

THE VALUE OF HANDWRITING

A ‘When I was in school in the 1970s,’ says Tammy Chou, ‘my end-of-term report included Handwriting as a subject alongside Mathematics and Physical Education, yet, by the time my brother started, a decade later, it had been subsumed into English. I learnt two scripts: printing and cursive,* while Chris can only print.’

The 2013 Common Core, a curriculum used throughout most of the US, requires the tuition of legible writing (generally printing) only in the first two years of school; thereafter, teaching keyboard skills is a priority.

B ‘I work in recruitment,’ continues Chou. ‘Sure, these days, applicants submit a digital CV and cover letter, but there’s still information interviewees need to fill out by hand, and I still judge them by the neatness of their writing when they do so. Plus there’s nothing more disheartening than receiving a birthday greeting or a condolence card with a scrawled message.’

C Psychologists and neuroscientists may concur with Chou for different reasons. They believe children learn to read faster when they start to write by hand, and they generate new ideas and retain information better. Karin James conducted an experiment at Indiana University in the US in which children who had not learnt to read were shown a letter on a card and asked to reproduce it by tracing, by drawing it on another piece of paper, or by typing it on a keyboard. Then, their brains were scanned while viewing the original image again. Children who had produced the freehand letter showed increased neural activity in the left fusiform gyrus, the inferior frontal gyrus, and the posterior parietal cortex – areas activated when adults read or write, whereas all other children displayed significantly weaker activation of the same areas.

James speculates that in handwriting there is variation in the production of any letter, so the brain has to learn each personal font – each variant of ‘F’, for example, that is still ‘F’. Recognition of variation may establish the eventual representation more permanently than recognising a uniform letter printed by computer.

Victoria Berninger at the University of Washington studied children in the first two grades of school to demonstrate that printing, cursive, and keyboarding are associated with separate brain patterns. Furthermore, children who wrote by hand did so much faster than the typists, who had not been taught to touch type. Not only did the typists produce fewer words but also the quality of their ideas was consistently lower. Scans from the older children’s brains exhibited enhanced neural activity when their handwriting was neater than average, and, importantly, the parts of their brains activated are those crucial to working memory.

Pam Mueller and Daniel Oppenheimer have shown in laboratories and live classrooms that tertiary students learn better when they take notes by hand rather than inputting via keyboard. As a result, some institutions ban laptops and tablets in lectures, and prohibit smartphone photography of lecture notes. Mueller and Oppenheimer also believe handwriting aids contemplation as well as memory storage.

D Some learners of English whose native script is not the Roman alphabet have difficulty in forming several English letters: the lower case ‘b’ and ‘d’, ‘p’ and ‘q’, ‘n’ and ‘u’, ‘m’ and ‘w’ may be confused. This condition affects a tiny minority of first-language learners and sufferers of brain damage. Called dysgraphia, it appears less frequently when writers use cursive instead of printing, which is why cursive has been posited as a cure for dyslexia.

PASSAGE 2

Spend about 20 minutes on *Questions 15-27*, based on *Passage 2* below.

Growing up in New Zealand

It has long been known that the first one thousand days of life are the most critical in ensuring a person's healthy future; precisely what happens during this period to any individual has been less well documented. To allocate resources appropriately, public health and education policies need to be based upon quantifiable data, so the New Zealand Ministry of Social Development began a longitudinal study of these early days, with the view to extending it for two decades. Born between March 2009 and May 2010, the 6,846 babies recruited came from a densely populated area of New Zealand, and it is hoped they will be followed until they reach the age of 21.

By 2014, four reports, collectively known as *Growing Up in New Zealand (GUiNZ)*, had been published, showing New Zealand to be a complex, changing country, with the participants and their families' being markedly different from those of previous generations.

Of the 6,846 babies, the majority were identified as European New Zealanders, but one quarter were Maori (indigenous New Zealanders), 20% were Pacific (originating in islands in the Pacific), and one in six were Asian. Almost 50% of the children had more than one ethnicity.

The first three reports of *GUiNZ* are descriptive, portraying the cohort before birth, at nine months, and at two years of age. Already, the first report, *Before we are born*, has made history as it contains interviews with the children's mothers *and* fathers. The fourth report, which is more analytical, explores the definition of vulnerability for children in their first one thousand days.

Before we are born, published in 2010, describes the hopes, dreams, and realities that prospective parents have. It shows that the average age of both parents having a child was 30, and around two-thirds of parents were in legally binding relationships. However, one third of the children were born to either a mother or a father who did not grow up in New Zealand – a significant difference from previous longitudinal studies in which a vast majority of parents were New Zealanders born and bred. Around 60% of the births in the cohort were planned, and most families hoped to have two or three children. During pregnancy, some women changed their behaviour, with regard to smoking, alcohol, and exercise, but many did not. Such information will be useful for public health campaigns.

