# Resource – Teaching with an understanding of cognitive architecture in Stage 6 PDHPE

| Strategy | Description | Application in Stage 6 PDHPE |
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| Priming the mind  | Is a technique used in psychology where a stimulus is introduced to influence how the person responds to a subsequent stimulus. In the classroom this may include the teacher introducing the content, metalanguage and purpose prior to the learning taking place. This serves to focus student's attention on learning the information, laying the foundation to encode and store the information (Schacter, 1992; cited by Johnson et al., 2020). | • Use learning intentions and success criteria to make learning visible for your students.<br>• Use 'signposting' in your teaching. This involves talking to students about what they are learning and why, and where they are headed. This helps with engagement and reduces anxiety.<br>• Discuss the syllabus content and degree of content (based on the syllabus verb) to be covered with your students.<br>• Provide opportunities for your students to learn the metalanguage first by providing a glossary of terms when starting to teach a new Core or Option module. |
| Teaching for understanding  | It is essential for students to understand information before they try to memorise it. This could include making a connection between what they are learning and their prior learning or experience. | • Provide opportunities for students to experience concepts firsthand or via observation or media e.g. students participate in or watch different types of aerobic and resistance training before trying to memorise and apply the principles of training, or reflect on their own health dimensions and interactions before interpreting external meanings of health. |

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| Distributed learning  | Distributed practice was a concept that was first studied and observed by psychologist Ebbinghaus in 1885, whereby learning or practice is broken up into a number of short sessions over a longer period of time (Baddeley & Longman, 1978). We have since seen it used effectively for athletes and skill acquisition, particularly at the cognitive stage of learning a skill. | • In your classroom this may involve students learning more complex concepts over a longer period of time, also known as the 'spacing effect' (Pashler, Rohrer, Cepeda & Carpenter, 2007). This is also important for revision for examinations. See 'Assessment of learning with feedback'. |
| Problem-based or inquiry-based learning  | Inquiry-based or project-based learning enables students to apply their knowledge, understanding and skills to real-life situations. This type of elaborative rehearsal also helps student encode information as they make personal connections. Hattie's research (2009) indicated that this strategy has a strong correlation to student achievement. | • Find opportunities for students to engage in inquiry-based learning, especially when students have an understanding of the syllabus concepts they are inquiring about. This type of learning will enable students to make personal connections and develop new knowledge, depth of understanding and skills. Use the verbs (research, investigate) in the syllabus as a guide for opportunities. For example, groups experiencing health inequities, social justice principles and responsibility for the action areas of the Ottawa charter, athlete case studies. |
| Mnemonics   | Techniques for remembering information that may be difficult to recall. Many researchers (Bower & Clark, 1969; Baddeley, Eysenck & Anderson, 2014; Wang & Thomas, 2000) have suggested that associating pieces of information to be remembered with something familiar to the learner, such as a location, word or image, is an effective technique for retention. Mneumonic pegs have been used throughout this document to provide a visual reference or stimulus for each strategy. We see these used in many places, even in the syllabus as icons for | • Use acronyms for concepts. An acronym is a word made up from the first letters of a list of words. Students remember what HSC ROME (physiological responses to training), SPORT VW (principles of training), RICER and TOTAPS stand for, and they can have lots of fun coming up with acronyms for other concepts, as a class.<br>• Use storytelling to demonstrate/highlight |

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| | the learning across the curriculum content. | concepts.<br>• Use visualisations such as memory devices or Method of loci to support encoding and retrieving information |
| Graphic organisers  | These tools help students to organise information and see what they are learning. There are many different types of graphic organisers. | • Mind-maps are beneficial for helping students to remember syllabus content, with students collaborating on whiteboards or electronic whiteboards to map the content in a focus question, using the correct metalanguage.<br>• Concept maps are also useful for visually representing concepts from simple through to more complex, such as the ATP-PC energy system.<br>• Venn diagrams are helpful for visually comparing and contrasting, e.g. “compare the dietary requirements of athletes in different sports” (Board of Studies NSW, 2009, p.45) |
| Visualisation  | Visualisation involves seeing images in your head without actually looking at it. Students can use visualisation to learn almost anything, from practical skills to mentally imagining processes and events. For students who find visualisation difficult, encourage them to draw pictures, graphs, charts or find images. | Students can visualise:<br>• practical skills such as first aid procedures or using TOTAPS<br>• the sporting examples they would use for a written response<br>• processes such as the ATP-PC energy system, physiological responses to training, recovery strategies, stages of skill acquisition. |

