"Brahmagupta's 18 laws of mathematics are completely missing from India's present mathematics curriculum."

India is known to be the birthplace of modern mathematics. Yet, many Indian school-going children lack proper understanding of mathematical concepts.

Australian mathematics historian Jonathan J. Crabtree was apprehensive of mathematics as a student like many of his classmates. He felt there was a need to better explain the laws and rules of mathematics. Over the years, Crabtree has retraced the origin of mathematics and linked it to ancient Indian wisdom. He found that India's definition of zero never made it to Europe. The disconnect between western mathematical explanations from the original teachings of ancient Indian mathematicians like Brahmagupta, Mahāvira (c. 850) or Bhāscara (c. 1150) was identified by Crabtree as a major contributing factor. BE's Isha Chakraborty spoke to him.

Jonathan J. Crabtree

Q. Why and when did you feel that there were some mistakes in basic mathematical concepts?

A. Fifty years ago, in 1968, my Class 2 teacher gave me the wrong explanation of multiplication. People have said $a \times b$ equals a added to itself b times for centuries. Yet this leads to $1 \times 1 = 2$. When asked *'what is two added to itself three times'*, I said **8**. My answer was correct, yet the explanation of 2×3, was wrong. The correct explanation for $a \times b$ is a added to India's zero b times, which simply leads to $0 + 2 + 2 + 2$.

Q. What according to you is the reason for these mistakes?

A. These mistakes were made because England developed the way elementary mathematics was taught since the 16th century. The ancient Greek mathematicians didn't consider zero and one to be numbers. Without zero, they also didn't have a concept of negative numbers. Therefore, the English definition of multiplication emerged with an error when translated from ancient Greek in 1570.

Unfortunately, the English then exported their mathematics to their settlements and colonies, infecting the world's mathematics with a logic 'virus'. Similarly, one was also omitted from the definition of exponentiation.

Consider a to the power of b, which is wrongly said to be a into itself b times. We must return one to the definition, so a to the power of 3, becomes 1 into a, 3 times, or $1 \times a \times a \times a$. Definitions of multiplication and exponentiation need fixing as does the definition of zero. Noably, the 7th century mathematical laws of India's Brahmagupta are consistent with the laws of the Universe, which is what you expect as Brahmagupta was an astronomer. Today, children are told that negative numbers are defined as being less than zero, yet that is mathematically and historically incorrect. The Chinese were using negative and positive numbers for around 1400 years before they adopted India's zero. So the Chinese could never have considered negatives numbers less than zero. Instead, they just viewed negatives as equal and opposite to positives, which is consistent with science and their philosophy of Yin and Yan. Free slides for readers are at www.bit.ly/NewMaths

Q. How do you think these changes can be implemented in the existing educational system?

A. As I toured some schools and gave mathematical lessons to more than 500 students ranging from Class 7 to Class 9, I explained Brahmagupta's laws of mathematics and asked them to tell me what they preferred. The children said they prefer India's own explanations of mathematics.

Brahmagupta's powerful set of 18 laws of mathematics are completely missing from India's present mathematics curriculum. So, I converted Brahmagupta's laws of maths into fun games for children. Hopefully, that will help in mitigating the fear of positive and negative numbers. Indian children have been forced to learn mathematics through bad pedagogies that do not resonate with them. How else could India perform second and third to last out of 74 participants in maths, ahead only of Kyrgyzstan, in a recently concluded global mathematical event? India had its true superior mathematical heritage stolen from it. My mission is simply to return the amazing simplicity and power of India's own mathematics to its people.

Note: Text edited for clarity.