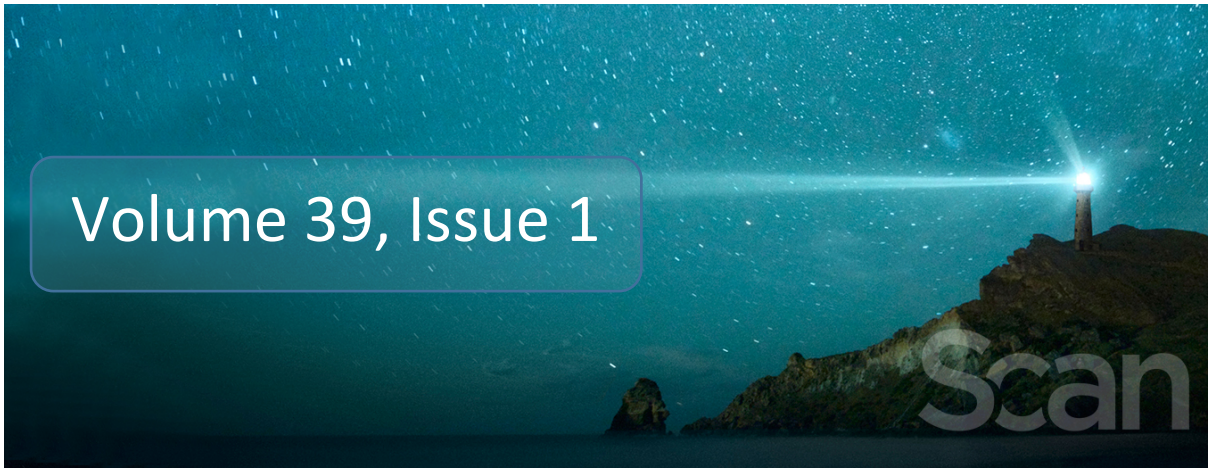

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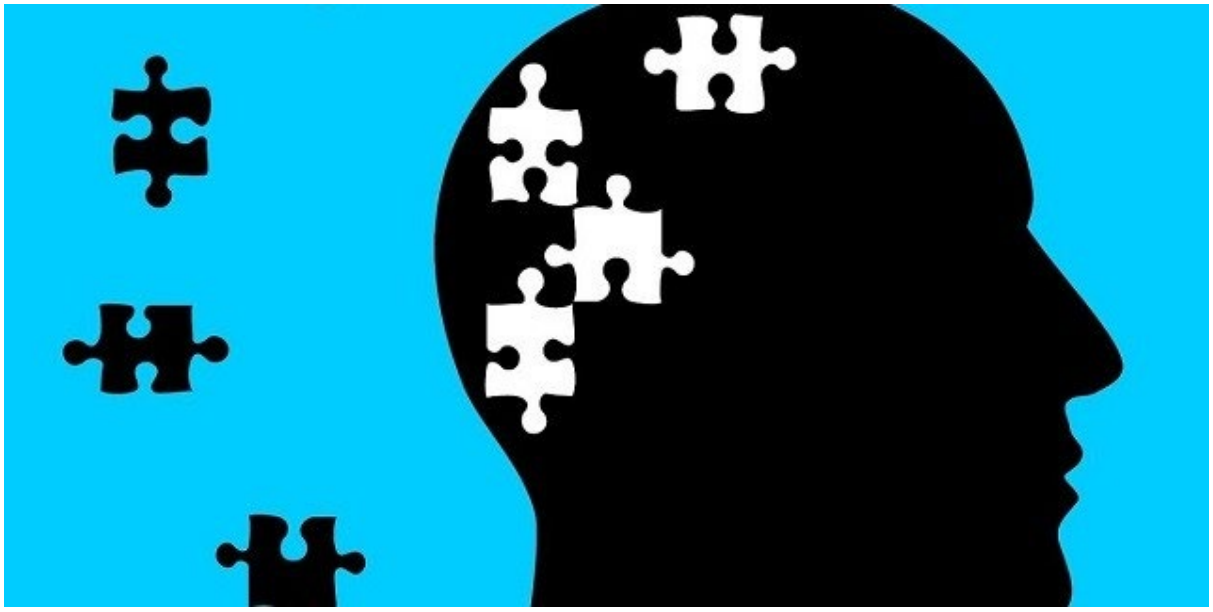


Enhancing memory for learning: Teachers' journeys of implementing memory strategies in their classrooms

Peer reviewed article

Dr Richard Johnson, Dr Sam Ginsberg and Dr Naomi Wilks-Smith

Introduction and literature review

Memory is a key component of learning at all levels of education. Memory is defined as 'the mental capacity or faculty of retaining and reviving impressions, or of recalling or recognising previous experiences' (Macquarie Concise Dictionary, 2013, p. 732). Without memory, we can't keep what we learn. In fact, without memory, there would not be learning. In many cases, we know we've learned because we can recall information. Memory is the glue that holds learning together therefore, students should learn memory strategies to maximise their learning (Radvansky, 2017).

> Memory involves the processes of 'encoding' information, 'storing' it in memory and 'retrieving' it. Encoding is the process of transforming information into a form that can be stored in memory. Storing involves maintaining the information in memory and retrieving is re-accessing the information that has been encoded and stored.

Throughout history and across cultures, techniques have been used to encode, store and retrieve large quantities of information. Australian Indigenous cultures, as well as other indigenous cultures, have encoded information in memory using such things as song, dance, story and place (Kelly, 2015). 'Elders memorised the knowledge on which survival, physically and culturally, depended: entire field guides to all the animals and plants, navigational charts, genealogies, laws, resource rights, trade agreements, land management, astronomy, geology ... all in memory' (Kelly, 2016a, p.1). A variety of techniques were used for the memorisation of such vast quantities of information in oral cultures including using monuments as mnemonic devices and encoding knowledge in the landscape with features each representing a different element of that knowledge, known as the 'Method of Loci' (Kelly, 2015). Astronomical features were also used as a form of landscape for memory. Additionally, such things as inscribed stones, rock art, decorated boards or totems, collections of symbolic objects, and knotted chords each provided memory aids. Songs, dances and stories also served as memory devices, capable of storing large quantities of knowledge.

Over time we have lost the ability to encode, store and retrieve such large quantities of knowledge and information in our own memories, however, we can draw from the methods of the past in our current education system to improve our memories to in turn improve learning (Kelly, 2019).

A broad range of literature identifies both theoretical understandings of memory as well as practical memory strategies that are applicable to classroom teaching and learning contexts. One foundational theoretical understanding about memory is the 'total time hypothesis' proposed by Ebbinghaus in 1885, which identifies that the amount of time learning relates to the amount of recall (Baddeley, Eysenck & Anderson, 2014). It could be suggested that 'more time equals more recall' is common sense, however, subsequent research builds on this and clarifies the nature of the learning time. Baddeley and Longman (1978) found that 'distributed practice' is most effective, whereby many short sessions are better than one long session of learning. On a practical level, this information is important to both teachers and students who can plan to enhance memory for learning by spreading out the learning over-time rather than concentrating it in one block of time.

