Parent Manual and Resources
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Overview
A Learner’s Toolkit (ALT), developed by Churchie in association with the University of Queensland (UQ) Science for Learning Research Centre (SLRC), seeks to develop resilient and life-long learners. The aim is to present students with a suite of effective and efficient strategies informed by current thinking from cognitive psychology and sciences. Its implementation seeks to challenge the default strategies that students tend to rely upon (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Hartwig & Dunlosky, 2012). These default strategies have ‘worked’ for students at an earlier stage of their schooling, thus creating the illusion of learning and a false-perception of their efficacy (Dirkx, Camp, Kester, & Kirschner, 2019; Yan, Clark, & Bjork, 2016). However, as students progress through their schooling, these time-intensive and other ‘low-utility’ strategies see behaviours and emotions that narrow focus and learning to possibly undermine performance (Kang, 2016; Putwain, Sander, & Larkin, 2013).

The Toolkit aims to present students with a suite of reliable, high-utility strategies to build their academic competence (Gettinger & Seibert, 2002). Dual Coding (Visualise It), Interleaving (Jumble It), Interrogative Elaboration (Connect It), Retrieval (Retrieve It) and Spaced (Space It) Practice (see Figure 1) is said to be the most efficient, effective and reliable study strategies (Dunlosky et al., 2013; Weinstein, Madan, & Sumeracki, 2018). Importantly, through their application, students are more likely to engage in those learning behaviours that will build their self-efficacy (Putwain et al., 2013). As their self-efficacy grows, students are more likely to put forth the effort and persistence, moderated by critical emotions, that will see them become more resilient learners (National Academies of Sciences, 2018). The aim is to build these behaviours and traits throughout their schooling to better place our learners to absorb, circumvent and work through the various challenges and situations.
Figure 1: Core cognitive strategies that constitute A Learner’s Toolkit (ALT)

The findings pertaining to the evaluation of the ALT program were published in the 2022 British Review of Education Journal article (Byers et al., 2022). Rather than take the accustomed knowledge-orientated bolt-on study interventions typical of the university setting, this study evaluated the efficacy of the early preparatory and applied instructional training interventions on secondary school-age students in two Brisbane schools. The findings suggest that when instruction is restricted to specific study strategies isolated from the immediate subject curricula context, the desired change in learner behaviours is superficial. However, when the instruction and training are embedded within their immediate context, student behaviours and study strategies are positively affected. The study is relevant to school leaders, teachers and researchers focused on unpacking the translation of the science of learning theory into the classroom setting. The result of which now sees the ALT program delivered across a growing number of schools throughout Australia and internationally.

Synopsis of the Literature
The current literature in the fields of cognitive and educational psychology tends to focus on university students. The research shows that they typically prefer and rely on study strategies considered ‘low-utility’ (Dunlosky, 2013; Dunlosky et al., 2013).
These include highlighting, rereading, re-writing notes and cramming (sometimes referred to as blocking). When students, typically in the later stages of primary school or early years of secondary schooling, use these strategies, they can lead to good performance. However, this success is more likely due to the nature of the assessment and the short-term recall of easily accessible information, rather than the efficacy of these study techniques (Karpicke & Roediger III, 2007; Yan et al., 2016). Students, and their teachers, mistake this performance for learning, thereby establishing common attitudes and behaviours associated with study (Yan et al., 2016).

These default low-utility strategies are adept for recalling information in the short-term. Interestingly, they are ideal for preparing for assessment of the short-term retention of learning (typically four to five weeks) (Karpicke & Roediger III, 2007). Given that students are assessed within a unit/topic/term in the later primary, and early secondary years, these strategies lead to success. Students attribute, in varying degrees, the use of these strategies to the perceived success they experience. However, this success can be fleeting as these strategies support the short-term retention of knowledge and not actual learning (Soderstrom & Bjork, 2015). As a result, students derive a false perception of their utility and that the short-term retention of knowledge constitutes the illusion of learning (Yan et al., 2016).

As students progress through their schooling and the curriculum and nature of assessment changes to focus on a longer-term view of knowledge and learning, these low-utility strategies may no longer be fit for purpose (Bjork, Dunlosky, & Kornell, 2013). Despite this, many students continue to persevere with their usual study routines. It is suggested that this continuation is due to both comfort and the perception that they are studying, and therefore learning (Bjork et al., 2013). At this point, these low-utility strategies’ efficacy becomes problematic with student academic performance and outcomes starting to decline. Collectively, the decline in results and the increasing inadequacy of one’s default set of study strategies can begin to negatively affect one’s emotions and self-efficacy (i.e., behaviours and perceptions) of themselves as a learner (Gettinger & Seibert, 2002; Putwain et al., 2013).

