

What he can teach us about the brain

The engagement of the Dalai Lama and other Buddhist scholars and practitioners with Western science has opened doors into the mind's inner workings and to new interest in 'poetic perception', writes **Arthur Zajonc**

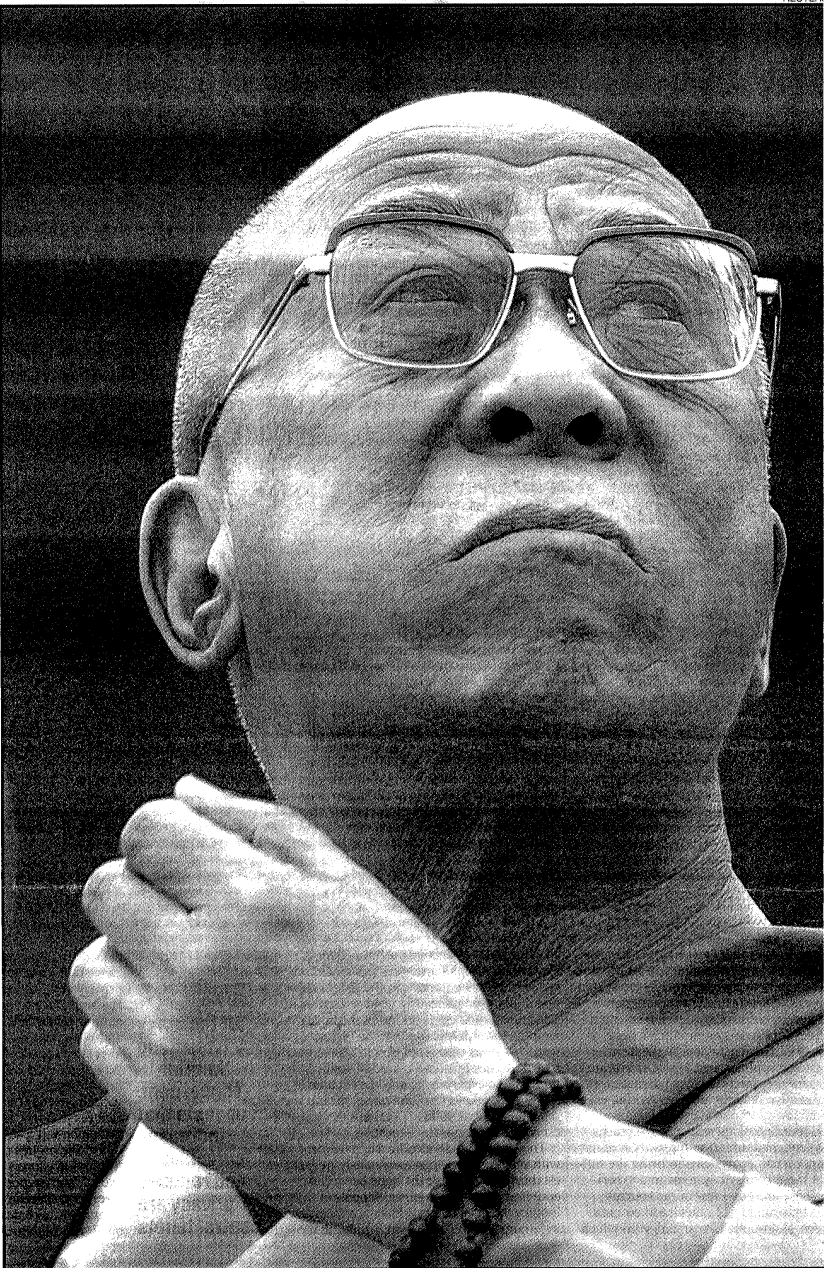
In 2003, more than a thousand scientists and scholars — including Charles Vest, president of the Massachusetts Institute of Technology, and Nobel laureate Philip Sharp — gathered for a landmark conference on the nature of the mind. On stage among the scientists sat the Dalai Lama and a collection of Buddhist monks and scholars. The conference marked the culmination of nearly 20 years of conversation and collaborative research between Western scientists and Buddhist practitioners and scholars.

Next month sees the publication of a book on the conference, which presents the substance of that meeting to the general public. The book, however, is only the latest in a series of developments in the dialogue between contemplative/spiritual traditions and sciences such as cognitive neuroscience and quantum physics, my own field.

The interaction between long-term practitioners of meditation and neuroscientists has yielded especially significant fruits in recent years. This is due to several factors. Extraordinary developments in non-invasive research methods have taken place — such as functional magnetic resonance imaging — but joint research has also benefited from more "expert" contemplatives and open-minded researchers who have agreed to collaborate.