Research such as that of Landauer and Bjork (1978) found that testing has a positive effect on memory. Specifically, they found that testing after a short delay, with delays gradually increasing, known as 'expanding retrieval' is most effective. This concept is more recently known as the 'spacing effect' (Pashler, Rohrer, Cepeda & Carpenter, 2007) and has been used for learning across a wide range of curriculum areas. Classroom evidence has identified that testing after learning new materials is found to have a greater impact on memory than spending more time learning the material (Bangert-Drowns, Kulik & Kulik, 1991; Roediger & Karpicke, 2006). This identifies that learners need to practice retrieving information, not just learning it. Landauer and Bjork (1978) emphasise the importance of testing with feedback, claiming that incorporating feedback with testing is more effective than more time learning. This claim is supported by a study of foreign language learning using such an approach by Karpicke and Roediger (2008).

The concept of 'priming' whereby the introduction of the topic, content, or words to be learned before starting the lesson that they will appear in is important for the memory of learning (Schacter, 1992). Priming provides a form of tuning students in to learning and increases their attention to the features to be learned and in turn increases their memory for those features. This strategy could easily become a natural part of teachers' lesson plans. It would help teachers to articulate what it is they want students to learn before commencing a lesson and would focus students' attention on the key concepts at the start of the lesson.

The 'von Restorff effect' proposed in 1933, suggests that an item to be remembered needs to be distinctively different from other items (Baddeley, Eysenck & Anderson, 2014). On a practical classroom level, this means that items to be remembered need to stand out in different ways, for example, a word on a list to be remembered should be written in a different colour to make it stand out from the other words. With a similar purpose, the Sans Forgetica font (RMIT, 2019) was developed to be distinctively different based on the concept of 'desirable difficulty' (Yue, Castel, & Bjork, 2013). Gaps and slants are embedded in the font requiring learners to put in more effort and engage in deeper cognitive processing when learning which leads to greater retention. The font was tested with 400 Australian university students, providing evidence that it increases memory (Deutrom, 2018; Earp, 2018).

Memory techniques including mnemonics have long-standing popularity (McPherson, 2004). Some involve visual imagery, whilst other forms of mnemonics include the items to be remembered in a story. Experimental studies using story mnemonics (Bower & Clark, 1969) and mnemonics for learning Pi (Hu, Ericsson, Yang & Lu, 2009) identify the success of learning using mnemonics.

The Method of Loci where items to be remembered are associated with locations familiar to the learner dates back to the first century BC (Baddeley, Eysenck & Anderson, 2014). Although it is known as an historical method for memory, there can be application of such a technique in a range of modern learning contexts. Equally as effective as the Method of Loci is the 'pegword system' (Wang & Thomas 2000). This system associates items to be remembered with 'pegwords' that rhyme, for example, each number has a rhyming word that links to an item to be remembered.

Many of these memory strategies include visual imagery. One example is 'mind maps' which are diagrams in which related items are linked to a central item. Similarly, are 'concept maps', diagrams which represent concepts from general to more specific concepts. Experimental research that investigated the impact of concept maps on medical students' learning found that their learning was enhanced when using concept maps (Farrand, Hussain & Hennessy, 2002; Veronese, Richards, Pernar, Sullivan & Schwartzstein, 2013).

Another area of research identifies the positive impact of learning with gestures on students' recall and memory. In a primary school second language learning context, the learning of a Japanese story with gestures and the viewing of those gestures during students' re-tell of that story significantly increased the quantity of Japanese that students could produce, including more of the story content (Wilks-Smith, 2019).

This range of research, although not exhaustive, provides some examples of successful strategies that improve memory and learning. In current times, there remains a need for learners to have a range of memory strategies to learn and to strengthen their learning. Students can directly benefit from a focus on learning strategies that improve memory and through an overall emphasis on explicitly addressing memory as a building block for learning (Kelly, 2019). It is timely to focus on how we learn and examine the importance of memory in that process of learning.

One group of teachers from a school in Melbourne, Australia, sought to embed memory into their pedagogical practice and document the impact it had on students' learning. The study is a pilot project on the impact of memory strategies used by these teachers across a range of primary and secondary school classes, in a range of curriculum areas. The data reported in this paper is teachers' self-reported findings and reflections on their experiences of embedding memory strategies into their practice. This pilot project highlights the importance of memory and the teaching of strategies to enhance memory. It also provides new knowledge about how teachers use memory strategies in practice to optimise recall by learners and to improve their overall teaching capacity.

Research Project

Aim and research questions

This pilot project was carried out in response to a request from the participating school and teachers for professional learning and tailored support to embed memory strategies into their teaching. This was an area of professional need self-identified by the school. The aim of the project was to embed research about memory and classroom teaching strategies that focus on memory into teachers' practice. Five participating teachers used action research to explore strategies to improve students' memory with the aim of improving student learning. The pilot project aims to showcase these five teachers' journeys implementing memory for learning strategies in their classrooms in a variety of year levels and across a range of curriculum areas, to inform future pedagogy and practice. It contributes these context-specific examples of research-informed teaching practice to the existing body of literature. The aim of sharing the pilot study is to remind current teachers about memory strategies for teaching and learning and to showcase a range of examples of practice across a variety of curriculum areas, as well as to introduce these to new pre-service teachers.

The guiding research questions for the study were:

1. What memory for learning strategies worked or didn't work in each classroom context?
2. What are the implications of the findings for pedagogy and practice?

Ethical Approval

The project was granted ethical approval from RMIT University and The Department of Education and Training Victoria.

Context

The pilot project was conducted in one government co-educational college in a northern suburb of Melbourne in Australia. It is a K-12 college comprising of approximately 3,000 students. It is a unique school that offers students the opportunity to continue their education at the same college from kindergarten until the end of secondary school. It was founded in 2014 and is located in a growth corridor of new housing development. The college proudly embraces a wide range of educational innovations and strives to exemplify 21st Century learning.

Participants

Teachers from primary and secondary levels at the college were invited to be participants in the pilot project. The aims of the study were communicated with teachers at a staff meeting and explained in a plain language statement and consent form. Participation was voluntary and was not an expectation of the school.

Seventeen teachers gave consent to participate in the study, however, only five teachers continued their participation for the two school terms of the project. This article reports on the experiences of those five teachers.