The research has identified a suite of high-utility strategies (see Table 1) that have shown the most significant impact on improving student learning through the most efficient use of time (Dunlosky et al., 2013). The research continues to identify the processes of Dual Coding, Interleaving, Interrogative Elaboration, Retrieval and Spaced Practice as being the most reliable strategies (Weinstein et al., 2018). The nature of these processes sees them able to be used concurrently. For example, the processes of Retrieval and Spaced Practice and Interleaving complement each other in structuring study that is particularly useful for increasing knowledge retention (National Academies of Sciences, 2018). Both Dual Coding and Interrogative Elaboration draw upon inferential processes that effectively organise and integrate
information for learning (National Academies of Sciences, 2018). Together these high utility strategies can accumulate and structure bodies of knowledge while developing a capacity to reason about the knowledge one has, with subsequent potential to impact learning now and into the future.

The application of these higher-utility strategies is associated with desirable changes to student emotions and learner behaviours. These strategies can scaffold opportunities to employ those feedback cycles that initiate the metacognitive process (Putnam, Nestojko, & Roediger III, 2016). Therefore, they are more likely to develop an awareness of the application, concerning context and timing of specific processes and strategies allowing their self-efficacy to grow (Putwain et al., 2013). When operationalised, self-efficacy is a predictor of academic achievement and emotions (Putwain et al., 2013).
### Table 1: Essential Cognitive Processes that Underpin the A Learner’s Toolkit

<table>
<thead>
<tr>
<th>Toolkit Strategy</th>
<th>Cognitive Process</th>
<th>Icon</th>
<th>Description</th>
<th>Applicable Subjects</th>
<th>Exemplar Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Read It</strong></td>
<td>Active Reading</td>
<td><img src="image" alt="Read It Icon" /></td>
<td>The purposeful action of engaged reading of a text to construct meaning by making connections to existing understanding, forming examples, and regulating learning</td>
<td>All subjects</td>
<td>Eagle and Wolf Cornell Notes</td>
</tr>
<tr>
<td><strong>Retrieve It</strong></td>
<td>Retrieval Practice</td>
<td><img src="image" alt="Retrieve It Icon" /></td>
<td>The effortful and purposeful act of bringing learned information to mind in a set period. Practice with effort aids the construction of a connection between concepts/ideas</td>
<td>Mathematics Language Sciences Music</td>
<td>Quick Review Practice Test Online Quiz Funnel/Filter</td>
</tr>
<tr>
<td><strong>Space It</strong></td>
<td>Spaced Practice</td>
<td><img src="image" alt="Space It Icon" /></td>
<td>Breaking up practice into shorter sessions that are spread over time. Retrieval over time requires effort to remember. Effort aids constructing connections between concepts</td>
<td>Mathematics Language Sciences Music Humanities* English*</td>
<td>ID the Gaps Spiral Back Weekly Study Plan</td>
</tr>
<tr>
<td><strong>Jumble It</strong></td>
<td>Interleaving</td>
<td><img src="image" alt="Jumble It Icon" /></td>
<td>Rearranging the order in which you study different concepts within a single session. Changing the order strengthens the connections between ‘chunks’ of information</td>
<td>All subjects</td>
<td>Flashcards Lucky Dip Four C’s Retrieval Roulette</td>
</tr>
<tr>
<td><strong>Visualise It</strong></td>
<td>Dual Coding</td>
<td><img src="image" alt="Visualise It Icon" /></td>
<td>Combining text and visuals to engage two processes (distinct cognitive channels in the brain) concurrently to retrieve information more efficiently</td>
<td>All subjects</td>
<td>Brain Jump Graphic Organiser Concept Maps</td>
</tr>
<tr>
<td><strong>Connect It</strong></td>
<td>Elaborative Interrogation</td>
<td><img src="image" alt="Connect It Icon" /></td>
<td>Explain, describe and link ideas into schemas. Creations of schemas aid the ease and efficiency of later retrieval</td>
<td>English Humanities All Sciences The Arts</td>
<td>10 in 10 Another Crack Writing Sprints</td>
</tr>
</tbody>
</table>
How the Nuances of Different Subjects Impact the Efficacy of Study Techniques

The applicability of the different study strategies is dictated by the nuances of subjects or the nature of assessment. Subjects like Languages, Mathematics and the sciences consist of knowledge compounded in ‘spirals’ upon previously taught concepts. Subjects like English and the Humanities see knowledge organised within discrete ‘silos’ (based on topics) connected by genre or modality-specific skills and strategies. As a result, these differences directly affect the efficacy of different study strategies.

