You Can Do It! Education

THE BRAIN LEARNS BETTER WHEN THE MIND IS RIGHT

A brain-based social-emotional learning review of You Can Do It! Education

Tammy-Anne Caldwell - The Mind-Brain Lady
Educational Neuroscience Specialist Teacher and Presenter,
You Can Do It! Education Trainer, Consultant and Co-Author

PREFACE

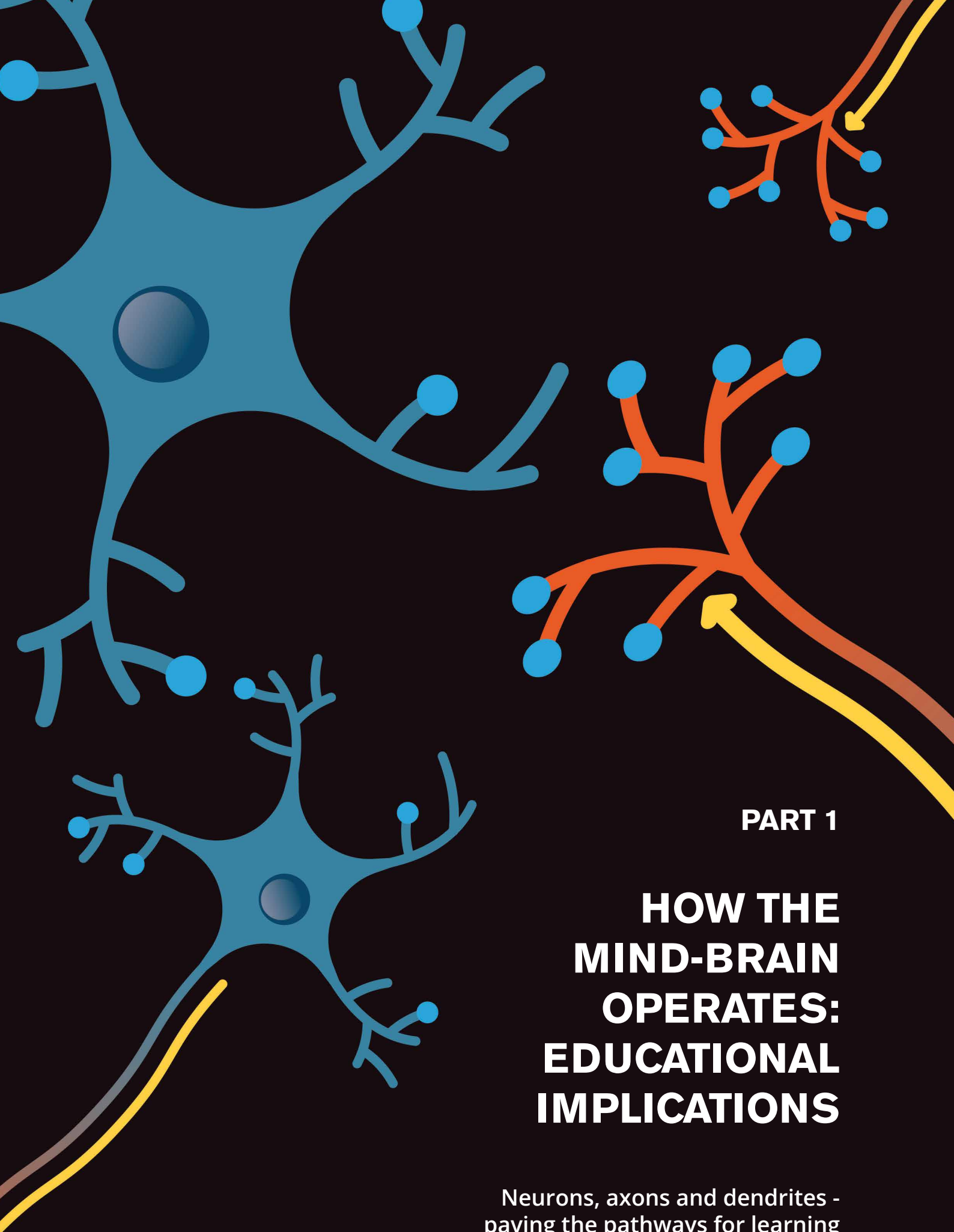
With a knowledge of how our students' minds and brains work, learn and grow best, we can create lessons that prime them for more effective learning and enjoyment, with better engagement, improved memory, and increased opportunities to take advantage of their brains' neuroplasticity potential.

As The Mind-Brain Lady, I always say:

'Since the brain is central to all learning, if we're in the business of learning, doesn't it make sense that we know how the brain learns best?'