Methodology

The research design used for this project is action research (Cohen, Manion, & Morrison, 2011). An ongoing, systematic cycle of action research was used by teachers to implement a new teaching strategy with a focus on improving memory for learning. Action research was deemed appropriate as it is a situationally responsive method to provide authenticity and voice to research that impacts on practice (Cohen, Manion, & Morrison, 2011). Action research in this study involved cycles of planning, acting by implementing plans, observing, gathering feedback, reflecting on the implementation of the new strategy and students' learning, modifying the plan based on findings and then repeating the cycle. The following image depicts the processes involved.

The action research cycle

The action research also included 'an approach in which the action researcher and a client collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis' (Bryman and Bell, 2011, p.414). In the context of this project, the action researchers were the teachers and the collaborators were teacher-researchers who provided professional learning, supported by in-class observations, feedback and advice to the teachers throughout the project. The authors of this paper were the teacher-researchers.

The Timperley Evidence-Based Professional Learning Cycle (Timperley, Wilson, Barrar & Fung, 2007; Timperley, 2010) was also an important part of the action research. The use of the cycle enables evaluation of the impact of professional learning on teachers' practice and also on students' learning outcomes through the scope of its five dimensions:

1. What do my students need to be able to know and be able to do?
2. What do I need to know and be able to do in response to my students' needs?
3. How do I go about deepening my knowledge and refining my skills?
4. What happens in the classroom when I apply my learning?
5. What impact did my learning have on my practice and on my students' learning?

The pilot project focused on working with teachers, their responses to the research, their own ideas for memory practice in their teaching contexts and pedagogy. Teachers were presented with the memory-enhancing strategies identified in the literature review, were encouraged to trial one or more within their own classroom practice and measure effectiveness using their current assessment practices. Research and readings were posted regularly on a Google Community site for all participating teachers to access which was the major forum for the sharing of ideas and discussions. The Google Community site was populated with succinct and engaging material on learning and the importance of focussing on teaching strategies that directly improved memory. The aim was for teachers to interact with the resources and translate the research and strategies recommended to their own classroom practice. Additionally, teachers participated in a professional development seminar with Dr. Lynne Kelly, author of the seminal text 'The Memory Code' (Kelly, 2016b) as the guest speaker, who focused on 'Memory methods for education' which provided a research knowledge base for teachers.

Dr Kelly's contribution to the field of memory research can be understood from her TEDx talk: Modern memory, ancient methods (16mins 49 secs).

Teachers were mentored directly throughout the project and there was a college-based coordinator who oversaw the project. Research on memory was discussed with the teachers and teaching strategies and activities relevant to their practice were suggested. In addition to bringing research to the teachers, teachers' own ideas were generated through processes of discussion that became stimuli for action. The mentor attended participating teachers' classrooms at their invitation and discussed their pedagogy, examined curriculum documents, and made recommendations for practice. Face-to-face discussions at the school and visiting classrooms as a 'critical friend' were key strategies, each with a focus on improving memory to improve learning. Teachers individually discussed memory pedagogy with the mentor, embedded new memory strategies into their practice, received feedback and reflected together, which in turn informed the next stage of action research, planning, pedagogy and practice. The pilot project culminated with a sharing session of each teacher's project and teachers' written reflections were submitted to the researchers. The data reported in this paper is teachers' self-reported findings and reflections on their experiences of embedding new memory strategies into their practice.

The memory strategies used by teachers in the pilot project included:

- Music and rhythm
- Visualisation
- Pictures
- Method of Loci
- Chunking content
- Priming
- Increase test/retest
- Flashcards
- Sans Forgetica font.

A discussion of these strategies and what they looked like in classroom practice are shared in the following section.

Examples of practice

This section of the article discusses each teacher's experiences implementing a new memory strategy into their classroom practice. Each teacher's action research journey was unique to their own context, year level, curriculum area and teaching philosophy, and so unsurprisingly their learnings and reflections reflect this uniqueness. This section provides examples of teaching pedagogy and practice, shares selected teachers' findings and reflections, and discusses implications for future action research and practice. Therefore, each example of practice addresses the two research questions:

1. What memory for learning strategies worked or didn't work in each classroom context? and
2. What are the implications of the findings for pedagogy and practice?

Memory strategies for music

Two music teachers were already using memory work in their pedagogy and embraced the project for the direction it offered them to build on their current work and provide validity and a platform for their work.

Music teacher 1

The key aim for this project was to embed a memory strategy into a sequence of Year 7 and 8 music lessons that introduced the concept of 'intervals' in western music. Students then used this understanding to navigate the keyboard in relation to the major Blues scale.

A range of memory strategies were taught then trialled with the Year 7 and 8 classes, including visualisation techniques and Method of Loci. The teacher explained that, 'As a class, we have discussed different memory/remembering techniques and how we might apply them to recall the different notes and scales. The class has attempted to use some visualising strategies to help identify the notes within the scale. We have spoken about repeating patterns as well as showing visual displays as examples. Students spent time practising different memory strategies and articulating what they were thinking to assist in recalling the scale. A number of students liked the idea of placing ideas into their 'memory house' (Method of Loci). One student shared that he had matched the visual pattern with features in his kitchen. He then drew a map of his thinking on the board to share with the class. Using features of his kitchen, he was able to map the keyboard layout 'matching' the blues pattern. Another particularly successful memory strategy was using ... iconic music or tones from pop culture to help remember the different intervals. For example, Minor 2nd = Jaws Theme (chromatic), Major 2nd = Happy Birthday, Perfect 5th = Twinkle Twinkle, etc.'

The provision of choice for students to select a memory strategy that they wanted to individually try reflects the teacher's overall teaching philosophy. Having a choice from a range of strategies was motivating for students and empowered them in their learning. When reflecting on the impact of using the memory strategies for learning, the teacher noted, 'It is difficult to say whether this task has improved the memory of students. This process would need to be reinforced with students and tested further along in the unit to check their recall. Some students found it hard to articulate how they were able to remember how to play the Blues scale, which makes it difficult to assess what strategies they are using. As each learner is different, exploring a range of memory strategies and allowing students to practise and apply different strategies to make their own assessments as to what they find most effective would be ideal.'

'The most common strategy within the class that proved effective was the visual aid and looking for repeating visual patterns. Few if any students were able to recognise the pitch of each note in relation to the tonic. Instead, students were far more likely to hear a relationship between each consecutive note in the scale. For example, going up the C minor blues scale, relating each note to the next note. C - Eb (Minor 3rd - Beverly Hills Cop), Eb - F (Major 2nd - Happy Birthday), F - F# (Minor 2nd - Jaws), F# - G (Minor 2nd - Jaws), G - Bb (Minor 3rd - Beverly Hills Cop), Bb - C (Minor 2nd - Happy Birthday).'