The spiral subjects see an iterative re-visiting of topics or themes overtime (Harden & Stamper, 1999). Each iteration is not merely the repetition of the previously taught topic as successive encounters build on the previous one in establishing a more in-depth and structured knowledge framework. Therefore, Interleaving and Retrieval and Spaced Practice strategies are adept at building the automaticity (speed of) recall and retention of the required foundational knowledge. Thereby, students are more likely to connect the new to existing knowledge, building deeper, integrated and structured conceptual understanding (Hattie & Donoghue, 2016). Such an understanding is more likely to lead to flexible learning and durable retention over the longer-term.

Subjects such as English and the Humanities see the development of knowledge confined within topics and themes. There is a much greater emphasis on the development of depth within and across themes, topics or units. Underpinning this depth is students’ ability to call upon specific skills and strategies dependent on assessment genre or modality. As a result, Dual Coding and Elaborative Interrogation are adept at moderating the requirements of in-depth and connected knowledge within the theme, topic or unit. Furthermore, they help the learner moderate the cognitive load associated with establishing a deeper and more sophisticated understanding of what is learned (Mayer & Moreno, 2010; National Academies of Sciences, 2018).

Homework and Study

Many students and teachers often prioritise homework tasks at the expense of studying; however, homework is a component of study. The purpose of homework should be to consolidate the material covered in the lesson of that day. While consolidation is an essential element of the learning process, it is not enough to build the requisite knowledge frameworks essential for deep and flexible understanding to be established. Homework by itself typically focused on consolidating the short-term retention of work covered that day, is an example of massing or cramming (Karpicke & Roediger III, 2007). If the set homework does not enable concepts to be connected and retrieved over time, the invested effort and time can derive limited long-term benefits.
For homework to better aid the learning process, the integration of spacing and retrieval practice can have significant benefits. Homework must be more than a compliance mechanism that sees students complete for the sake of completing a set task. The characteristics of effective use of homework within the notion of study include:

- Ensuring that the work taught in class is understood, learnt and practised
- Giving practice that connects previously learnt material
- Providing time for reinforcing the basics such as memorising facts and applying formulas and simple processes
- Providing time for retrieving knowledge already gained to test one’s understanding
- Providing the opportunity to learn to work alone, to struggle with academic problems and to learn academic self-discipline (although some study may be better suited to small groups)
- Revealing gaps/weaknesses in knowledge and understanding early. Early identification of minor gaps in knowledge and understanding is more likely to circumvent later issues.

A Plan of Attack - Importance of weekly assessment and study planning
The first step of any study regime is to focus on putting together a weekly assessment and study plan. Putting together and sticking to a weekly plan can deliver multiple short and long-term benefits. The most immediate benefit to students is distributing their work on assessment and study throughout the term. Not only will this support them to rely less on cramming, but alleviate procrastination that often precedes students feeling of anxiety, a lack of preparedness and stress. Teachers often see students leaving the massing of considerable effort and focus in a shorter period leading up to assessment (see Figure 2). Such an approach does bear fruit in the early primary and early secondary years, due to the nature of the curriculum and assessment focused on the short-term recall of surface knowledge (Kornell, 2009). However, as they progress to the later stages of secondary schooling, the changing nature of assessment and curriculum sees this short-term and intensive cramming regime leading to increased anxiety and stress and ultimately underperformance.
The literature highlights that repeated study distributed over a more extended period has considerable benefits to students’ wellbeing, learning and achievement (Cepeda, Vul, Rohrer, Wixted, & Pashler, 2008). Distributing or spacing study sees time become an aid in overcoming the ‘Forgetting Curve’ (see Figure 3). The delay between studying a particular concept naturally affords the integration of Interleaving (or jumbling the order of study) within a routine. Both Interleaving and spacing increase the effort associated with each retrieval. Retrieval over time causes effort through the recall, synthesis and then reconstruction of knowledge. This effort establishes a meaningful and interconnected representation of the memory accessible even when conditions change over time. As a result, the decay rate of memory decreases due to the created schemas (ordered network) of knowledge.
The shift to a regular study plan throughout the term can translate to student learner behaviours, confidence and emotions (see Figure 4). By students establishing and sticking to a regular plan (see Table 2), they are more likely than those who leave study to the last minute to have a higher self-efficacy (Putwain et al., 2013). Self-efficacy is the belief, or confidence, that one can achieve a specific academic goal or attain a particular outcome on a specific academic task (Bandura, 2006). Academic self-efficacy is a reliable predictor of student competency of their learning behaviours (i.e. motivation and task value) and emotions (i.e. anxiety and fear of failure) that underpin self-regulated learning (Schunk, 2005). Therefore, by establishing and sticking to a regular study plan, students begin to employ those learning behaviours that not only can regulate negative emotions but build the foundation of academic achievement.
Metacognition – The key ‘skill’ that ties learner behaviours and study strategies

