[**Minds are not set in stone**](https://www.dawn.com/news/1430672/minds-are-not-set-in-stone)

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AN aspect of culture that we share with all other cultures is our disarming acceptance of assistive technology. There is no consternation around the use of spectacles, hearing aids or wheelchairs. We don’t resist telephones, cars and aeroplanes. Physical, tangible products interfacing with the five senses provide immediate benefits so all cultures adopt new habits and ways of doing things better. We allow old habits to roll off the shelf and die, like clunky old-model mobiles.

However, the ubiquitous use of assistive technology does not boost cognitive abilities. The brain doesn’t perform at higher levels when using glasses, driving cars or pressing buttons to pour coffee. It just widens its area of neural activation though not necessarily in those that plan, analyse or problem-solve. Over time, and with much use, people simply get better at what they do, that’s all. Most become smarter do-ers than thinkers.

*Pakistan’s school culture ought to grow more mindful of its duties and responsibilities to our children.*

By contrast, interventions in the cognitive (thinking-learning) domain influence thinking patterns and levels. Recall the days in Pakistani missionary schools, and subsequently in elitist English-medium schools where we learned to write numbers using Roman numerals: 243 written as CCXLIII. This 2,000-year-old numeral is now used in heritage clocks and watches. Today, it reflects culture: we write Henry VIII and Pope Paul III. The 32nd Olympics in Tokyo will be flashed as Olympics XXXII.

Until 1,000 AD Europeans were using these clunky numerals to add, subtract, multiply and divide. If you time-travel to the 18th century and multiply CCXLII by itself it would take you half a page and eight to 10 laborious minutes using ink and parchment. Reckoning (calculating) with Roman numerals was not a mere clerical task: it took an exceptional mind to recall the rules of constructing Roman numerals as they streamed through the head, then to write them. Add to that, the convoluted rules of old multiplication and the rules of meticulously recording the procedure. The process engaged short-term (or working) memory and simultaneous number-processing at higher, more complex levels. The chances of making computational errors due to the slightest lapse in concentration were enormous, with perilous consequences.

In his book Number: The Language of Science, Tobias Dantzig describes the rules of operating Roman numerals: “How difficult these rules were can be gleaned from the great awe in which all reckoning was held in those days. A man skilled in the art was regarded as endowed with almost supernatural powers”.

Calculations (or reckoning) that an eight-year-old child can now perform in seconds using Indo-Arabic numerals “required the services of a specialist and what is now only a matter of minutes meant in the 12th century days of elaborate work”.

Yet, thanks to cultural resistance, Europeans took 1,000 years to switch to the numerals in use today. It shows how a cognitive discipline, practised for centuries, evolves into a mindset carved in stone. A way of thinking and manifesting culture becomes rock hard, unchangeable and much harder to dislodge.

Today, in Pakistan, the computational aspect in mathematics is still viewed with the same reverential awe as 1,000 years ago. Those skilled in the low-level, clerical task of calculating (versus problem-solving, a higher-level skill) are assumed to possess extraordinary intelligence, which in turn is wrongly associated with memory and the memorising of rules. Long-held mistaken assumptions express the ossification of a culture more than culture itself. Fossilised elements present in culture hinder mindsets from flexing to evolve cognitively, just as the calcification of bones, nerves and vessels hinders physical movement.

At training seminars on education in Pakistan and Bangladesh, teachers and school administrators were asked to identify their most essential tasks and responsibilities. Their responses varied from ‘teaching’ (over 90 per cent) and ‘classroom management’, followed by a clutch of fashionable terminology picked up during other teacher-training events, eg ‘teach-by-doing’, ‘project-oriented’, ‘child-centred teaching’, ‘make students feel better about themselves’ … it’s a long, tedious list. There is no mention about learning. It was like a coin with just one side: teach. The other side, ‘learn’, was as blank as their puzzled expressions. Teaching is to learning as the lake is to water.

But to the audience, teaching meant sending facts and information down a tube for students to swallow at the other end, then regurgitate on demand. Whether any learning took place (and if so, what and how much) never entered the equation. So all the faddish ‘stuff’ they were learning about pedagogy, etc, was to help support mediaeval classroom practices. Children are taught the rules of engagement, the how-to’s of doing classwork, homework, exam preparations and behaviour. Our culture allows little room for children to draw meaning or give meaning to their experiences, or help them examine the significance of why they learn what they do. Understandably, our children’s schooling is as far removed from education as our past is from their future.

Today, mathematical computation and language literacy are an essential part of our culture. Communicating it meaningfully requires innovative content, design and delivery tools. These are developed with a working knowledge of (a) how growing minds learn numbers and language, (b) how the brain evolves neurologically to function at ascending levels of complexity, and (c) a deep knowledge of the content itself. The three have to be integrated to generate seamless learning.

Such innovations are similar to the introduction of the Indo-Arabic numerals. Contrary to some conventional thinking, they are not dumbing down knowledge any more than the place value system dumbs down the ancient process of ‘reckoning’. Pakistan’s school culture ought to grow more mindful of its duties and responsibilities to our children.

However, this is not possible if parents, educators, school administrators and policymakers remain complicit in perpetuating a culture that espouses higher aims without abandoning the crutches that inhibit the move to higher-level cognitive functioning.

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