The teacher was pleased with the impact that a variety of memory strategies had on students' engagement and their memory for musical patterns. This positive outcome led the teacher to express a desire to continue to embed memory strategies into their teaching pedagogy and practice, explore more memory techniques and allow students to trial them in different areas of their learning. The teacher noted that the short duration of time for explicit teaching with memory strategies made it hard to gauge the effectiveness of the strategies and the impact on students' memory, so an extended period of teaching time using memory strategies would be beneficial.

Music teacher 2

This Year 7 music teacher focussed on a memory strategy to support students playing the Djembe Drums the West African way. Rather than teaching the pattern to the class with a West African vocalisation or a phrase which was common practice, it was taught as a visual sequence, with the teacher describing each sound as they were produced, for example 'bass bass tone tone base mute slap'.

The teacher remarked on the success of the strategy and the speed at which it was picked up by students. When commenting on the development of learning of one student, the teacher said, 'Her main motivation for remembering the pattern was that she really loved learning and playing the pattern and had the movements of her hands visually memorised. She has practiced it over and over, so she is able to play it quickly when recalling it.' The teacher commented on overall increases in students' motivation, success in learning with a visual sequence and a faster rate of learning. As a result, the visual memory strategy will continue to be embedded into the teaching pedagogy of this teacher's music classes.

Memory strategies for humanities

Flashcards and student journals were used in humanities to encourage Year 9 students to develop their metacognitive skills with a particular focus on developing their memory and being conscious of their efforts and the impact on their learning. One explicit memory strategy that was used in humanities was the use of chunking content and including visual/pictorial cues together with text. An example of this technique used by students in their work is shown below.

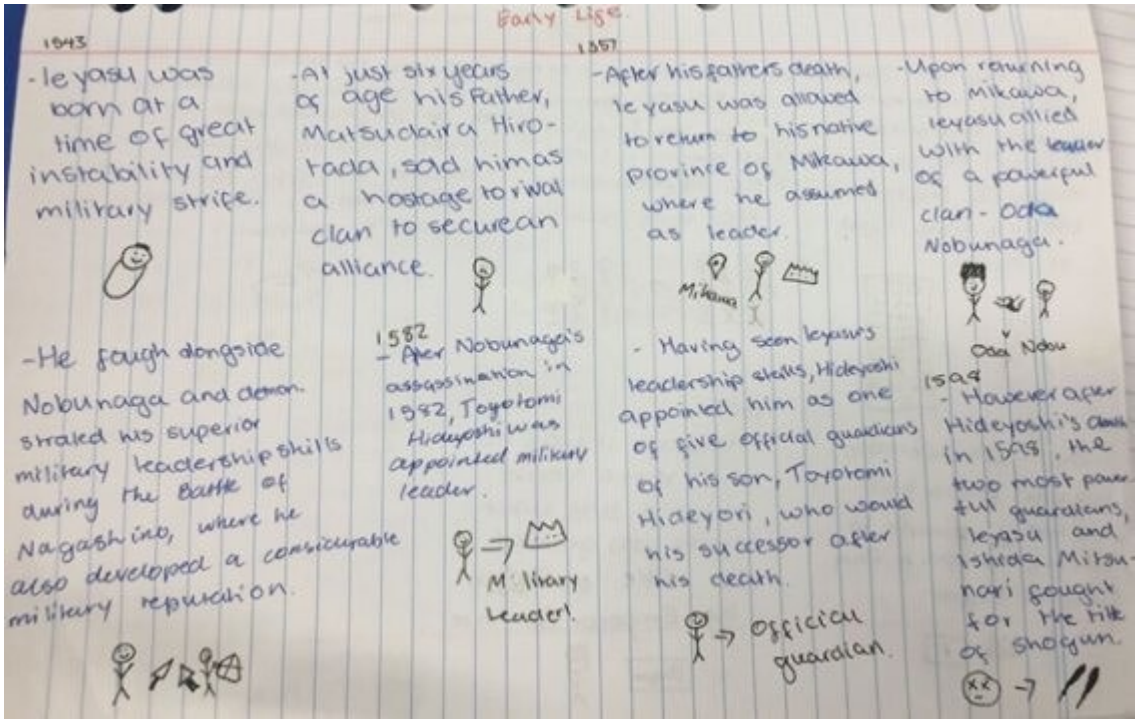
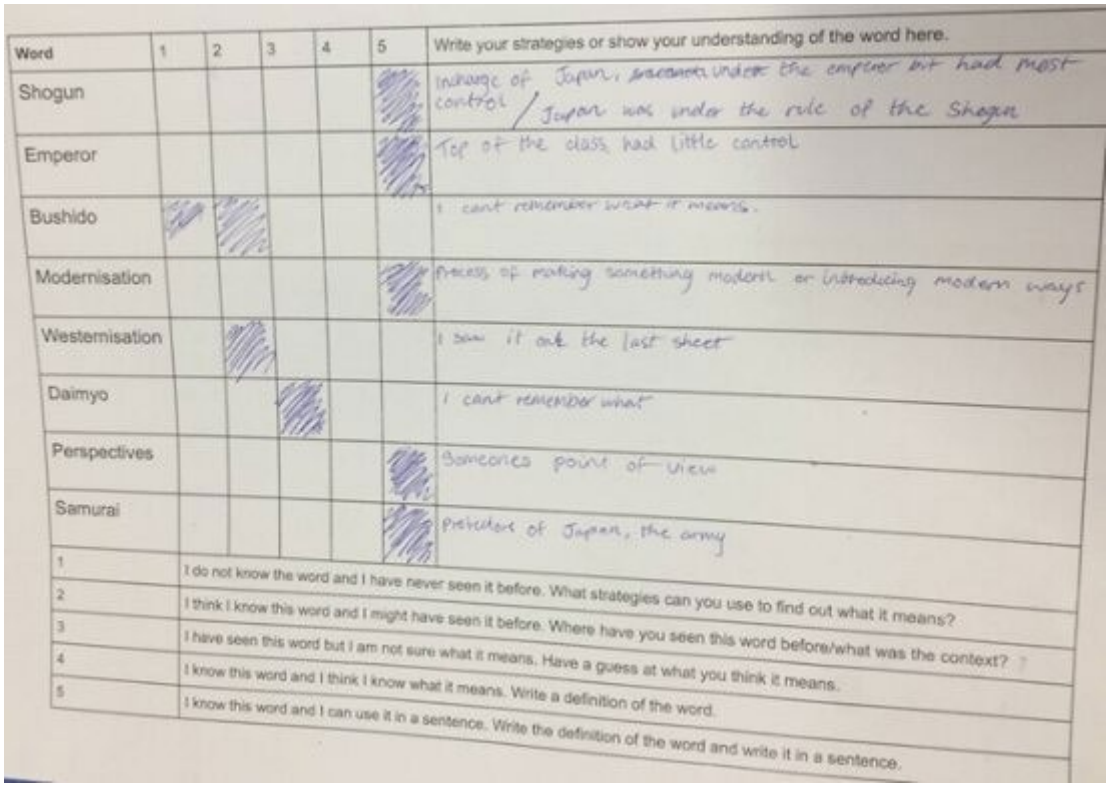


Image:Chunking content, with pictorial cues

Students then used self-assessment rubrics to reflect on their knowledge of the new humanities terms and identified the strategies they used to learn them.