Now we are born is the second report. Fifty-two percent of its babies were male and 48% female, with nearly a quarter delivered by caesarean section. The World Health Organisation and New Zealand guidelines recommend babies be breastfed exclusively for six months, but the median age for this in the *GUiNZ* cohort was four months, since almost one third of mothers had returned to full-time work. By nine months, the babies were all eating solid food. While 54% of them were living in accommodation their families owned, their parents had almost all experienced a drop in income, sometimes a steep one, mostly due to mothers' not working. Over 90% of the babies were immunised, and almost all were in very good health. Of the mothers, however, 11% had experienced post-natal depression – an alarming statistic, perhaps, but, once again, useful for mental health campaigns. Many of the babies were put in childcare while their mothers worked or studied, and the providers varied by ethnicity: children who were Maori or Pacific were more likely to be looked after by grandparents; European New Zealanders tended to be sent to day care.

Now we are two, the third report, provides more insights into the children's development – physically, emotionally, behaviourally, and cognitively. Major changes in home environments are documented, like the socio-economic situation, and childcare arrangements. Information was collected both from direct observations of the children and from parental interviews. Once again, a high proportion of New Zealand two-year-olds were in very good health. Two thirds of the children knew their gender, and used their own name or expressed independence in some way. The most common first word was a variation on 'Mum', and the most common favourite first food was a banana. Bilingual or multi-lingual children were in a large minority of 40%. Digital exposure was high: one in seven two-year-olds had used a laptop or a children's computer, and 80% watched TV or DVDs daily; by contrast, 66% had books read to them each day.

The fourth report evaluates twelve environmental risk factors that increase the likelihood of poor developmental outcomes for children, and draws on experiences in Western Europe, where the specific factors were collated. This, however, was the first time for their use in a New Zealand context. The factors include: being born to an adolescent mother; having one or both parents on income-tested benefits; and, living in cramped conditions.

In addition to descriptive ones, future reports will focus on children who move in and out of vulnerability to see how these transitions affect their later life.

To date, *GUiNZ* has been highly successful with only a very small dropout rate for participants – even those living abroad, predominantly in Australia, have continued to provide information. The portrait *GUiNZ* paints of a country and its people is indeed revealing.

Night lighting has a vacuum-cleaner effect on insects, particularly moths, drawing them from as far away as 122 metres. As insects play an important role in pollination, and in providing food for birds, their destruction is a grave concern. Using low-pressure sodium-vapour lamps or UV-filtered bulbs would reduce insect mortality, but an alternative light source does not help amphibians: frogs exposed to any night light experience altered feeding and mating behaviour, making them easy prey.

Furthermore, birds and insects use the sun, the moon, and the stars to navigate. It is estimated that around 500 million migratory birds are killed each year by collisions with brightly-lit structures, like skyscrapers or radio towers. In Toronto, Canada, the Fatal Light Awareness Program educates building owners about reducing such deaths by darkening their buildings at the peak of the migratory season. Still, over 1,500 birds may be killed within one night when this does not happen.

Non-migratory birds are also adversely affected by light pollution – sleep is difficult, and waking up only occurs when the sun has overpowered artificial lighting, resulting in the birds' being too late to catch insects.

Leatherback turtles, which have lived on Earth for over 150 million years, are now endangered as their hatchlings are meant to follow light reflected from the moon and stars to go from their sandy nests to the sea. Instead, they follow street lamps or hotel lights, resulting in death by dehydration, predation, or accidents, since they wander onto the road in the opposite direction from the sea.

D Currently, eight percent of all energy generated in the US is dedicated to public outdoor lighting, and much evidence shows that lighting and energy use are growing at around four percent a year, exceeding population growth. In some newly-industrialised countries, lighting use is rising by 20%. Unfortunately, as the developing world urbanises, it also lights up brightly, rather than opting for sustainability.

E There are several organisations devoted to restoring the night sky: one is the International Dark-Sky Association (IDA), based in Arizona, US. The IDA draws attention to the hazards of light pollution, and works with manufacturers, planners, legislators, and citizens to encourage lighting only what is necessary when necessary.

With 58 chapters in sixteen countries, the IDA has been the driving force behind the establishment of nine world reserves, most recently the 1,720-square-kilometre Rhon Biosphere Reserve in Germany. IDA campaigns have also reduced street lighting in several US states, and changed national legislation in Italy.

F Except in some parks and observatory zones, the IDA does not defend complete darkness, acknowledging that urban areas operate around the clock. For transport, lighting is particularly important. Nonetheless, there is an appreciable difference between harsh, glaring lights and those that illuminate the ground without streaming into the sky. The US Department of Transportation recently conducted research into highway safety, and found that a highway lit well only at interchanges was as safe as one lit along its entire length. In addition, reflective signage and strategic white paint improved safety more than adding lights.

Research by the US Department of Justice showed that outdoor lighting may not deter crime. Its only real benefit is in citizens' perceptions: lighting reduces the fear of crime, not crime itself. Indeed, bright lights may compromise safety, as they make victims and property more visible.

The IDA recommends that where streetlights stay on all night, they have a lower lumen rating, or are controlled with dimmers; and, that they point downwards, or are fitted with directional metal shields. For private dwellings, low-lumen nightlights should be activated only when motion is detected.

G It is not merely the firefly, the fruit bat, or the frog that suffers from light pollution – many human beings no longer experience falling stars or any but the brightest stars, nor consequently ponder their own place in the universe. Hopefully, prize-winning LED lights will be modified and used circum-spectly to return to us all the splendour of the night sky.