In this paper, you will discover the science behind the learning activities that form part of the You Can Do It! Education Program Achieve lessons (Bernard, 2023a, b). As teachers, when we know the reasoning behind the activities provided in these lesson plans, we are far more likely to put in the effort to carry them out enthusiastically and as scripted, which results in more effective learning for our students. Understanding 'how and why' different learning tasks help or hinder the abilities of our students' brains is enormously empowering as a teacher.

You will also learn how helping your students' mental development through social-emotional learning improves their brain's physical development and their ability to learn academically.



PART 1

HOW THE MIND-BRAIN OPERATES: EDUCATIONAL IMPLICATIONS

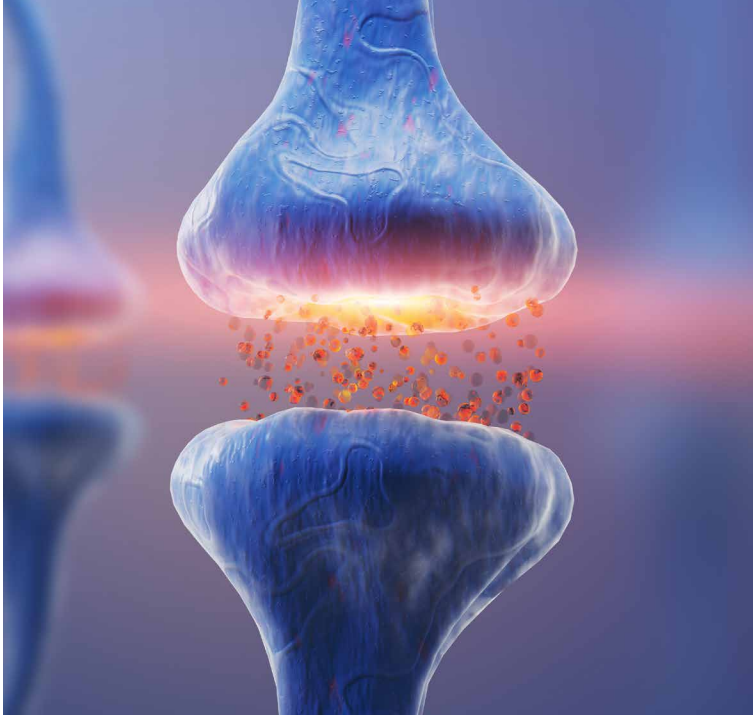
Neurons, axons and dendrites - paving the pathways for learning

Our students have approximately 86 billion brain cells making up the incredible organ inside their skulls. Microscopic brain cells are called **Neurons**, which look like little trees with roots (DENDRITES) and branches (AXONS).

An electrical pathway is created through the brain, between brain cells, for each thought and action our students have. One axon branch from one neuron will reach out and connect with a dendrite branch from another neuron. The connection process will happen between potentially millions of neurons to form complex electrical pathways for every fact students learn, every thought they have, every emotion they feel, and every skill they master. Each neuron can have thousands of connections with other neurons.

Electrical impulses, or action potentials, are the mechanisms by which a thought or action travels through the brain. In other words, electricity sends messages that allow thinking, learning, problem-solving, analysing, evaluating, and creating to occur throughout our students' brains. Importantly, when the branches of our students' neurons reach out and connect, they never actually touch. Instead, there is a minuscule gap between them, across which the electrical impulse, or message, must travel.

An electrical message cannot jump across the gap, so it relies upon messenger chemicals, or **Neurotransmitters**, to transmit the message between the neurons' branches. The end of each axon branch waits for neurotransmitters, ready to take the electrical message across the gap to receptor sites on the dendrite branch of the other neuron, where it is converted back into an electrical impulse. The cycle continues through potentially millions of neurons to create a pathway for every skill, fact or understanding our students learn. This transmission site between each brain cell is called a **Synapse**.



Neurotransmitters. The messenger chemicals

There are certain messenger chemicals, or neurotransmitters, that radically enhance learning, including but not limited to, Dopamine, Acetylcholine and Epinephrine.

Dopamine is the key neurotransmitter that triggers changes in our brain, or neuroplasticity. This 'reward chemical' is powerful in helping our students to feel more motivated and engaged, learn new things and form new memories. One of the critical ways Dopamine produces in our students' brains is when they experience positive emotions. Acetylcholine is essential for forming memories and is produced when students pay attention to what they learn and when they deem it to be meaningful and relevant. Likewise, epinephrine improves the formation of memories. Epinephrine is produced when our students experience relatively 'demanding' situations, or low-level states of agitation, requiring them to exert some *effort* in challenging tasks.