Word	1	2	3	4	5	Write your strategies or show your understanding of the word here.
Shogun						Incharge of Japan, under the emperor but had most control / Japan was under the rule of the Shogun
Emperor						Top of the class had little control
Bushido						I cant remember what it means.
Modernisation						Process of making something modern or introducing modern ways
Westernisation						I saw it on the last sheet
Daimyo						I cant remember what
Perspectives						Someones point of view
Samurai						Protector of Japan, the army

1	I do not know the word and I have never seen it before. What strategies can you use to find out what it means?
2	I think I know this word and I might have seen it before. Where have you seen this word before/what was the context?
3	I have seen this word but I am not sure what it means. Have a guess at what you think it means.
4	I know this word and I think I know what it means. Write a definition of the word.
5	I know this word and I can use it in a sentence. Write the definition of the word and write it in a sentence.

Image:Self-assessment rubric

Students responded positively to the inclusion of these strategies in humanities and anecdotally, the teacher found them to be a successful strategy to support students' learning of new terms and information. The teacher will continue to include these memory strategies within this context and

will explore ways to identify the impact of these memory strategies for learning more formally as part of future teaching practice.

Memory strategies for mathematics

The focus in Year 2 mathematics was on how memory strategies could help students retain addition and subtraction strategies. The teacher shared that '... I've noticed, and I've heard other teachers say many times that students don't remember what we are teaching them. Especially when we come back after school holidays from year to year. It's as if they regress.' The memory strategies used with the teaching of addition and subtraction were 'priming' and 'increase test/retest'.

The teacher explains, 'Priming students means that I'm preparing them before the maths session, for example, in the morning when I go through the visual timetable that outlines the day's sessions, instead of just saying 'in session 3 is maths', I would say 'in session 3 is maths and we will continue learning near doubles'. Another part of priming is priming students with the big picture and how important it is. This means that I put addition and subtraction into context and make it relevant for students, students must understand why and how addition and subtraction is used in everyday life in their world. So, I used a lot of word stories or word problems that the kids could relate to.'

'Increasing test/retest has been as simple as having the students create their own set of addition & subtraction flashcards (based on number facts of 10 and extending these and doubles and near doubles) and having the students test the person next to them at the beginning of a session. Playing games is also another way of incorporating test/retest.' Engaging children in the preparation of test/retest flashcards extended their focus time on the content to be learned and engaged the creativity of students. The teacher shared, 'I find it interesting how so many of the memory strategies can be combined. For example, distribution of practise can include using priming in the morning or test/retest at different times like lunch eating time or end of day reflection so that would mean doing two memory strategies at once, test/retest while using the spacing effect.'

The teacher was very pleased with the test results of students after using the memory strategies in maths. The teacher also noted, 'another important indicator to me is their engagement in maths. My students have a really positive attitude towards maths.' After this pilot project, the teacher commented that 'I am more aware of the importance of memory in learning' and as a result 'I will in future try to factor in memory strategies into planning'. The teacher also acknowledged the benefit from supported professional learning, stating, 'I would like to do more PD (professional development) on learning and memory to improve my knowledge and practise.' These comments identify a wide variety of implications for future pedagogy and practice based on the teachers' experiences in the pilot project.

Memory strategies for science and mathematics

A Year 7 teacher used science and mathematics as areas of focus for this memory study. The teacher made innovative use of flashcards with the Sans Forgetica font to promote memory of new science and maths terms.

The Sans Forgetica font is the first typeface specifically designed to help learners retain more information and remember more. The font was developed by researchers from RMIT University using a learning principle called 'desirable difficulty', where an obstruction is added to the learning process that requires learners to put in just enough effort, leading to better memory retention to promote deeper cognitive processing. Sans Forgetica has varying degrees of 'distinctiveness', created by the gaps and left slant built in, that subvert many of the design principles normally associated with conventional typography. These degrees of distinctiveness cause readers to dwell longer on

each word, giving the brain more time to engage in deeper cognitive processing, to enhance information retention.

Sans Forgetica is available for free.

Image:Sans Forgetica

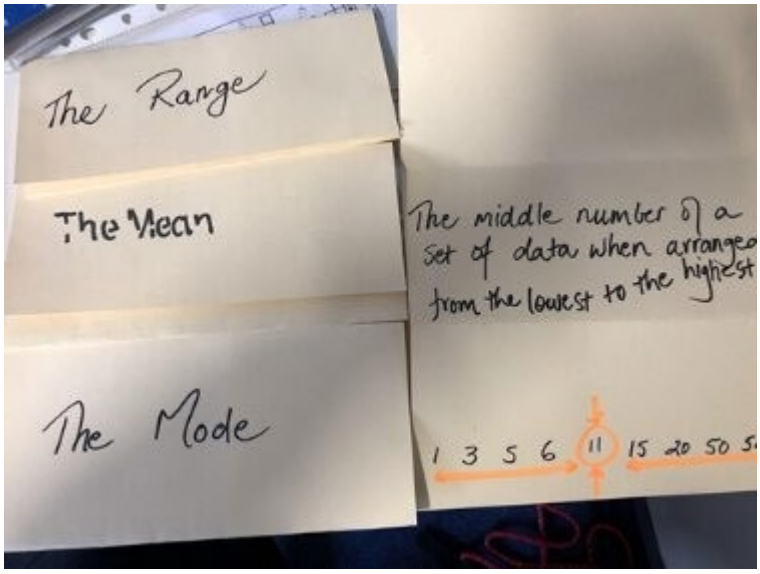


Image:Sans Forgetica - flash cards

The teacher recognised the importance of 'attention' in memory and learning (Horsley 2016) and found that the use of flashcards with the Sans Forgetica font was a successful method with Year 7 students in science and mathematics. This method will continue to be used by the teacher with future classes.

