A whole-brain education

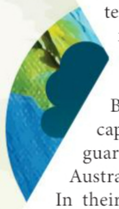
Have you heard developmental psychologist Howard Gardner's now infamous statement, that an education without the arts is a half-brain kind of education?

Gardner is not making an ableist statement, but suggesting that non-arts subjects are the domain of the left hemisphere, or 'logical' side of the brain, rather than the right hemisphere, or 'creative' side. We can surmise that Gardner and his devotees around the globe think an education devoid of science and mathematics is also a half-brain kind of education; that a student requires both 'types' of learning to have a 'whole-brain' educational experience (this makes sense, given that multiple intelligences are Gardner's core rhetoric). Gardner's original statement was in support of STEAM as an educational focus – that's STEM with the Arts inserted.

Following the US STEM initiative announced in 2009, Australia's Chief Scientist at the time, Professor Ian Chubb, launched a position paper in 2013 titled, Science, Technology, Engineering and Mathematics in the National Interest: A Strategic Approach. Chubb outlined a strategy to increase focus on STEM education, research, and funding, asking that the initiative be implemented as a matter of urgency. The key objective was to 'secure social, cultural and economic prosperity for all Australians while positioning Australia to advantage in a changing world' (p. 8), through four pathways: education, new knowledge, innovation and influence.

Interestingly, Chubb's paper (2013) states that engineering and the 'technological sciences' were included in the power acronym 'at least in part based on the creative application of scientific principles leading to outcomes and inventions' (p. 4). This is interesting because the arts—the learning area most synonymous with creativity—might have been incorporated within this acronym from the beginning. Some postulate that the impact of the absent 'A' can be traced in declining arts enrolments since 2013.

STEAM does make a lot of sense. Creative thinking is a high-level cognitive function that flexes multiple, complex processes and ultimately, creates new solutions to problems. There is very good reason for science, technology, engineering, and mathematics to welcome creativity into the fold.



But the arts develop unique capabilities that should guarantee them centrality in Australia's education policies. In their own right. Esteemed arts and education scholar Elliot Eisner already says it best in his article, Does Experience in the Arts Boost Academic Achievement? The answer to the titular question is that they may, but the arts are valuable beyond their potential to transform and extend scientific or mathematical learning. An arts education also has value beyond its ability to be persuasive, produce endorphins, develop self-esteem and empathy, or be therapeutic or cathartic (though these are by-products we as teachers are happy to foster) (Ewing, 2010; McCrindle & Fell, 2021; O'Shea, 2020).

Eisner (2002) says, 'the arts can serve as a model for teaching the subjects we usually think of as academic' (p. 196). Ewing (2010) agrees, the arts can transform the learning environment itself. Their justification is largely epistemological; the nature of knowing and learning in the arts can be modelled to increase capacity in other learning areas.

Eisner (2002) touts the arts' ability to model:

- divergent thinking to generate multiple solutions and variability
- diversity and personalisation of outcomes
- an understanding that context and form matter, because content does not exist in a vacuum
- inventive scholarship, which is dependent upon imagination
- refinement of sensibility, using strategies such as comparative analysis to appreciate and respond to stimulus
- the critical nature of relationships, and an understanding of how forms relate to one another to influence and create meaning
- an understanding that 'literal language and quantification are not the only means through which human understanding is secured or represented' (p. 204) – in visual art we read and create coded language to communicate meaning
- flexible endpoints, as students, 'define goals but keep their eye on the context in order to shift goals when needed' (p. 206)
- the importance of intrinsic satisfaction. As much as instrumentalised, extrinsic rewards, such as test scores motivate some students, intrinsic satisfaction drives student motivation and connection to subject matter, giving them a reason for attending to the task.

Beyond Eisner's psychometric examination, we can prove the arts provide students with the opportunity to engage their whole brain as they practice critical cognitive processes.

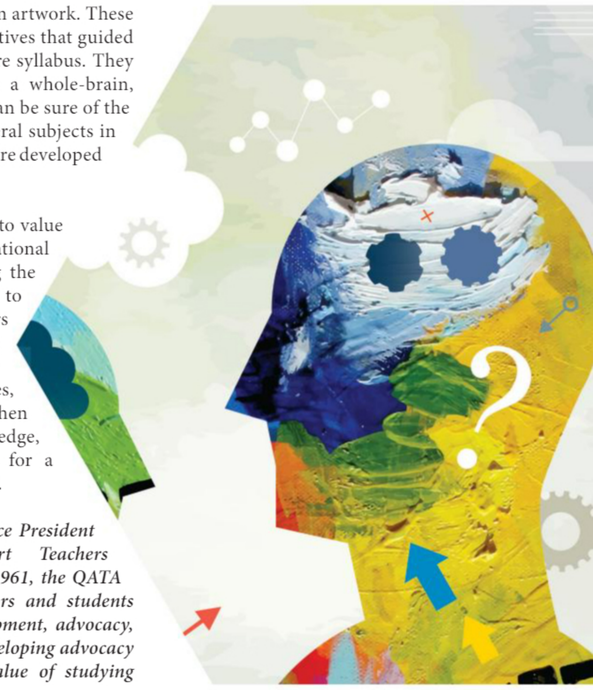
With contemporary science, and particularly the development of neuroimaging techniques and split-brain studies, we can see which parts of the brain are recruited or activated during creative activities. As it turns out, being creative requires complex and dynamic neural interactions that traverse the whole brain (Kenett et al., 2018; Jung & Vartanian, 2018).

The right hemisphere is related to capacities like flexibility, motivation and the 'suppression of obvious thoughts and prepotent responses to create something new' (Chen et al., 2020, p. 3413; Zhang et al., 2020). The left hemisphere is related to evaluation, the connection of concepts and construction of theories, and to idea valuation and selection (Chen et al., 2000; Kenett et al., 2018). Then there are prefrontal (central) parts of the brain that relate to the control of movement.

Through examining brain imaging data, Kenett et al. (2018) even found that creativity is 'related to a heightened ability to drive the brain into difficult to reach states' (p. 88). Doesn't this ability sound essential to the problem-solver or the innovator? McCrindle and Fell (2021) report that by 2030, workers will spend 100 per cent more time at work solving problems.

Senior Visual Art students in Queensland are successful when they can implement ideas, apply skills, analyse, interpret, evaluate, justify, experiment, and—unique to the learning area—create meaning and realise an artwork. These are the cognitions and objectives that guided the construction of the entire syllabus. They are cognitions that require a whole-brain, neurological response. We can be sure of the rigour of all registered, general subjects in Queensland, because they were developed in the same system.

There are countless reasons to value the arts within an educational system focused on building the critical capacity of students to be creative problem solvers who take risks and imagine possibilities. Through whole-brain educational experiences, the arts enable and strengthen the production of new knowledge, innovation, and influence, for a brighter future for Australia.



Bethany Loveridge is the Vice President of the Queensland Art Teachers Association (QATA). Since 1961, the QATA has supported arts educators and students through professional development, advocacy, and mediation. QATA is developing advocacy projects to highlight the value of studying senior Visual Art.

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