Educational Implication: Since the neurotransmitters dopamine, acetylcholine and epinephrine radically enhance learning, memory, thinking, creating, and problem-solving, it is essential as teachers to design

learning activities within our lessons that stimulate the production of these messenger chemicals. To begin with, we need to motivate and engage students at the beginning of a lesson and keep this engagement high throughout the lesson by causing the release of Dopamine in our student's brains. We can do this in several ways, such as:

- invoking positive emotions like curiosity and excitement
- telling stories
- running fun group competitions and quizzes
- having students draw
- playing music and games
- movement activities
- having students make predictions
- giving students simple choices to make
- social interactions and discussion among peers

We also need to ensure the students see the content and skills they are learning as important, meaningful, and relevant to their own life so they want to pay attention to it. And lastly, we need to ensure that our lessons involve just the right amount of challenge or 'agitation' so that our students are required to exert some effort in relatively demanding tasks, achieved via activities with time limits, quizzes etc.

Neural pathways: How your mind stores information and thoughts that affect your behaviour

Paving the Pathways

The first time a student learns anything new, whether a simple fact, any cognitive or physical skill, or any new thought, piece of information or perspective, an electrical pathway forms between the neurons for the first time. Since this pathway is brand new, it is relatively fragile, weak and slow. At this point, a solid long-term memory has not yet formed, and true 'learning' has not yet occurred. Think of the first time a baby tries to walk or the first time you learnt to drive a car.

When students repeat, revise and recall any given thought, action, skill or piece of knowledge, that particular neural pathway becomes stronger, well-worn, familiar and dominant. In doing so, the electrical impulses can travel that pathway faster and more powerfully. When this occurs, students have formed a memory. The effects of repeating, revising and recalling learned material is the science behind the saying, 'Practice makes perfect' and 'Neurons that fire together, wire together'.

However, if students don't continue to practice and repeat what they are trying to learn and remember, just like a pathway through a forest will eventually disappear if no one traverses it for an extended period, their unused pathways will eventually fade away, and they will struggle to remember what we once 'taught' them. This is the science behind the saying, 'Use it or lose it'.

Strong, familiar neural pathways are extremely powerful in determining our emotions and behaviour in response to a situation. For example, suppose you get angry quickly when things don't go your way. In that case, it's probably because a dominant neural pathway in your brain has

repeatedly triggered your anger response when things go wrong. The good news? We can change our existing neural pathways! With practice and repetition, we can change how we think, feel, and respond to bad events – in very powerful ways.

Importantly, when learning a new skill or understanding, we elaborate or extend our neural pathways by creating new pathways linked to a previously created pathway. Consequently, activating a student's prior knowledge and ascertaining their current skill set is essential when teaching.

Educational Implication: First, we need to help our students make links and connections with their prior memories, knowledge, and skills for the new information we try to teach them to be built on and added to. Then, for our students to learn effectively and form strong memories easily recalled at any time, we need to ensure that our lessons, and indeed yearly programs, incorporate multiple opportunities for repetition, revision & recall. If this doesn't occur, students will quickly forget what we are trying to help them learn, remember, and truly master.

Re-coding is a valuable and effective way to achieve repetition within a single lesson. Re-coding involves students taking some information they are learning and representing or re-coding it in different modes, such as reading, writing, discussing, role-playing, drawing etc. Importantly, for optimal memory retention, this repetition must occur in multiple learning modes, with the repetition moments spaced further and further apart over time. Spaced repetition is powerful because the longer the spaces between recall of learnt information, the more effort students need to exert to remember them, thus producing epinephrine, a helpful chemical messenger for learning new things.

Pre-frontal Cortex. Home for Student Executive Functions

The Pre-Frontal Cortex (PFC) is a major site of brain development during childhood and teenage years. It is a crucial brain structure that allows students to gradually learn to be more rational and logical and progress their higher-order thinking skills. The PFC is the last part of the brain to mature, beginning its early development in infancy and then undergoing a 'redevelopment' during the teenage years and early twenties.

The PFC can be thought of as the 'human', thinking, learning part of the brain; in other words, it is the most significant part of the brain for students to use while learning new things. It allows our students' brains to complete processes such as planning, putting things into perspective, creativity, focusing their attention, comprehension of information, reasoning with logic, risk assessment, impulse control, emotional self-regulation – and ultimately, thinking and learning.

Educational Implications: As teachers, we must ensure we consistently provide a variety of opportunities for our students

to flex and strengthen the many different higher-order executive functions of their Pre-Frontal Cortex. Activities that involve logical, rational, critical and creative thinking are enormously beneficial. These include goal-setting, evaluating, problem-solving, maintaining attention, emotional analysis, reasoning, metacognition, active listening, comprehension, decision-making, and other creative exercises. In addition, teaching students to use SEL tools rooted in rational thought, such as the 'Catastrophe Scale', to re-evaluate their thoughts and change the way they think is a very beneficial way of activating and flexing their PFC. Helping students develop a Growth Mindset is extremely powerful for more effective learning and involves using the Pre-Frontal Cortex. Faced with something difficult to learn, many students think, "I can't do this", but instead, when we help them to think ", I haven't learnt this YET", – it builds a more rational, beneficial mindset.