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| Kinaesthetic learning  | Is a process that results in new knowledge or understanding with the involvement of the learner's body movement. This movement can be to consolidate previous learning or to develop new knowledge and understanding. | • Practical application of content, e.g. muscles and bones of the body, biomechanics, first aid practices, participating in anaerobic and aerobic training, recovery strategies, types of practice methods and feedback.<br>• Using charades in groups for students to revise concepts or metalanguage<br>• Role playing processes, e.g. ATP resynthesis, systemic and pulmonary circulation<br>• Building models of systems or processes from found objects (not sure if this would be considered purely kinaesthetic based on the description used) |
| Reciprocal teaching  | This is a scaffolded discussion technique based on the four strategies that strong readers use: clarifying, summarising, predicting and questioning (Palinscar, 2003). In pairs, students clarify (analyse parts of the text), summarise (outline the main ideas), predict (make predictions using evidence from the text) and question (draw on evidence to ask and answer questions to better understand the text) in order to comprehend text, whilst practising topic vocabulary in a supportive context. These strategies can be used in any order. The discussion technique fosters meaningful dialogue between students and enables students to make personal connections with the content. Hattie (2009) reported that this was one of the highest rating strategies for improving student achievement. | • Model metacognitive discussions by sharing with students the strategies you use to comprehend a text. This could include an informative article related to a concept or content, or even highlighting how an extended response answers the question.<br>• Build in time for collaborative learning such as turn and talk, think, pair, share, or expert groups.<br>• Encourage study groups or provide the opportunity for lunch-time or after-school study sessions to enable students to discuss what they are learning. |

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| Assessment of learning with feedback  | Research has shown that testing after learning new content, especially combined with feedback, is found to have a greater impact on memory than students spending additional time learning the same content. This highlights the need for learners to practice retrieving information, not just learning it (Landauer & Bjork, 1978; cited by Johnson et al., 2020). It's important to note that the spacing effect mentioned for learning content, is equally important for retrieval practice, hence the importance of using both formative and summative assessment practices. E.g assessing throughout or at the end of a lesson to inform what comes next as opposed to assessing at the end of a unit.<br>Testing should focus on assessing knowledge and understanding, and skills. Use the verbs in the syllabus as clues for the type of assessments that could be used.<br><br>Consider using assessment of learning every lesson to inform your teaching, where to next, whilst also providing opportunities for students to practice retrieval. Students are more likely to revise their notes before lessons knowing they are going to be tested. | • Use various questioning techniques and plan questioning where possible, e.g. socratic, basketball<br>• Online quizzes, verbal quizzes or using mini whiteboards.<br>• Peer assessment using taboo cards or flash cards.<br>• Exit tickets.<br>• Verbalising understanding – via presentation, discussion, debates, recording podcasts.<br>• Students answering multiple choice questions or writing exam responses in class at the point of learning the content. Include self and peer-marking.<br>• Summative assessment tasks as per assessment schedule. |
| Sans Forgetica Font<br>  | Sans Forgetica is a font that has been scientifically designed to improve retention of written information. It works by using principles of psychology fused with type design to create what is known as "desirable difficulty", meaning that learners need to engage in deeper cognitive processing when reading which leads to greater retention. The font was tested with 400 | • Try downloading this font and using it for visual learning displayed around the room, or have students create their own flashcards or mind-maps using the font. |

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| | Australian University students, providing evidence that the font increases learning (Deutrom, 2018; Earp, 2018; cited by Johnson et al., 2020). | |