Two studies in particular demonstrate the benefit of such collaboration: one at the University of Wisconsin's Keck Lab for Brain Imaging, the other at Harvard/Massachusetts General Hospital's Neuroimaging Programme. In the first study, neuroscientists Antoine Lutz and Richard Davidson worked with the monk-scientist Matthieu Ricard and others to demonstrate convincingly that meditation by experts with more than 10,000 hours of practice caused unprecedented changes in high-frequency (gamma band) oscillations and that these became phase-synchronised over extensive regions of the brain. The second study, done at Harvard/ MGH by Sara Lazar and collaborators, found that changes in brain structure — cortical thickening, to be specific — occur in those who meditate regularly (in their study, on average 40 minutes a day for nine years). This result supports the view that the brain is "plastic" and can be developed even in adults by repeated experience, in this case the experience of meditation. Taken together with other studies, we are beginning to gain a scientific understanding of the transformative effects of meditation on brain structure and activity.

While of great interest, the neuroscience of



Dalai Lama: changes in the brain occur in those who meditate regularly, supporting the view that the brain is 'plastic'

meditation is not, in fact, the sole or primary focus for the interaction between cognitive science and the contemplative traditions. Meditative introspection offers a direct method of investigating the mind. More than a hundred years ago, psychologist William James famously declared that "introspective observation is what we have to rely on first and foremost and always". Successful introspective observation has, however, remained elusive for Western psychology. James was well aware that sustained voluntary attention was a rare event in the human psyche. The meditative traditions of Asia and the West have placed great emphasis on training the attention, a possibility that Jonathan Cohen, a Princeton University attention researcher, is studying.

In Buddhism, the schooled capacity for attention is directed on the mind itself. When joined with a phenomenologically oriented philosophy, meditative introspection can offer a remarkably detailed taxonomy of mental states, traits and training strategies. Building on the work of William James and the Paris neuroscientist Francisco Varela, Evan Thompson, the University of Toronto philosopher of mind, has argued persuasively for inclusion of a first-person perspective in research on the mind.

Increasingly, cognitive scientists are developing research strategies that integrate conventional third-person neuroscientific methods with first-person reports by expert introspective observers, who are often long-term Buddhist contemplatives. Many Western

researchers are surprised that Buddhist contemplatives not only contribute precise observations but also well-developed empirically grounded theoretical schemes for the classification and understanding of mental states. In addition, they offer practices designed to reduce mental suffering (afflictive emotions and suggest ways of cultivating attention and emotional stability).

This last observation led Paul Ekman, the well-known researcher on emotion, to propose a research project, Cultivating Emotional Balance, to the Dalai Lama. That multi-year project has been performed at the University of California, San Francisco, by psychologist Margaret Kemeny, Buddhist scholar/practitioner Alan Watts and colleagues. Final analysis of the

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is nearly complete.

In recent years, my own interest and that of many academic colleagues has grown to include the pedagogical significance of contemplation for higher education. As a professor, I am interested in developing a way of teaching that addresses the whole student. I wish to ensure that students not only master a field of knowledge and its analytical methods but also develop the capacity for close observation, sustained attention, a mind that perceives relationships and can

even work with ambiguity, be it wave-particle duality or a literary metaphor. In my view, school and university education have long emphasised analytical skills and brute facts while allowing students' basic attentional skills, and their synthetic and creative capacities, to go unaddressed. As Ralph Waldo Emerson once remarked, no scientific discovery was ever made except by "poetic perception". Secularised contemplative practices offer one means for redressing this imbalance and cultivating careful observation, sustained attention and perhaps even poetic perception.

For some years, many hundreds of academics in the US and Canada have been turning to secular contemplative practices as a pedagogical method. In collaboration with the Center for Contemplative Mind in Society, the American Council of Learned Societies has granted 120 contemplative practice fellowships to professors over the past ten years, supporting them in designing courses that include contemplative practice as a pedagogical strategy. At conferences and summer schools at Columbia University, Amherst College and elsewhere, hundreds of professors have gathered to share their experiences with the emerging area of contemplative pedagogy. Their efforts range from simple silence at the start of class to exercises that school attention and, most recently, to innovative contemplative practices that relate directly to course content.

For example, art historians Joanna Ziegler and Joel Upton have independently developed a practice called, respectively, "contemplative seeing" or "beholding", in which students patiently and systematically study a few works of art for the entire semester. They thereby consciously develop essential capacities for "seeing" a painting's light, colour, organisation, style and theme at increasingly sophisticated levels. Literature professors are selecting short passages for contemplative reading and free writing exercises. Following the model of primatologist Jane Goodall, ecology students are practising patient contemplative observation of natural and urban ecosystems to bring the fullness of these complex systems into experience. These are but a few of the courses offered that range from theatre to economics, from philosophy to cosmology, in which university teachers are experimenting with contemplative ways of teaching. I have become convinced that contemplation benefits both students and faculty, and that secular contemplative practices should assume a significant place on our educational agenda.