Amygdala: Switch it OFF in times of stress to allow the pre-frontal cortex to stay ON

The **Amygdala**, although it has other more positive roles, is most commonly known as the home to our brain's 'fight or flight' response. However, it's not just life or death survival situations that stimulate the Amygdala; this small almond-shaped part of the brain becomes highly activated when our students experience negative emotions such as fear, stress, anxiety, worry and anger. When the Amygdala becomes activated in students, their **Pre-Frontal Cortex**, which sits higher up in the brain behind their forehead, goes offline and begins to shut down.

Since the Pre-Frontal Cortex (PFC) is responsible for rational, logical thinking and higher-order learning skills, we must help students reduce negative emotions, such as anger and worry. In addition, when stress and anxiety activate the Amygdala, the Hippocampus, or the memory part of our brain, shrinks in size. So, high levels of Amygdala stress over extended period results in students who are intolerant, irritable, lacking creativity, negative, critical, have impaired memory and learning abilities, and are prone to making bad decisions.

One of the most common strategies for regulating arousal of the amygdala is found in the PFC's executive function of 'cognitive reappraisal'. Cognitive reappraisal involves deliberately changing and choosing the way we think about the meaning of a situation that would normally evoke strong negative emotions.

For example, by learning to place negative events on a mental 'catastrophe scale' to help us see that the real 'badness' of an event is often not as extreme as initially thought, we can learn to limit our Amygdala activation when something goes wrong. By allowing us to reappraise the negative event as 'not so bad,' we can calm down emotionally, choose helpful behaviours and regain the use of our PFC.

For this reason, when we help young people change their mind's thoughts (emotions and behaviours), we set their physical brains up for learning success.

Educational Implication: Students need repeated social-emotional learning activities to help them strengthen their capacity to self-regulate their amygdala activation and

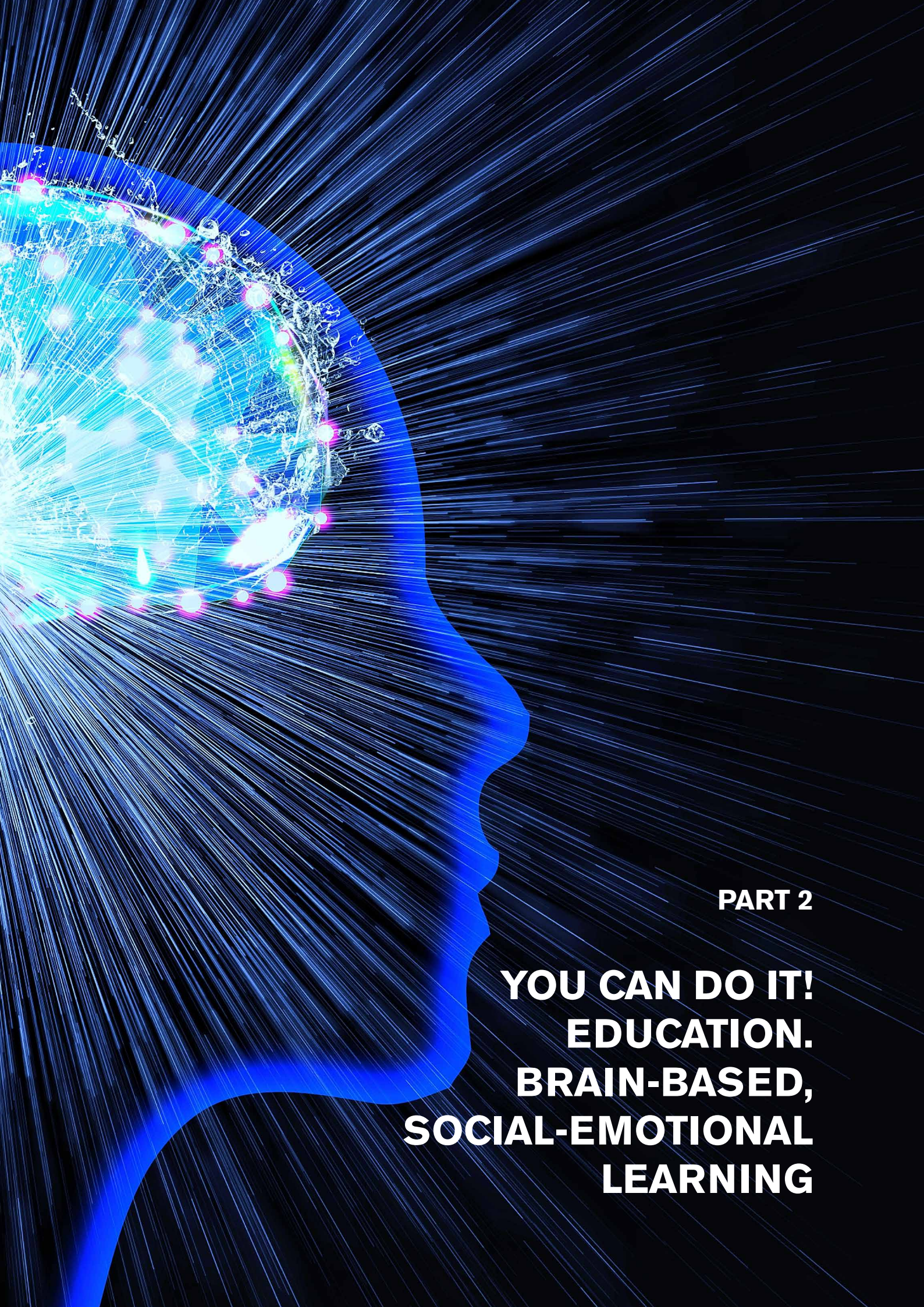
dial down the intensity of their negative emotions. When we help students choose rational, logical thoughts and create positive physical changes in their brains, we set them up for learning success; in other words, we need to help students learn the power of their minds over their brains. Teaching students cognitive reappraisal strategies, such as using the 'catastrophe scale', are essential. Furthermore, we need to teach students to use mindfulness techniques such as meditation, breathing exercises, movement, yoga and listening to music as powerful strategies to calm the Amygdala and boost emotional regulation in times of heightened arousal.