Often, students see studying as a separate task from their regular homework and everyday learning. For many, studying happens at the ‘end’ of the term. The separation of studying from regular learning correlates with students becoming ‘passengers’ to their learning rather than active agents. When students become passive in the learning equation, they rely on the teacher to plan, monitor and assess their understanding and be the provider of feedback. On the other hand, the literature points to considerable benefits when students become drivers of the learning equation and orchestrate the feedback process.

The integration of feedback presents the basis for the process of self-reflection. Self-reflection is the first step in metacognition. Metacognition is the collection of processes used that plan, monitor, and assess one’s understanding and performance. Metacognition also evokes an awareness of one’s thinking and learning and oneself as a thinker and learner.

In the seminal works of Baker and Brown (1984), Dunning, Johnson, Ehrlinger, and Kruger (2003) and National Academies of Sciences (2018), metacognition is shown to support the learner in taking charge by developing a deeper awareness of their strengths and weaknesses. By taking charge of their learning, they are more likely to develop their ability (and resilience) to transfer or adapt their learning to new contexts and tasks. In the current debate around the ‘skills’ that students need to be effective and resilient learners, metacognition is often overlooked. When we considered the evidence, as opposed to ambient claims, metacognition is a foundational and translative skill that a student needs to be a ‘life-long learner’.

Attacking One’s Gaps

When it comes to preparing for exams, most students know that they need to study. They may use specific techniques and strategies but rarely do they consider where to begin. When we observe students studying during exam blocks, there is a tendency for them to start by either completing a practice test (often neither under exam conditions or a specified time limit) or going back to the content from week 1 of the term. In the latter, students can fall into the trap of assuming a deficit mindset. Here the students have asserted that they know very little and that they have to re-learn the material. This approach is inefficient, as the amount of time to re-learning 8-9 weeks of material is significant. It assumes that students have not retained any knowledge of the concepts covered. Dunning et al. (2003) found that the absence of metacognition correlated with people’s tendency to be both ‘blissfully unaware of their incompetence’ and lacking insight about their deficiencies. If metacognition is critical to the learning equation, what are the practical steps students can use to incorporate the associated processes into their processes around study?
The best way to prepare for exams is first to identify one’s strengths and weaknesses (through the metacognitive process). There are simple yet effective retrieval mechanisms that students can employ to identify what they already know. Examples of retrieval practices that students may employ include:

1. Practice exam: Completed under exam conditions and then marked through a provided marking scheme.
2. Brain dump: Visualise and connect the key concepts and formulas covered in a term
3. An online quiz (i.e. That’s Quiz or Khan Academy sites): Self-marking assessment with feedback (right or wrong) in the application of fundamental concepts to answer closed questions

At the same time, the retrieval process helps illuminate gaps within one’s understanding. From this understanding, the learner is better positioned to decide on what first to focus their efforts. Here, the metacognitive process supports the learner to monitor their understanding actively and then engage in focused study. Addressing gaps first can translate to the improvement in understanding, which then underpins academic growth and improvement.
Study Strategy #1 - Read It
Active Reading: Purposeful construction of meaning from text

What is it?

Active Reading is the purposeful action of engaged reading of a text to construct meaning by making connections to existing understanding, forming examples, and regulating learning.

Employing a reading strategy enables students to engage with challenging texts. Students are more able to read beyond literal meanings to make inferential understandings of texts.

