

The power of the unfocused mind

*Most people agree that a focused mind is essential for learning, but growing evidence suggests that daydreaming, procrastination and an idle brain may be just as important. **Kat Arney** looks at how enabling students to lose focus could be the key to their success*



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confession: I haven't fully concentrated my mental firepower on writing this article. I spent much of the time allocated to researching and writing it staring into space, mulling it over while doing other things, and distractedly surfing the internet, mainly in the form of chatting on social media.

I realise this crime will rankle a teaching audience more than any other. A lack of focus on the task in hand is the kind of thing that drives teachers to despair. Classroom windows reverberate regularly with the sound of a teacher imploring students to "Focus!" and these warnings tend to multiply for older students around exam time, when revision has to compete with long summer days and the easy gratification of social media for attention.

But it's not just teaching – in all walks of life the ability to focus is a coveted skill that is celebrated and nurtured. If you don't give the task your full attention, it is said, you cannot achieve as much as you could have done. Students would not get the exam results they were capable of achieving, workers would not be as productive as they might have been and this article would not be as comprehensive and entertaining as the good people at *TES* were expecting.

So should I apologise in advance of you reading on?

Apparently not: it turns out that my mental meandering – and that of students everywhere – is supported by a growing body of evidence questioning the devotion to the creed of focus. Researchers now believe that distraction may be a good thing, procrastination a beneficial pastime, and that constantly forcing the thumbscrews of attention on our kids is actually hindering rather than helping their learning.

Focus is important, but it is only half the answer. It's time education woke up to the power of the unfocused mind.

Losing control

There's no doubt that being able to pay attention is an advantage in life. Psychologist Daniel Goleman, author of *Focus: The Hidden Driver of Excellence*, says that the level of controlled attention that a young child displays – subsequently blossoming into willpower, determination and self-discipline – is as good a predictor of health, wealth and success in adult life as social class or IQ. This cognitive control, as he describes it, is the bedrock of educational attainment.

"Cognitive control refers to the ability to focus on one goal and ignore the distractions and all the other things that take you away from it," he says.

That goal may be reading or writing an assignment, doing some maths problems or any other aspect of schoolwork.

So it follows that focusing harder for longer must be better for learning, right?

Wrong.

Barbara Oakley is professor of engineering at Oakland University in California. She runs the world's most popular Mooc (massive open online course). While there are courses that can teach you anything from Latin to linear algebra, the topic of Barbara's course is learning itself – and the role of focus in learning plays a major part.

The taster video for her Mooc, "Learning How To Learn", opens with her explaining how struggling to learn something new can leave us feeling like zombies who



just keep bashing our heads against the wall. Oakley says the solution to this frustration lies in understanding that there are two modes of thinking: focused attention – the head-in-the-textbook kind of concentration that's typically associated with learning; and the "default" or "diffuse" mode – essentially, letting your thoughts wander.

The "default mode network", to give it its full name, is one of the hottest topics in neuroscience right now. Its official discovery dates back to 2001, when brain-scanning experiments by US-based neuroscientist Marcus Raichle and his colleagues revealed a characteristic pattern of baseline (default) activity in certain regions of the brain during periods of mind-wandering, which quickly switches off when attention is directed onto an external task.

Studies suggest that our brains spend a staggering 30 to 50 per cent of our daily life in the default mode. You could be washing up and rather than concentrating on



the dishes, you wonder what you're going to have for dinner. You could be driving the car in steady traffic and instead of concentrating on the act of driving, you're thinking about what to wear to that party on Saturday night. Or you could be a student in a maths lesson, staring out of the window rather than balancing equations.

It's tempting to dismiss this state as frivolous meandering of the mind, and some researchers do indeed think that the default mode is a kind of mental idling state where nothing much is happening – a bit like running a car in neutral. But many others now believe that there's far more going on under the bonnet.

The default state is associated with what neuroscientists call "internal mentation" – thinking and reflecting, lost in one's own thoughts rather than focusing on the outside world. As the mind roams free, we run through various scenarios and daydreams, figuring out that if we do *this*, then *that* might happen.

Researchers have discovered that this kind of mind-wandering is needed for emotional and social growth, and that the ability to switch quickly between the default mode and outwardly-focused attention tends to be found in people with better reading and memory skills.

Furthermore, it's also been shown that people with stronger connections between the different parts of their default network (which is distributed through various regions of the brain rather than concentrated in one particular place) do better on cognitive tasks such as comprehension tests.

It's this impact on learning where Oakley feels education is missing out.

"When you focus in on a task that you know how to do, you're using a certain way of perceiving the world and running certain brain patterns that you are very familiar with," explains Oakley. "But this doesn't work when you're learning something completely new."

For example, she tells me, say that you already know how to do multiplication. If you are presented with a multiplication problem, you can try to solve it using the brain patterns that you have already got. But then along comes something different.

"Now let's say that you're trying to learn something completely new, like division. First, you would start to tackle learning division using those multiplication brain patterns that you are familiar with. But they're the wrong ones, so it gets really frustrating.

"It turns out that the brain's way of analysing the completely new types of patterns that you need but you have never experienced before often requires



Learning how to learn

Barbara Oakley's academic career didn't take a traditional route. Heading into the army straight from high school, she decided to learn Russian. But, she says, it wasn't the smartest choice.

"When I got up to age 26 and was about to get out [of the army] I realised that my sole professional expertise was that I could speak this language. I'd worked with a lot of engineers in the

military and I could see that they had great careers ahead of them, so I decided to try and retrain my brain, even though I'd always been terrible in maths and science."