Mirror Neuron Effect. An additional way you can light up your students' electrical pathways

"We are hard wired to perceive the mind of another being." Dan Siegel, M.D., clinical professor of psychiatry.

As teachers, our emotions and attitudes towards the lessons we teach are quite literally contagious due to a phenomenon called the Mirror Neuron Effect.

Educational Implication: This simply means that if we are genuinely optimistic, curious, excited, and enthusiastic about the subjects we are teaching, the electrical pathways for these same emotions will be matched, or mirrored, in the brains of our students. Likewise, if we are apathetic, bored, grumpy, or annoyed in the lessons we teach, we cannot expect our students to feel any differently from us. A genuine smile is the easiest way for our positivity to 'rub off' on our students via the Mirror Neuron Effect.



PART 2

YOU CAN DO IT! EDUCATION. BRAIN-BASED, SOCIAL-EMOTIONAL LEARNING

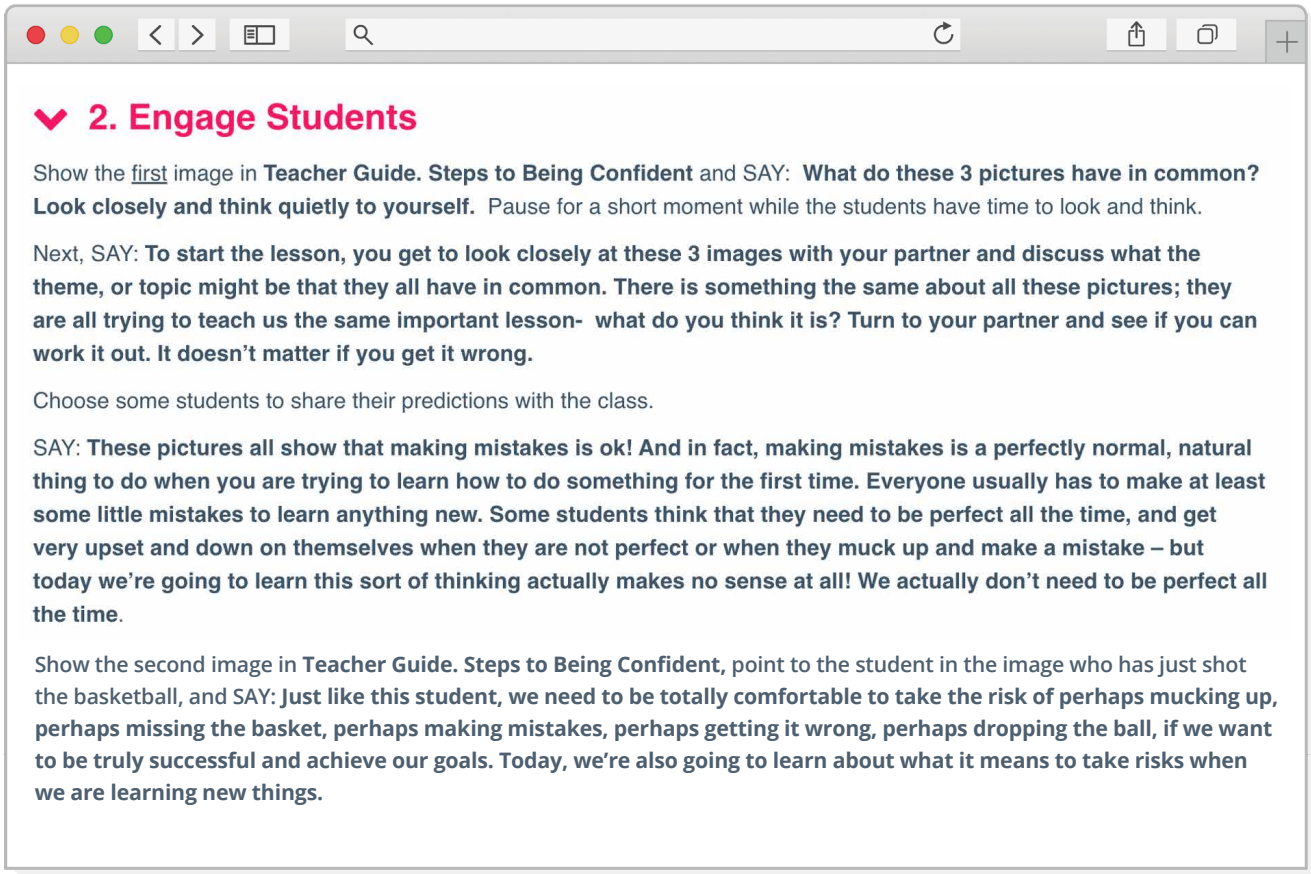
Founder of Australia's first social-emotional learning program, Professor Michael Bernard, designed You Can Do It! Education (YCDI!) to help students strengthen the five key social-emotional learning skills of Confidence, Resilience, Persistence, Organisation and Getting Along, plus 12 Positive Attitudes (e.g., self-acceptance, optimism, growth mindset, working tough) that support these skills and help reduce mental health difficulties such as anxiety, anger, worry and feeling down. Students learn this through cognitive restructuring and reappraisal techniques that help modify their ways of thinking. YCDI!'s Program Achieve curricula teach students of all ages the importance of values and character strengths. Beyond-Blue – Be You has recognised these YCDI! programs as best practice in supporting the mental health and wellbeing of students of all ages.

As a school-wide community, students, parents and teachers need to learn the relevance of social-emotional learning by understanding the bigger-picture goal behind You Can Do It! Education is to help students be successful and happy in school and life. You Can Do It! Education's professional development programs help school leaders and other staff to understand and accomplish this.