The important role of the Dalai Lama in fostering such developments was clear to me as I sat with more than 10,000 neuroscientists as he addressed the Society for Neuroscience's annual meeting last year. I realised then that only someone of his stature could overcome the centuries of distrust between science and religion and successfully convene a collaboration between science and Buddhist philosophy at the highest levels.

Key to his success has been his open, even sceptical attitude towards dogma, including that of his own tradition. He has no interest whatsoever in advocating for Buddhism. His only interest is knowledge that can lead to the mitigation of suffering. In this way, his motive is not curiosity or a new patent but

the welfare of all sentient beings. At its best, I see science as embodying similar values.

I should say that I write as a non-Buddhist, but also as someone who has long sought appropriate ways of working in science that are open to the philosophical dimensions of my discipline, and even to the ethical and spiritual issues that may pertain to it. This is a complex stance, but we should remember that the data and theories of science do not mandate a particular metaphysics. The Dalai Lama is right to distinguish between materialism, which is a metaphysical position, and science itself. While he rejects the former, he delights in the latter.

Science is at its best when it stays close to the phenomena of nature and the mind. Then science can travel anywhere and safely pursue all questions, even those that challenge conventional views. The compelling experimental evidence of quantum physics demands non-locality. Yet the entanglement of quanta can now be harnessed for quantum computation, a technical achievement that rests on data and ideas that are still beyond our full comprehension.

In 1998, Anton Zeilinger, the distinguished Austrian physicist, and I took real pleasure in our three days of private conversations with the Dalai Lama concerning quantum physics and philosophy at Zeilinger's Innsbruck labs. The subtle analysis of reality offered by Buddhist philosophy as described by the Dalai Lama was an exhilarating stimulus complementing our own study of reality by experimental and theoretical methods. Moreover, we discovered a shared commitment to empiricism. To paraphrase William James, experience is "what we have to rely on first and foremost and always".

Yet experience can be deepened by training. Goethe, whose approach to science emphasised the contemplative, once remarked that "every object, well-contemplated, opens a new organ in us". The object of our attention may be a natural phenomenon or a mental one, but if we contemplate it long and well, then new capacities for knowing develop in us. These are essential for productive research and good teaching.

Long before neuroplasticity, the contemplative traditions of Asia knew that the human being was malleable and that capacities of mind could be cultivated. As a corollary, they prized a form of knowing called "direct perception" and contrasted it with "valid inference". The new organs of which Goethe wrote were and are capacities for insight. They provide for knowing as immediate experience, as epiphany. Analysis alone cannot produce insight, nor can the accumulation of data spontaneously yield a discovery. The eureka moment is a kind of theoretical seeing. How appropriate that the Greek word "theoria" meant "to behold". True theoretical physics is indeed a kind of seeing through the experiments and the equations to the subtle patterns of the universe, and the schooling of that ability is perhaps the greatest challenge of physics education.

The Dalai Lama's steadfast engagement with science has helped enormously in establishing an active dialogue between science and other philosophical schools of inquiry. Neither he nor I have any interest in joining science to religion; I think that such a union can lead only to profound and intolerable difficulties. But when a philosophical or spiritual tradition is based on experience and reason, on contemplative training of the mind and careful intellectual analysis, then collaboration can be profoundly fruitful for both parties.

Buddhism and the Dalai Lama have captured the spotlight, but numerous individuals and other contemplative traditions also adopt an empirical orientation and a reasoned approach to the mysteries of nature and the mind. They, too, have much to offer to an integrative approach to science and higher education. I look forward to the exchange and the epiphanies.

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Does your VLE virtually undress its users?

Few educators are aware of how online learning tools can betray the privacy of individual users and stifle their learning experience, says **Adam Joinson**

'Of the many teaching theories in vogue, none suggests that increased surveillance and reduced privacy are central tenets for improving students' education'

In August, three leading employees of the internet giant AOL were forced to leave their jobs after the release of anonymous search data that could threaten the privacy of their customers. Later this month, many thousands of students will begin their studies in the UK, log on to the virtual learning environment (VLE) provided by their university and have their privacy considerably more compromised than the consumers of AOL. And no one will complain. Very few will even know.