Conclusion

This paper reported on a pilot project that focused on the implementation of memory strategies grounded by research into the classroom practice of five teachers from a co-educational K-12 college. The project provided the opportunity for teachers to explore memory strategies for learning within their own teaching context. The teachers' action research journeys were shared which provided specific examples of practice using a variety of strategies with a range of year levels, content and curriculum areas. The examples of practice showed benefits for learning with strategies such as music and rhythm, visualisation, pictures, Method of Loci, chunking content, priming, increase test/retest, flashcards, and the Sans Forgetica font. Each teacher commented on their perceived benefits of a focus on teaching memory strategies, however, a limitation of the pilot project is that empirical data was not collected to objectively show that. Teachers shared the view

that participation in the project expanded their knowledge of and use of memory strategies and suggested implications for their own future teaching pedagogy and practice based on their experiences. It was disappointing that 17 teachers commenced the pilot but only 5 finished. This was another limitation of the study. The reason for the attrition is unknown however, one possible reason may be that participation in the project did ask something extra of teachers whom already have a very full workload. Another possibility may be some teachers' reluctance to invite teacher-researchers into their classrooms. Despite many teachers not going the extra step in the project to continue professional learning within their own classrooms and provide a culminating report of their experiences and findings, this does not suggest that they did not continue to consider the role of memory strategies in their classrooms or trial the strategies that they were introduced to.

The pilot project showed that there was scope for each teacher to tailor memory strategies for their own teaching-learning context across a range of year levels and curriculum areas. It is anticipated that the implications for practice will extend into teachers' future practice, that there will be a focus on memory when teachers plan, and that there will be learning benefits for students in these classes. Each of these possible implications for practice could be areas for future research. A consideration of 'developmentally appropriate', 'subject appropriate' and 'universally appropriate' memory strategies was often discussed by teachers and could also be a focus of future research. Further research could also include parents, with the hope that they could support some of the memory-enhancing strategies at home. The school was particularly looking for greater parental engagement and so including this aspect in future research would provide this additional gain.

Acknowledgements

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Examining persuasive techniques using visual and digital texts

Jennifer Asha

In a previous Scan article, I wrote about using imaginative digital texts as resources for teaching visual metalanguage to facilitate deep understanding of digital narratives. That article made suggestions for classroom talk, particularly teacher questioning to support student literacy learning. In this article, I will explore a different type of text - those created for persuasive purposes. This piece will also examine the ways that teachers can use questioning to support learning about persuasive techniques used in visual and digital texts.

The Melbourne Declaration on Educational Goals for Young Australians states the need for schools to prepare students to be 'active and informed citizens' (MCEETYA, 2008, pp 6-7). Research similarly demonstrates the necessity of preparing students to think in critical ways (Zammit and Downes, 2002; Freebody, 2007) to help them become 'informed sceptics' (Durrant and Green, 2000, pp 97-98), rather than 'passive recipients' (Kervin and Mantei, 2009, p 3). The Australian Curriculum and NSW English syllabuses also mandate critical literacy practices.

The Australian Curriculum: English and NSW English K-10 Syllabus show a progression of literacy practices that students should be taught from Stage 1 through to Stage 3 in relation to persuasive texts. The outcomes across the stages show an increasing sophistication of comprehension and interpretation of texts - from describing 'differences between imaginative, informative and persuasive texts' (ACELY1658) to identifying 'the audience' (ACELY1668) 'and purpose of imaginative, informative and persuasive texts' (ACELY1678). Students are expected to 'identify' (ACELY1690), 'explain' (ACELY1701) and then 'analyse' (ACELY1711) characteristic features used in persuasive texts to meet the text purpose as they progress through the stages. The texts teachers use to instil these literacy practices need to be rich enough to allow for the application of these sophisticated critical literacy skills. The internet gives teachers access to high quality texts that can be worthwhile resources for lessons designed to explore the structures, features, purpose and audience of texts created for persuasive purposes. In the following paragraphs I will share some exemplary digital texts that employ a range of techniques to meet their purpose and persuade their audience.

YouTube video: 'All I need' by MTV and Radiohead

The purpose of this short video by MTV and Radiohead (3 mins 47 secs) is to raise awareness of child labour in the footwear industry. The clip design employs an unusual layout with a split screen running two different clips side-by-side simultaneously. The intended audience can see elements of their own daily life represented on the left or 'given' (Kress and van Leeuwen, 1996) as it shows a day in the life of a child in a developed country. Through a variety of close-ups and mid-shots, we see the familiar elements of a school day: eating cereal at the kitchen table while mum packs a lunchbox, walking to school along a safe and clean suburban street, participating enthusiastically in a classroom discussion with a positive and supportive teacher, and playing games in the playground with school friends. In stark contrast, the clip on the right shows a day in the life of a child working in a developing country's shoe factory. This child lacks a loving home, care from adults, sufficient food, access to education, and the childhood freedoms that are the rights of every child. This 'new' (Kress and Van Leeuwen, 1996) information tells the tragic story behind the school shoes we rarely give much thought to. The contrast in the children's lives reaches its most impactful conclusion when the child on the left is shown taking off his school shoes at the end of the day, while the clip on the right shows the child in the factory continuing to work and produce the very shoes shown on the left. The dual clips are accompanied by a melancholic soundtrack ('All I need' by Radiohead), with its themes of loneliness and unnoticed admiration. The lack of spoken text allows for different levels of interpretation and could elicit rich discussion in the classroom.

Teachers can support students to interpret the choices of the text creators through carefully worded questions which incorporate visual metalanguage. For example:

- how has the creator used layout to help meet the persuasive purpose of this text?
- how does the clip creator use different distances or shots to show the details of the children's lives?
- how does the mournful tone of the sound track contribute to meeting the persuasive purpose of the text?
- how has the text creator attempted to make the audience connect emotionally or personally with the text?

YouTube video: 'First 1000 days' by World Vision Australia

This video advertisement (2 mins 23 secs) aims to highlight the importance of nutrition in the first one thousand days of a child's life. It also encourages viewers to partner with World Vision Australia to urge world leaders to address poor maternal and childhood nutrition. The clip begins like a fairytale, with the written text and voice over narrating: 'Once upon a time...'. It continues by introducing the caricatured image of Peter Pan, the boy who never grew up. However, this perpetually young boy is used to symbolise the child who doesn't grow properly due to poor nutrition. The magical Tinkerbell symbolises the transformative power of appropriate nourishment. The written and spoken text also draw on the Peter Pan story through the appropriation of Never Never Land. The repetition of 'never never' in the verb groups describes the prospects of the child character and explains the vicious cycle of poverty. This use of intertextuality would resonate with an audience who possesses childhood memories of the fairytale, conjuring up remembered feelings of wonder, while putting a poignant spin on the realities of never growing up and the subsequent consequences. The clip uses a simple colour palette and seemingly 'cut out' images of the featured characters and setting. These design features lower the modality (Kress and Van Leeuwen, 1996) of the clip in contrast to other videos by World Vision Australia that often feature footage of real children and families via high modality images. By choosing these stylised characters and setting,

World Vision Australia is highlighting the plight shared by different communities in various countries across the world, focussing the audience on the enormity of the intergenerational issue. This issue is reiterated through the call to action at the conclusion of the clip: 'Join World Vision's Child Health Now campaign today and call on world leaders to urgently address poor maternal and child nutrition'.

