly superior to other conventional methods.

Partnering with several top universities in Japan, the company even published a research paper in 2020 on how matrix factorisation can predict each student’s learning performance with more accuracy than other baseline models.



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Students who find the questions overly easy or difficult will have their learning experience hampered.

“If students are able to get 80% of the questions correct all the time, it makes the learning experience exciting for them, motivating them to answer future questions correctly. We can control these figures just by watching and analysing this data,” he says.

These adaptive learning tools can be used for other subjects, but Hashimoto has no plans to do so just yet. He says the company’s resources would be better used to perfect SoroTouch and make it the best mental calculation tool in the industry.

Although open to all ages, SoroTouch targets mainly students aged five to eight. They can learn SoroTouch directly from the app, as well as attend online or physical classes held in the 120 partner centres located in seven countries. SoroTouch is available in Malaysia through centres such as AI Tech House or Kidz Edtech Malaysia.

“We are also holding global mental calculation competitions in the SoroTouch community. This is important for students, whether from Japan or Malaysia, because they can connect and compete with each other like in the Olympics,” says Hashimoto.

“This is very valuable for students, and they can experience this competitive spirit at the age of five. We also plan to expand to more centres worldwide, because ‘numbers’ is a language we all have in common and everyone has to learn how to calculate.”

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