The Strategies that Employ Read It

Exemplar study strategies that use Read it are:

1. **Eagle and Wolf**: Fly over the text, hypothesise and connect your understanding; section the text into meaningful chunks; hunt for keywords and phrases; look for patterns (e.g. cause and effect) and summarise your understanding of the whole.

2. **Cornell Notes**: Divide your page into two columns, leaving enough room beneath these for a summary; take free form notes in the right column as you read; following reading create key points in the right column; use these points to write a summary at the bottom of the page.

3. **Outlining note-taking method**: Create a subject matter heading; read the text noting key points; use them to create sub-headings; reread the text making sub-points under each sub-heading.

Best Subjects to Apply Read It

All Subjects

What is the evidence of its impact?

A Churchie action research project (Bodell and Erbacher, 2017) employed the Eagle and Wolf strategy with Year 10 students. Over 20 weeks, students read and annotated texts and answered ten comprehension questions each week. 53% of students who used the reading strategy improved their score by one or more correct answers.

In Reading between the lines: What the ACT reveals about college readiness in reading (2006), Ferguson found that those who were the most ‘college ready’ were those who engage with challenging texts during high school.

53% of Students Improved their Reading Comprehension
Study Strategy #2 - Retrieve It

Retrieve Practice: Retrieval overtime builds understanding

What is it?

Retrieve Practice is the purposeful action of bringing learned information to mind from one’s long-term memory. It exploits the psychological testing effect and is very efficient in consolidating long-term memory.

The testing process helps identify gaps in one’s understanding while strengthening future recall.

Active Retrieval overcomes the decline of our memory as described by the Forgetting Curve (Ebbinghaus, 1885, see right).

Each Retrieval connects and cues knowledge that then improves the ability/efficiency of future recall.

Study Strategies that Employ Retrieval Practice

Exemplar study strategies that use retrieval practice are:

2. **Quick Review:** Consists of a question/problem from work covered yesterday, last week and a month ago.

2. **Practice Test:** Self-testing or taking practice tests under those settings (i.e., closed book, no notes and time limits) and environments that simulate test conditions.

3. **Paired Quiz:** Allowing students to quiz each other in pairs activates them as learning resources for another.

Best Subjects to Apply Retrieval Practice

Mathematics  Languages  Senior Sciences  Music  IB Subjects

What is the evidence of its impact?

Karpicke and Roediger (2008) studied two groups (Retrieval and Studied by Reading):

- The group that predominately used **Retrieval** averaged **80%** on the test.
- The group that predominately **Studied by Reading** averaged **36%** on the test.
- **Extra study repetitions** of reading were of little benefit with no improvement in the final performance.
Study Strategy #3 - Space It
Spaced Practice: Gaps between study builds understanding

What is it?

Retrieval over time requires effort to remember past content/concepts. The addition of effort aids the construction of the connection between concepts/ideas, which, in turn, aids future recall.

The length of time between Retrieval affects the duration of future recall. For term-based exams, the optimal spacing time is 10 days. For year-long exams, the optimal spacing time is 5-6 weeks.

Spacing Formula = Number of Days util Test x 15% (or .15)

Study Strategies that Employ Space Practice

Exemplar study strategies that use Spaced Practice are:

1. **Lucky Dip**: Flick to five random pages from a text or exercise book that you have been studying. What are three details on each page that help to develop your understanding? Take notes to consolidate your thoughts.

2. **Brain Dump**: Retrieval of everything you know about a topic of study that is written/drawn in a certain length of time (to cause EFFORT). Like a test, create a visual map of your understanding to show linkages between concepts.

3. **Spiral Back 1-page Summary**: Great for subjects like Biology, the Humanities and English/Literature, when you try to remember key definitions, details, facts and ideas of the current topic.

Best Subjects to Apply Spaced Practice

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Languages</th>
<th>Senior Sciences</th>
<th>Music</th>
<th>IB Subjects</th>
</tr>
</thead>
</table>

What is the evidence of its impact?

Rawson, Dunlosky & Sciarretti (2013) found that Spaced Retrieval (Red) students outperformed those who restudied (Yellow) or used their own technique (Grey).

Kornell (2009) found that spaced study is a more efficient strategy than massed study. Students who used spaced study techniques (in this case through Flashcards) out-performed those who crammed by approximately 74%
Study Strategy #4 - Jumble It
Interleaving: Changing the order of study of what you study

What is it?

Interleaving works against cramming/massing by jumbling the order of what is studied.