Teachers will probably need to fill gaps in student background knowledge regarding the original Peter Pan story by J. M. Barrie, briefing students on the characters, plot and themes prior to viewing 'First 1000 days'.

Subsequent discussion prompts that could help students to analyse and interpret the text in a critical way could include the following:

- what is World Vision Australia saying about the idea of never growing up?
- how is the Peter Pan fairytale used to connect to the audience's emotions?
- how does the lowered modality of the images help to focus the audience on the issue of poor maternal and child nutrition?

YouTube video: 'Mr. W' by Epuron

A German commercial for wind energy, this quirky digital clip (2 mins 3 secs) uses humour and novelty to engage the viewer and keep them guessing about the main character (played by actor Guillaume Raffi) right up until the very end. The advertisement begins and ends with interview style 'pieces to camera', showing close-ups of a figure clad all in black with ill-fitting clothes and hat, foreshadowing the concept that this is a person who doesn't 'fit in' to society. This disruptive character is then shown moving through various common settings, interacting with people in a most uncommon way. He throws sand in the face of a child in a playground; tussles the hair of a well-dressed woman; pulls another woman's skirt up, exposing her knickers; knocks pot plants off window sills; turns umbrellas inside out; bangs window shutters; bats the hat off a man's head; and pushes a load of plastic bottles from a homeless man's trolley. One socially inappropriate action after the other leaves the viewer wondering: 'who does this person think he is?' and 'why isn't anyone telling him to stop?'. The main character delivers a voice over throughout the advertisement. In language reminiscent of a job interview, he shares his sadness at not belonging and being misunderstood, until his potential is finally noticed and harnessed. It isn't until the closing screens, however, that a written text emerges, revealing the character to be a personification of the wind: 'The Wind. His potential is ours'. As the meaning of this visual metaphor slowly dawns on the viewer, and they begin to make sense of all the strange scenes they have witnessed, Mr. W turns and gently spins the wind turbine replica that has sat, unnoticed, on a table behind him throughout the entire advertisement.

Teachers can draw student attention to the clever persuasive and audience engagement techniques in 'Mr. W' through questions such as:

- why did the text creator use the contrasting close-up eye level shots of the main character and longer shots from a distance to help characterise Mr. W?
- how did the text creator use the element of surprise and viewer concern for other people to keep the audience watching and thinking throughout this advertisement?
- people don't normally feel strong emotions for the wind. What techniques do the text creators use to generate feelings in the viewer?

YouTube video: 'Lasting energy' by Australian Bananas

This television advertisement (30 secs) for the popular Australian fruit contrasts the 'no nos' of sugary junk food with the long-lasting energy of bananas, affectionately referred to as 'na nas'. The ad employs a number of sophisticated visual techniques. Beginning with a scene showing a woman holding a sugary snack in one hand and a banana in the other, the 'given' and 'new' (Kress and Van Leeuwen, 1996) layout is evident. The no no is positioned on the left, in the 'given', and the na na on the right, in the 'new'. Subsequent scenes then follow a repeating pattern of showing no nos and their negative effect on the consumer, followed by a corresponding na na scene with their positive effects. The no no eaters are shown as unhappy, unhealthy and sedentary people. While na na eaters appear happy, healthy and active. The visual modality of these scenes also follows this pattern with no nos depicted using unnatural colour saturation and grey, unhealthy, 'peaky' colours. These scenes have 'animated' qualities that include an oversized boxing glove punching a no no eater, a chair rocketing a no no eater through the roof of a building, and the background whizzing around behind an overweight participant to show the unnatural and unpleasant experiences of the no no eater. In contrast, the na na eaters are shown in pleasant outdoor environments via a more realistic colour saturation, with brighter yellow-tinged lighting, symbolic of bananas.

The angles used throughout the ad further contribute to the intended message. A scene toward the beginning of the commercial positions the viewer above, as a no no eater is rocketed through the sky, creating a sense that we all know the feeling of a 'sugar high'. Toward the end of the advertisement, a scene shot from below features a boy kicking a football high into the sky, towards the sun, symbolic of the natural 'high' created by bananas. The viewer is positioned to believe bananas have given the eater the ability to soar naturally. Placement of a shot from above at the beginning of the ad and a shot from below at the end of the ad provides a type of balance and cohesion that is echoed in the verbal text of the voice over. The voice over also makes use of alliteration, juxtaposition of competing elements, and evaluative language. A transcript and verbal analysis can be accessed on Gumleaf Games and Resources.

Students can be supported to critically consider the elements employed by the 'Lasting Energy' advertisement through questions such as:

- how is what we know about healthy and unhealthy food choices echoed in the left-to-right layout in the opening scene of the ad?
- how do the ad creators position the viewer to think about sugary snacks versus bananas through angles at the beginning and end of the ad?
- how is the symbolic use of colour employed in each of the scenes? How does this build up a pattern that is intended to persuade the viewer to choose bananas over junk food?

These persuasive texts are rich examples of the genre, and make use of many more techniques than there is room to explore here. It is hoped that these brief explanations will provide a starting point for classroom discussion and discovery. If teachers analyse the structure and features of a persuasive multimodal text, considering the techniques used to meet the purpose of the text, for the audience, they are well placed to lead classroom discussions that support student description, interpretation and analysis of the texts. Teacher modelling of visual metalanguage during discussions and the contextualised use of metalanguage in teacher questions encourage meaningful use of shared metalanguage and deep understanding of persuasive texts to help students to become 'active and informed citizens' (MCEETYA, 2008, pp 6-7).

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Interoception as a proactive tool to decrease challenging behaviour

Dr Emma Goodall

What is interoception?

Interoception is sometimes referred to as mindful body awareness or somatic awareness. It's colloquially known as the eighth sense, with the other seven being sight, hearing, taste, smell, touch, proprioception and vestibular (Lynch and Simpson, 2004). Interoception is an internal sensory system in which the internal physical and emotional states of the body are noticed, recognised/identified and responded to. Awareness of both these internal body cues is impacted in individuals who are affected by trauma, including intergenerational trauma, and neurodevelopmental disabilities including the autism spectrum (Schauder, Mash, Bryant and Cascio, 2015; Mahler, 2015).

Interoception skills are required for a range of basic needs, such as knowing when to go to the toilet, and more advanced emotions, like being aware that you are becoming angry or upset and managing these feelings proactively. When children and young people have not yet developed interoception skills they will struggle with their emotions and social interactions. These students require higher levels of co-regulation by their teachers, as they become dysregulated far more quickly than their peers, often resulting in much lower levels of learning and higher levels of take-homes, suspensions and exclusions.

