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China's Efforts to Lead the Way in AI Start in Its Classrooms

A fast-spreading use of artificial intelligence in schools from kindergartens to universities provides the country with an unrivaled database

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These days, many students at Jinhua Xiaoshun Primary School in eastern China begin their lessons not by opening textbooks, but by putting on headbands.

After a two-minute meditation in which children are encouraged to feel their “inner universe,” they enter into a contest to see who can focus the best—as measured by their headwear.

The competition plays out in the form of a simulated rocket race on a screen at the front of the classroom. The headwear measures electric signals from neurons in the brain and translates that into an attention score using an algorithm. The more focused a student is, the higher the score gets, and the higher his or her rocket flies. If the score falls—meaning the student’s attention is waning—the rocket slows.

The two exercises are intended to prepare the students for optimal learning, and the headbands stay on as they proceed through their usual lesson, measuring how focused they are throughout the class.

“It’s like a psychological hint,” Zhang Yiwei, a language teacher, says of the new technology in her classroom. Students “feel as if they are being monitored and feel the need to read louder, to pay attention.”

Closely monitored

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The pilot project, designed to help teachers keep tabs on and improve students' attentiveness at this school in Jinhua, a small city known for China's best ham, offers a glimpse into an artificial-intelligence boom in classrooms across the country.

From kindergartens to universities, digital cameras scan students, detecting them raising hands or chatting behind the teacher's back, and facial-recognition robots take attendance and quiz toddlers. Bluetooth wristbands record heart rates and how much time a student spends in the library or on the playground. Proponents say such information can boost safety, help teachers quantify learning progress and make education more individualized.

This increasingly aggressive and sometimes intrusive use of high-end technology in education is pivotal to Beijing's goal to make the AI industry a fresh driver of economic expansion. Virtually unobstructed access to a potential sample pool of around 200 million students allows Chinese scientists and researchers to amass an unrivaled database, which is indispensable to develop advanced algorithms. That provides a key advantage for China in an ongoing race with the U.S. for global dominance in the field.

The headbands at Jinhua Xiaoshun, developed by startup BrainCo Inc. of Somerville, Mass., use three electrodes—one on the forehead and two behind the ears—to detect electrical activity in the brain, sending the data to a teacher's computer. Software generates real-time alerts about students' attention levels and gives an analysis at the end of each class.



Teachers say they have seen positive results from the use of AI in their classrooms. PHOTO: CRYSTAL TAI/THE WALL STREET JOURNAL

“Teachers have an intuition about who’s engaged and who’s not,” says Max Newlon, president of BrainCo’s U.S. office. “What we are aiming to do is take this feeling and make it a measurable metric.”

Skeptics question the ability of current research to accurately interpret the electric signals. But teachers at the school say they’ve seen a difference since the pilot program began in December.

“The change was really obvious when I first used the headbands in a lesson,” says Ms. Zhang. “The voice with which they answered my questions was so much louder.” After using the device for half a semester, her class moved up two places in test-result ranking among all of the school’s fourth-grade classrooms.

Critics speak up

Some teachers and students jokingly compared the device’s appearance to the “golden hoop,” a crown-like head ring featured in the 16th-century Chinese mythological classic, “Journey to the West.” In the story, the magical hoop is used to discipline the legendary Monkey King, tightening around his head when his Buddhist master recites an incantation.

Yang Zhenxuan, a sixth-grader, says he feels pressure if his parents see low concentration levels in reports sent by the school sometimes.

“They roll their eyes or ask me to face the wall and reflect on my mistakes,” he says. But he says that his grades have improved since he started using the head gear.

Some critics say “smart education,” as China’s State Council calls it, bears resemblance to Beijing’s push in recent years to deploy similar technology to keep watch over citizens in efforts to maintain public safety and social stability.

Last month, many Chinese social-media users widely condemned some technologies as excessive surveillance after images circulated online showing how facial-recognition tools can be used to log how much students read, slouch at their desks and play with their phones. Days later, the Education Ministry released a document calling for tighter regulations on digital technology and data collection in schools.

Education a priority

Companies behind the AI gadgets say it’s easier to penetrate the Chinese market because of parents’ strong concerns about children’s safety and sometimes near obsession with academic achievement. Policy support from a government that spends billions of dollars annually on smart-education initiatives also helps.

“Parents in China value education highly, and because of the competitive environment, they are willing to try anything that could possibly help their children,” says Gao Yuan, head of



Robots take attendance, teach and analyze children's behavior. PHOTO: CRYSTAL TAI/THE WALL STREET JOURNAL

educational research at BrainCo. in China. The company has shipped more than 20,000

headbands to China, its largest market for education products. In the U.S., it plans to expand similar pilot programs to 10 schools by the end of the year.

While facial recognition in U.S. schools has run into opposition over worries it infringes on civil liberties, AI technology often goes into Chinese classrooms without formal consent from parents.

“In terms of data privacy, compared with the West, China is relatively tolerant when it comes to the way it is regulated and people’s views toward it,” says Min Haibo, chief executive of Beijing iBingo Ltd., a startup that sells AI robots used in nearly 4,000 kindergartens across China to take attendance, teach and analyze behavior. Mr. Min says about 30% of the schools haven’t told parents about the analysis functions.

The robots also provide data to a government research project seeking to help educators better analyze children’s physical and mental health, as well as learning habits, Mr. Min adds. “It’s to help the government make decisions scientifically,” he says.

Jiang Junxia, mother of a sixth-grader at Jinhua Xiaoshun, says she doesn’t mind if her child’s brainwave data are used for research purposes as long as it helps improve technology and product quality. “We Chinese people are more willing to make sacrifices,” Ms. Jiang says.

Zhang Haopeng, general manager of Beijing Hanwang Education Technology Ltd., a company that has put facial-recognition cameras in hundreds of classrooms in China, says the technology would ultimately improve education in the country.

It offers, he says, “much improvement at low costs.”

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