More than three decades later, Oakley is a respected engineer and author of several books, including *A Mind for Numbers: How to Excel at Math and Science (Even if You Flunked Algebra)*, so the gamble paid off – but

it wasn't easy. "If you look at all my textbooks from when I was learning maths, you'd see all these little dimples on the pages, because I'd get so frustrated while I was trying to learn this stuff that I would take a fork and stamp it in the book. But it was because I didn't realise back then that

there are two ways that the brain perceives the world."

That insight led to her online course "Learning How To Learn", which has been credited as the most-viewed Mooc ever offered by a major university.

Watch Professor Oakley talk about learning at bit.ly/BarbaraOakley





the mental ability to step back and use a more diffuse kind of pattern, which is this default mode.”

Essentially, what Oakley is arguing is that in order to understand new content, the brain needs to be in the focused state to get the information in the first place, but then it needs to enter the default mode in order to move away from the ill-fitting approach that it is trying to apply to the problem (the established brain patterns) in order to work out the right way of approaching it (the new brain patterns).

The two types of thinking – focused and fluffy – cannot coexist, but both are needed for learning. The focused state always overrides the default mode.

“We often fool ourselves, because we think that we only learn something when we are focusing on it,” says Oakley. “But actually, if you can manage to get your attention off it and do something else, it will still be going on in the background.

“Go for a walk, work on a different subject, sit in a car and drive someplace, sit on a bus, take a shower or bath – lots of people get conceptual breakthroughs while they’re in the bath – or go to sleep. There’s a real ‘letting go’ that occurs when you’re not consciously focusing on anything. Your brain starts rattling around and helps you home in on these new patterns.”

The history of scientific breakthroughs is littered with examples of people deliberately taking time to tune out to create these “Eureka” moments when the new patterns are established, though it is not until now that the reason why time-outs work has been explained. For example, Charles Darwin would go for daily laps around a sand-strewn track in his garden at Down House in Kent, often referring to it as his “thinking path”.

Appliance of science

Knowing that this is how the brain works and applying that knowledge to teaching and learning are two very different things, and there is some frustration in the neuroscientific community that this information hasn’t filtered down to educators. As deputy headteacher turned psychologist Tim O’Brien explains, it would require a conceptual shift in the mind of teachers to implement any strategy that takes up lesson time with periods in which students could lose focus.

O’Brien also notes that the task is getting ever harder as we look outside our borders for our teaching inspiration. He’s critical of the kind of teaching methods that are popular in places such as China and Singapore, which are gaining popularity among some educators. “They seem to be very highly structured processes that really only



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benefit the elite, or people who can succeed despite it,” he complains. “If, say, you were to get everyone in the class to listen to some music and see where it takes them, it might come across as ‘the hippies are taking over the school’. But I think space should be given for multisensory consolidation so that people have time to restructure their thoughts.

“The unconscious mind associates, inoculates and consolidates. It actively participates in how we learn. Providing time for young people to make meaning out of what has been taught enables the emergence of unconscious learning. It promotes creative meaning-making as well as creative thinking and is inclusive in terms of meeting a range of learning needs.”

It’s not just a conceptual leap, but also a practical one. Oakley is arguing for a total time-out from structured learning, but it would be a brave teacher who hauled the whole class out for a walk around the block halfway through a calculus lesson, let a child switch to working on their geography homework if they became stuck on French verbs, or actively encouraged “mindless” staring out of the window.

As a more realistic alternative, Oakley suggests focusing for defined lengths of time (usually 25 minutes) with breaks – ideally filled with high-quality reflection time,

rather than phone-fiddling, to allow any new information to sink in and be processed.

Other ways to build in time for default-mode thinking, particularly around more creative tasks or consolidating new learning, include listening to music, watching videos, switching between familiar and novel topics, or just a few minutes of daydreaming.

Before you reach for the lava lamps and whalesong, it’s important to reiterate that what Oakley and others are advocating is not lessons full of daydreaming or kids playing on their phones. Quite the opposite: focus is very much still part of the plan.

Goleman supports the benefits of setting the mind adrift, particularly for creative tasks, but stresses that it has to be handled properly.

“With children, attention is the final pathway for learning,” he says. “Without attention nothing registers. It’s absolutely essential that we help children strengthen their attentional capacities, particularly in the current atmosphere of constant distractions.”

So as well as building in time for the default state of mind to do its work, particularly on creative tasks, Goleman says that we need to work to help students avoid the distractions of modern life. He says there are simple attention-strengthening exercises that can help





to build focus in the same way that lifting weights builds muscle. “I visited a second grade classroom in a down-and-out area of Manhattan called Spanish Harlem,” he explains. “These are seven-year-old children that come from very chaotic families, and about half the class has problems like attention deficit disorder. I thought that it would be chaos but in fact the students were very focused and calm.”

The secret to the classroom’s serenity? The teacher had given each of the students a small stuffed-animal toy called a “belly buddy”. When they need to concentrate, each child goes and lies down on a rug, puts the toy on their belly and watches it rise and fall as their lungs move, counting to three with every breath.

“It’s a simple attention strengthening exercise,” says Goleman. “Because the same circuitry for focusing calms turbulent emotions, the students were calm throughout the day – the optimal state to be in for learning.”

It’s strategies like this, along with an acknowledgement of the role of the unfocused mind and ways of bringing that state more into play in schools, that the new evidence suggests is the way forward for teachers. At the moment, teaching is all about focus alone but, as Oakley says, if we learned to embrace the unfocused mind, “everyone would benefit from it.” ●

Dr Kat Arney is a science author, broadcaster and co-presenter of the BBC Radio 5Live Science show

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