Once a child or young person can recognise and understand their internal body signals for uncomfortable emotions, they can begin to work out what distresses or stresses them and then how to respond to these stressors. Parents and teachers may well have a good idea of the feelings involved, and their causes - but without learning it for themselves, the child or young person will never be able to learn to self-regulate independently and will require co-regulating throughout their education.

Resources for teaching interoception

The following resources can be used together or separately to introduce and teach interoception:

- Ready to Learn - Interoception Kit (PDF 6936KB) by Department for Education, South Australia (2019) - for preschools and primary schools (plus families and allied health professionals)
- Interoception Activity Guide 301 (PDF 3085KB) by Department for Education, South Australia (2019) - for upper primary, intermediate and secondary schools (plus families and allied health professionals)
- YouTube videos about interoception and managing behaviour by Healthy Possibilities (2019).

The two resources from the South Australian Department for Education provide a brief outline of the evidence base for teaching interoception and offer a range of explicit teaching activities and resources for lesson planning and delivery. If you are new to interoception and are only starting to implement the approach, it may be helpful to browse the department's Interoception webpage or watch some of the videos on the Healthy Possibilities YouTube channel. These videos range from cartoon explanations of interoception to practical advice on how to teach it in the classroom, including videos which will introduce it to preschool and primary children for you. Additional videos explain the link between poor interoception and challenging behaviour and emotional dysregulation.

Together, the three resources link to multiple areas of the national curriculum, across all ages and stages of learning, including English, mathematics, science, PDHPE, creative arts and preschool. Links to specific syllabuses and general capabilities are noted in Interoception Activity Guide 301 (pp 5-14), together with brief examples. This information is also available as a separate download via Linking Interoception to the Australian Curriculum, General Capabilities and Embedding in Classroom Practices .

Educational significance

As its name suggests, the Ready to Learn - Interoception Kit is designed to ensure students are ready and able to learn prior to starting formal lessons. However, interoception and formal lessons can also be easily combined to enhance effective learning, as the curriculum links within Interoception Activity Guide 301 make clear.

When students are too stressed or distressed (whether due to high cortisol levels from chronic stress or because they are experiencing sympathetic nervous system overload - flight/fight/freeze/flop/drop), they are unable to learn effectively. At worst, they can be so disruptive that no-one can learn.

Teaching interoception using the suggested activities helps students connect to and learn to understand their own bodies and emotions. This develops the prerequisite skills for self-management and self-regulation. The suggested resources provide children and young people with the tools to know when they are developing emotional reactions, and the skills to be in control of those reactions.

Schools and preschools where interoception is being taught have decreasing behavioural challenges over the school year, while those where it is not have static or increasing behavioural challenges (South Australian school-wide behaviour reporting analysis 2016-2019). In the 230 schools and

preschools using these resources, over the course of a term, children and young people have consistently demonstrated decreases in challenging behaviour and increases in pro-social behaviour, followed by increases in engagement in learning. School learning support officers/teacher aides who use interoception activities to start withdrawal group activities have reported much higher levels of engagement and learning in those groups as compared to not using interoception.

With most states and territories now focused on Positive Behaviour Support (PBS) or Positive Behaviour for Learning (PBL), teaching interoception is a unique version of these approaches that uses universal design for learning philosophy to teach the prerequisite skills for self-management and self-regulation in classrooms, preschools and families.

Schools and preschools where interoception is being taught have decreasing behavioural

challenges... and increases in pro-social behaviour, followed by increases in engagement in learning.

Suggestions for using these resources

Educators could show some of the videos from the Healthy Possibilities YouTube channel to their students and then discuss, or they could simply start using the activities in Ready to Learn - Interoception Kit or Interoception Activity Guide 301. These activities can be used in any order, though it is preferable to start at the beginning and work through them. To improve self-regulation in the classroom (or preschool) effectively, interoception activities must be taught 2-3 times a day. Most educators find that teaching an activity or two before rollcall, and after recess and lunch is the most effective and simplest way to embed interoception in the school day. Each activity takes 1-5 minutes to implement and teachers simply read the dot points whilst modelling the activity as students follow along.

An interoception activity focuses on a particular part of the body for 30-60 seconds. Students observe and label the movement and part of the body involved (for example, toes - stretch and curl up or curl under). They are then encouraged to identify a change in their body state (for example, hot-cold, soft-hard, stretch-relax) and where they felt that change (arch or ball of foot, on top). The change in body state is always repeated a second time, and the whole class is asked to focus on noticing what they feel in a very specific part of their body. When undertaking interoception activities 2-3 times a day, decreases in challenging behaviour and increases in engagement in learning should be noticed within 8-10 weeks.

Secondary teachers have indicated that they find watching a short video on Dan Siegal's hand model of the brain (2:52) can be useful as an initial introduction to students. A follow-up discussion can focus on how helpful it can be for students to have their thinking cap of the brain connected, and how interoception re-engages their thinking cap. Educators can increase confidence prior to presenting activities to students by watching a short video on How to develop interoception (2:37) or How to teach interoception (5:30).

Teaching activities

Using the warm-up style interoception activities and tracking students' personal bests (for example, 'how long can I hold a wall press/plank?') can be the easiest ways to get upper primary and secondary school students to engage in interoception. This is reflected in Interoception Activity Guide 301. This guide also includes a food and technology unit plan which has been developed and

successfully implemented by staff at Paralowie R-12 School in South Australia for their Years 8 and 9 students (pp 46-58).

The Ready to Learn - Interoception Kit contains three mini lessons and numerous activities which can be used with the whole class to settle students after recess and lunch. An example of the activities presented is 'Feeling muscles - hands'. In this exercise, students start by sitting down, resting their hands on top of their thighs (teacher demonstrates). Then everyone stretches their fingers as wide apart as possible and holds them tense in this position for 30 seconds. Everyone then rests their hands again, so they should be relaxed. Students are then asked by the teacher: 'Where could you feel your muscles when your hands were stretched?' Students can either point or say where they felt something. The teacher then asks the students to repeat the stretch for another 30 seconds, this time focusing on a specific part of their hand (such as the webbing between their fingers). Each time the activity is done for the second time, a different place can be designated for the students to focus on. After the second stretch, the students can be asked if they felt it more. It can take up to 12 months for some students to feel some areas of their body.

Time trials in several South Australian schools showed a decrease from up to 15 minutes to 5 minutes from coming in to starting work. These interoception activities can thereby serve to increase both available teaching time and the likelihood that students will be neurologically and emotionally ready to learn.

Experimenting

Sports teams may find their accuracy of play improves as their collective interoception increases - which could form a scientific experiment.

Another interesting way that primary school teachers have creatively incorporated interoception into their lesson planning is to get students who are already familiar with the activities and theory behind them, to design, record and present their own interoception activities to their peers.

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