Changing the order of study requires multiple processing strategies to see the links, similarities, and differences between concepts. Interleaving can scaffold the practice of problem-solving processes or strategies. By changing up the order of problems/questions, it helps students choose not just what to do, but how to choose an applicable strategy and when.

Study Strategies that Employ Interleaving

Exemplar study strategies that use Interleaving are:

1. **Flash Cards**: Engage ‘active recall’, which creates strong neuron connections by creating multiple memory-enhancing recall. The added benefit of feedback (the answer on the back of the card) evokes self-reflection.

2. **Retrieval Roulette**: A simple Excel program that uses a list of questions and answers to generate a random quiz. You can set it to ask questions from any point in the course and questions from the current topic.

3. **Online Quizzes**: Many online quiz generators allow you to randomise the order of questions and the difficulty. Online quizzes also self-mark providing real-time feedback.

Best Subjects to Apply Spaced Practice

Mathematics Languages Senior Sciences Music IB Subjects

What is the evidence of its impact?

Taylor and Rohrer (2010) solved different types of math problems through blocked and Interleaving practice. The results showed that blocked practice initially produced better performance. However, a day later, this difference reversed; the group that learned with interleaved practise showed greater retention.
Study Strategy #5 - Visualise It
Dual Coding: Visualise (with structure) concepts or knowledge

What is it?

Dual Coding is when the arrangement and organisation of the text and accompanying images create a meaning that is easier to comprehend than text or images alone.

Allan Paivio’s Dual Coding Theory suggests that there are visual and verbal intake channels in the brain. Paivio indicated that the simultaneous use of the visual and verbal pathways in the brain supports the absorption of more information while reducing the impact of cognitive load (negative factor on learning).

Study Strategies that Employ Dual Coding

Exemplar study strategies that use Dual Coding are:

1. **Brain Dumps**: The retrieval of everything you know about a topic of study organised into a visual schema. Similar to a test, it creates a visual map of your understanding to show linkages between concepts.

2. **Graphic Organisers**: Help students to organise their ideas, thoughts or notes. Different visual structures support particular genres and visual displays of information. The effort and time to re-visit the information are decreased.

3. **SketchNotes**: Combines traditional handwritten notes with drawings, symbols, and other visual elements. The resulting map of ideas, with clear visual cues, reduces the effort and time to re-visit the information.

Best Subjects to Apply Dual Coding

<table>
<thead>
<tr>
<th>English</th>
<th>Humanities</th>
<th>Mathematics</th>
<th>Sciences</th>
<th>The Arts</th>
</tr>
</thead>
</table>

What is the evidence of its impact?

In 11 studies, Mayer and colleagues found that students who learned through a combination of words and graphics produced from 55% to 121% more correct solutions on tests than those students who used words alone.
Study Strategy #6 - Connect It
Elaborative Interrogation: Explanation through connections

What is it?

Elaborative Interrogation involves explaining and describing ideas with many details. The process involves making connections among ideas you are trying to learn and connecting material.

Asking ‘what’, ‘why’ and ‘how’ questions encourage the production of explanations for the ideas you are learning. The process integrates new material with the things you already know or have experienced.

Study Strategies that Employ Elaborative Interrogation

Exemplar study strategies that use Elaborative Interrogation are:

1. **Make a List**: List key ideas from a current topic. Then, go down the list and ask yourself questions about how these ideas work together (or not) and why. The nature of the process can underpin the formation of a Brain Dump.

2. **What, How and Why**: By using this questioning scaffold, students will start to go from the basic recall of information (What) and then through explanation (How) will begin to see the connections between (Why).

3. **SketchNotes**: Combines traditional handwritten notes with drawings, symbols, and other visual elements. The resulting map of ideas, with clear visual cues, reduces to effort and time to revisit the information.

Best Subjects to Apply Elaborative Interrogation

<table>
<thead>
<tr>
<th>English</th>
<th>Humanities</th>
<th>Sciences</th>
<th>The Arts</th>
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What is the evidence of its impact?

Woloshynn, Pressley and Schneider (1992) compared the average test performance of learners with high or low domain knowledge who used either Elaborative Interrogation of reading only during learning. It was found that students who used Elaborative Interrogation outperformed those who relied on reading by 12% (low knowledge) and 23% (high knowledge).
Reference List


Karpicke, J. D., & Roediger Ill, H. L. (2007). Expanding retrieval practice promotes short-term retention, but equally spaced retrieval enhances long-term