Based on the current science of brain-based teaching and learning, Program Achieve now incorporates a variety of new brain-based social-emotional learning activities, which:

1. Increase the variety of positive, interactive, social learning activities to heighten dopamine levels at the beginning of many lessons.
2. Incorporate visually stimulating images, props, and discussion prompts that arouse students' curiosity (producing dopamine). The release of dopamine due to their curiosity is what hooks their attention as dopamine motivates them to want to pay attention and be able to stay alert.
3. Include more re-coding activities that aid students processing and memory of new content via different learning modes.
4. Include relatively challenging tasks requiring students to exert effort and develop their pre-frontal cortex.
5. Help students see the lesson content and skills as meaningful and relevant to their lives and prior experiences.
6. Help students connect new social-emotional knowledge and skills with what they remember about similar content learnt previously.
7. Incorporate activities (as we have done in the previous edition) to increase student awareness of ways to regulate their Amygdala when stressed (e.g. slow, deep breathing).

Following is an example of a brain-based, social and emotional learning activity illustrating several of these instructional methods (Year 4, Lesson 4. Steps to Being Confident).



2. Engage Students

Show the first image in **Teacher Guide. Steps to Being Confident** and SAY: **What do these 3 pictures have in common? Look closely and think quietly to yourself.** Pause for a short moment while the students have time to look and think.

Next, SAY: **To start the lesson, you get to look closely at these 3 images with your partner and discuss what the theme, or topic might be that they all have in common. There is something the same about all these pictures; they are all trying to teach us the same important lesson- what do you think it is? Turn to your partner and see if you can work it out. It doesn't matter if you get it wrong.**

Choose some students to share their predictions with the class.