The seemingly inexorable rise of the VLE, designed to deliver e-learning, was fuelled by utopian visions of a non-threatening, non-hierarchical, constructive (and constructivist) place for students and tutors to interact and learn. A recent survey found that 95 per cent of UK universities have a VLE. But while the pedagogic functions of these tools are heralded, it is rare to hear about how they track and watch over students. Indeed, one usually needs to delve deep into the product specifications of most VLEs to begin to understand the degree to which students are measured, recorded, reported and tracked while they use a typical VLE.

As the AOL case shows, a privacy threat often comes not from a specific item of personal information but from the accrual of semi-personal information from a number of sources. For any individual student, it is usually possible to see what they read, when they read it, how many times they read it, how they did on a quiz (even a formative assessment), at what time they submitted an assignment, what questions they posted to a discussion forum, how many edits to a wiki (a collaborative authoring tool) they made or comments to a blog they posted. When combined in a single report, the potential threat to students' privacy is enormous.

Quite apart from the obligation on institutions to avoid the excessive and unnecessary collection of personal data, and to protect data that is collected, educators may also have sound pedagogic reasons for taking the privacy of students seriously. Of the many teaching theories in vogue at the moment, none suggests that increased surveillance and reduced privacy are central tenets for improving students' education. There is evidence that reducing students' privacy might lead to less successful educational outcomes.

Judith DeCew, a privacy researcher, has believed that privacy extends not just to information but also to expression and accessibility. She argues that privacy allows us the freedom to express unpopular views without fear of interference from authority. It also gives us a space to prepare and present arguments and ideas without being vulnerable to ridicule. But, in the case of a VLE, opportunities for expressive privacy are rare.

The main place to try out ideas and arguments would be a chat or discussion forum, but students rarely have the opportunity to use them while protected by a pseudonym. So a student's basic misunderstanding could be linked, in perpetuity, to his or her name for all to see, rather than hidden behind a pseudonym. By allowing pseudonyms, rather than relying on real names, a VLE designer can build expressive privacy into the environment. But even in activities geared towards experimentation and testing, it is rare for measures to be taken to enhance expressive privacy.

In fact, many VLE designers and educationists seem to be designing their tools and activities specifically to reduce free expression and experimentation. Under the auspices of greater social presence, photographs, video and voice communication are gradually being added to the communication facilities of VLEs, despite extensive research

evidence that doing so will lead to deterioration in the quality of group communications and affiliation in the group.

If you fear "looking a wally", it is easy post to a semi-anonymous discussion list chatsite than to join a voice or video conference. In the latter, feedback is immediate and nerves show more easily in the voice than in text. Similarly, many of the activities designed for use in VLEs (for example, "breaker" activities in which students describe themselves) ignore evidence that focusing attention on the individual rather than the group reduces expressive privacy and the effectiveness of later group work.

Some of the newer learning technology being piloted violate privacy in myriad ways, including enforced contribution to discussions. The adaptation of "web 2.0" software for educational purposes will put further privacy threats because they offer rely on (user-entered) personal information to function.

And yet the educational community has, with a few exceptions, tended to ignore a potential privacy threat of new technology. The *British Journal of Educational Technology* shows 11 articles over the past decade that mention "privacy", but privacy is not the focus of a single one. This compares with 140 articles that mention "e-learning". Most discussion of privacy in the e-learning research area is in terms of meeting the data protection requirements of legislation rather than the pedagogic implications of privacy invasion. In a 2004 report for the UK Joint Information Systems Committee, e-learning professor Grainne Conboy noted that surveillance was an emerging issue in the development of e-learning. I since then researchers have made very little attempt to address the issue seriously. Little at the privacy policies of many UK universities illustrates the degree of this creeping surveillance. There is hardly any mention of the tracking of students' data on VLE, less still of what becomes of the data once stored.

But this selective blindness is not going to work. A quick visit to the support forums of many VLEs provides ample evidence that the privacy implications of tracking students are causing real concern. VLE enthusiasts write off many of these concerns as paranoia. But the issues are not likely to go away — other, more invasive, technologies (such as RFID tags to record attendance) are implemented across campuses.

There are ways in which many of the intrusive aspects of a VLE can be kept, even enhanced, while protecting students' privacy. At a minimum, tracking and usage reports should be anonymised, and ideally tutors should have access only to summary reports of usage, not the actions of an individual. Identity management systems should be introduced, enabling students to control much of their identity as made known when they post to a discussion forum. This would give students the expressive privacy needed to ask "stupid" questions or pose premeditated ideas without being vulnerable to ridicule.

Institutions and tutors should also have a clear privacy policy in which they make students aware of what tracking takes place, who has access to the data, to whom they are put and for how long they are stored. Taking student privacy into account in these ways will help educators realise the promise of e-learning.

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