SAY: **These pictures all show that making mistakes is ok! And in fact, making mistakes is a perfectly normal, natural thing to do when you are trying to learn how to do something for the first time. Everyone usually has to make at least some little mistakes to learn anything new. Some students think that they need to be perfect all the time, and get very upset and down on themselves when they are not perfect or when they muck up and make a mistake – but today we're going to learn this sort of thinking actually makes no sense at all! We actually don't need to be perfect all the time**.

Show the second image in **Teacher Guide. Steps to Being Confident**, point to the student in the image who has just shot the basketball, and SAY: **Just like this student, we need to be totally comfortable to take the risk of perhaps mucking up, perhaps missing the basket, perhaps making mistakes, perhaps getting it wrong, perhaps dropping the ball, if we want to be truly successful and achieve our goals. Today, we're also going to learn about what it means to take risks when we are learning new things.**

PROGRAM ACHIEVE YEAR 4 | LESSON 2

Teacher Guide. Steps to Being Confident

PROGRAM ACHIEVE YEAR 4 | LESSON 2

Teacher Guide. Steps to Being Confident

The Amygdala and the Pre-Frontal Cortex

You Can Do It! Education focuses on understanding the unseen 'internal' mental events of how students feel and think (self-talk) that cause their observable 'external' behaviour (what they say and do).

Professor Bernard discovered that a set of positive and negative attitudes are at the core of student mindset – or rational and irrational beliefs. Program Achieve focuses on helping young people to become aware of and change their negative attitudes into positive ones, which is a role of the PFC. Learning to change their attitude does a lot to help students to promote positive rather than negative self-talk, feelings and behaviours and can prevent or reduce emotional and behavioural difficulties.

Program Achieve lessons teach students the power of 12 positive attitudes, including rational ways to think (self-talk), which strengthen the five key social-emotional skills, resulting in less activation of the amygdala and aiding retention of the PFC capabilities when stressful events occur. Using repetition and revision, students progressively and repeatedly practice these 12 Positive Attitudes (and become aware of their 12 negative opposites) so helpful ways of thinking can become automatic. Students can apply them when bad things happen without needing to be reminded. Students are ultimately guided to acquire the self-belief to handle themselves when faced with stressful situations and difficult people - without always needing the help of others.

The lessons help students perceive, interpret and evaluate reality in level-headed, moderate, non-extreme ways, positively affecting their thinking, emotions and behaviours - so that they are not extreme or self-defeating. These rational beliefs (e.g. self-acceptance, risk-taking, being independent, growth mindset, high frustration tolerance, acceptance of others) help students of all ages to emotionally cope when faced with life's stressors. As a result, Program Achieve helps students to self-regulate their Amygdala activation and retain the use of their PFC by helping them change the way their mind thinks.

Resiliency is particularly important and a core SEL skill taught in YCDI!'s Program Achieve. From a brain-science perspective, resilience is the essential skill that, when bad events occur, allows us to retain the use of our Pre-Frontal Cortex while preventing the Amygdala from being activated (or at least to prevent it from becoming significantly activated) and shutting down our ability to think, learn, and problem-solve. Resilience also includes developing an inner ability to bounce back quickly and calm our brain even after a highly negative response to an event by using strategies to switch off the amygdala when it is activated and regain the use of the PFC.

In Program Achieve, two powerful tools, the Catastrophe Scale and the Emotional Thermometer, help students learn how to re-evaluate how 'bad' an event is, therefore lowering their emotional intensity and boosting their rational thinking.

Students also learn different mindfulness techniques, such as breathing, meditation and yoga, which help to calm the Amygdala and increase emotional regulation in times of stress, anger or anxiety.

Essential Messenger Chemicals

Program Achieve lessons include a range of engaging and effective learning strategies to help students' brains create the essential neurotransmitters or messenger chemicals needed for enhanced learning and improved memory-formation.

Numerous activities involve social interaction, and many lessons include learning through movement, producing dopamine in our students' brains.

The Engage Students section of each lesson contains various visually stimulating images, props, and discussion prompts to arouse students' curiosity (producing dopamine). The release of dopamine due to their curiosity is what hooks their attention as dopamine motivates them to want to pay attention and be able to stay alert.

Lessons involve strategies for students to understand the topic's relevance and realise it is meaningful and beneficial to them (creating Acetylcholine), helping focus their attention.

Age-appropriate, relatively demanding aspects of every lesson, such as timed activities, involve students exerting effort (producing Epinephrine) to complete challenging tasks.

These updated lessons in Program Achieve contain a variety of activities that allow for the production of messenger chemicals, which radically enhance student learning.

Repetition

Program Achieve lessons revise and build on fundamental topics in an increasingly complex fashion from Year 1 to Year 10. Each lesson begins with a brief 'Review Previous Lesson Challenge' section before the new lesson builds on this prior knowledge.

The lessons within a term cover different components of the same social-emotional skills, allowing for continuous revision and elaboration over eight weeks. Throughout the year, the lessons include previously learnt knowledge and skills so students can link to their prior knowledge. A range of effective repetition and re-coding activities in various learning modes are spread throughout the lessons, including reading, writing, discussing, role-playing, drawing and more. Importantly, each lesson ends with a Goal Setting Challenge to encourage the topic to be remembered and practised throughout the week.

The repetitive components of Program Achieve mean that our students can form stronger neural pathways, consequently forming solid memories of the skills and content taught.

Mirror-Neuron Effect

When teaching Program Achieve lessons, it is essential for our student's success that we are excited, positive, and genuinely 'on board' with the importance of social-emotional learning and helping our students develop the skills and attitudes that You Can Do It! Education helps us to teach. As teachers, our emotions and attitudes towards the lessons we teach are quite literally contagious due to a phenomenon called the Mirror Neuron Effect. To increase staff 'buy-in' and enthusiasm, have teachers participate in You Can Do It! Professional Development sessions to learn more about the incredible importance and benefits of social-emotional learning and the various components of Program Achieve. After completing the PD and whole-school 'buy-in' has been achieved, teachers' increased enthusiasm for and genuine interest in teaching the topics in Program Achieve will mean students' brains will mirror their positive emotions about the lessons.

Summary

As educators, we can now teach the lessons in Program Achieve with the knowledge of how mental blockers in a student's mind (anxiety, anger, worry, feeling down) affect the physical learning ability of our students' brains and why reducing them and increasing the five key skills literally and physically helps to set their brains up for

lifelong success.

In addition, as teachers, we now know the brain science behind the activities provided in the Program Achieve lesson plans and how these activities allow for more effective, engaging, and enjoyable learning for our students.

Lastly, as teachers who want to help our students reach their true potential by using You Can Do It! Education, we can teach them ways to take control of their thoughts, develop rational, logical thinking and improve social-emotional skills. Then our students can self-regulate their Amygdala's activation and strengthen the use of their pre-frontal cortex.

After all, getting the mind right helps the brain learn better.

Background References

Basso, J.C. & Suzuki, W.A. (2017). The effects of acute exercise on mood, cognition, neurophysiology and neurochemical pathways. *Brain Plasticity*, 2, 127-152.

Bernard, M.E. (2023a). *You Can Do It! Early Childhood Program Achieve, 5th Ed.* East Melbourne: The Bernard Group. https://youcandoiteducation.com.au

Bernard, M.E. (2023b). *Program Achieve. A Social-Emotional Learning Curricula (Primary; Secondary), 5th Ed.* East Melbourne: The Bernard Group.https://youcandoiteducation.com.au

Bernard, M.E. & Terjesen, M. (Eds.) (2020). *Rational-Emotive and Cognitive-Behavioral Approaches to Child and Adolescent Mental Health: Theory, Practice, Research, Applications.* Cham, Switzerland: Springer Nature, pp. 543.

Dweck, C., & Yeager, D. *Global Mindset Initiative Introduction: Envisioning the Future of Growth Mindset Research in Education* (August 25, 2021). Available at SSRN: https://ssrn.com/abstract=3911564.

Ellis, A. (1962; 1994 rev ed.). *Reason and emotion in psychotherapy*. Secaucus, NJ: Lyle Stuart and Citadel Press.

Ratey J. (2013). *The Revolutionary New Science of Exercise and the Brain*. New York: Little Brown.

Siegel, D.J., & Bryson, T.P. (2012). *The Whole-Brain Child.* New York: Penguin Random House.

Willis, J. (2008). *How Your Child Learns Best: Brain-Friendly Strategies You Can Use to Ignite Your Child's Learning and Increase success.* Nashville, Tenn: Sourcebooks.

Willis, J.& Willis, M. (2020). *Research-Based Strategies to Ignite Student Learning, Insights from Neuroscience and the Classroom.* Alexandria, VA: Association for Supervision & Curriculum Development.

youcandoiteducation.com.au

Tammy-Anne is an experienced You Can Do It! Education social-emotional learning trainer who presents staff professional development on how to best use Program Achieve in schools. She is a qualified teacher of 10 years who also runs Above & Beyond Education, sharing her Brain-Based Holistic Approach to Well-Being, Teaching & Learning in highly-recommended teacher PDs, student Year 1–12 incursions, and parent engagement workshops. If you are interested in learning more about educational neuroscience & mind-brain education and how to implement it at your school, please head to:

Website:
abovebeyondeducation.com
Facebook:
facebook.com/abovebeyondeducation
Email:
abovebeyondeducation@outlook.com