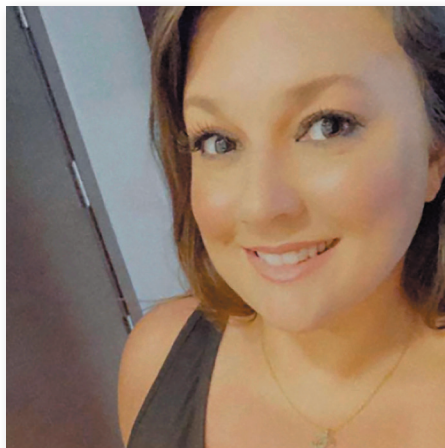




EVIDENCE - INFORMED RESOURCE PACK

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EVIDENCE – INFORMED TEACHING & LEARNING GLOSSARY

As the findings from cognitive psychology and academic research are becoming more widely known in education, there are a lot of new key terms and concepts for teachers to be familiar with. I certainly wasn't familiar with the majority of the terms below when I started teaching in 2010. It can be overwhelming and at times even intimidating trying to get to grips with research as part of being an evidence-informed teacher and leader. I hope you find my glossary below helpful and useful.

Thanks to Bradley Busch and Samuel Strickland for checking the glossary for accuracy and clarity.

Asynchronous Instruction – Asynchronous teaching and learning refers to all students learning, but not at the same place or same time. For example class work set on the Google Classroom for students to complete and they will do so at different times and from different locations.

Automacy – This is when we do something so often that it becomes automatic, also known as 'auto-pilot'. There are many scenarios, both inside and outside of the classroom, where this can happen and it will therefore reduce the cognitive load on working memory.

Blocking – This is when subject content or taught material is revised in specific blocks, one after the other. The opposite of blocking is interleaving (see below) and isn't as effective.

Brain dump – This is a low effort, high impact teaching and learning strategy. Students simply have to write down from memory what they can recall about a specific topic/unit as instructed by the teacher.

Blended learning – This also known as hybrid learning, which can contain elements of live teaching from the classroom and online learning. In my current school all lessons are delivered in the physical classroom with some students attending the lesson and others attending via Zoom remotely.

Chunking – Grouping information into more manageable sections, categories or chunks to support the limitations of working memory.

Cognitive Biases – When people search or interpret research, evidence and/or information that supports their pre-existing beliefs.

Cognitive Load – If we present our students with too much new information, all at once, this will lead to information overload in working memory. It is important for teachers to be aware of this when planning and delivering lessons.

Cognitive Load Theory – Professor John Sweller has written extensively about cognitive load and this refers to his work described by Dylan Wiliam (2017) as '*the single most important thing for teachers to know*'.

Cognitive Science – The scientific study of the human mind.

Cognitive Psychology – The study of specific mental processes such as attention, encoding, memory, perception, problem solving, and thinking.

Concrete examples – Using specific examples to help understand abstract ideas and concepts.

Confirmation Bias – When people search for research, evidence and information to support their own beliefs and ideas or interpret information to suit and match their beliefs.

Control group – When conducting research, some studies like to compare an intervention group (where something has been changed or added) to a control group (where everything stays the same). This allows us to compare the differences.

Cramming – This refers to intense and last minute studying, for example revising for a test the night before. Also, known as massed practice.

Curse of knowledge – This is an example of a cognitive bias, where someone assumes that other people know the things they do or that they have the background to grasp what is being discussed.

Curiosity gap – When there is a gap in our knowledge and we need to find the answer or information to close that gap, our curiosity is driving that.

Curriculum – This refers to the subjects, topics, content, skills and experiences that are taught in a school.

Declarative memory – A type of long term memory, also known as explicit memory. Information recalled from declarative memory involves conscious effort to bring it to mind unlike procedural memory (see below).

Desirable difficulties – This is a term coined by Professor Robert A Bjork and Professor Elizabeth Bjork. A desirable level of challenge and difficulty must be something that students can overcome with increased effort. ‘*The Goldilocks Principle*’ – we don’t want tasks to be too easy, too difficult but instead desirably difficult!

Distributed practice – This is when students do little amounts regularly (i.e. one hour a day for six days) as opposed to a lot all at once (i.e. six hours in one day). Distributed practice tends to be more effective for long term memory and is also known as spacing. Direct instruction – In academic literature there have been various definitions and interpretations of direct instruction. To generalise, it is academic instruction that is led by the teacher in the classroom.

Dual Coding – Providing information in two different formats, eg visual aids and text, to be transferred through two different channels to memory.

Dunning Kruger effect – This is a cognitive bias where people with low ability can overestimate their ability, believing themselves to be more intelligent and capable than they actually are!

Effect size – This is most commonly associated with the work of Professor John Hattie and quite simply measures the impact of educational initiatives on achievement and outcomes.

Elaboration/ Elaborative interrogation – By having students ask themselves questions (i.e ‘How? Why? When?’) it encourages them to think deeper and make connections to what they already know.

Encoding – This is the act of processing information and this is the first process of memory when trying to learn new material. Information needs to be transferred so that it can be stored, then later retrieved.

Episodic memories – If we think back to our own school days we have distinct personal memories, these can include our first day at school, performing in concerts, participating in sports days or receiving examination results. We can remember who we were with, what happened and how we felt. These are episodic memories.

Evidence – based – This is an approach to practice that focuses attention on empirical evidence in professional decision making and action. Schools and teachers often refer to themselves as evidence based, as they base their classroom practice and approaches on an evidence base.

Evidence – informed – Similar to evidence-based but evidence-informed practice recognises that it is more challenging to determine the circumstances and conditions where the evidence works best. It is about applying evidence in the unique context of our classrooms and contexts. For this reason, I consider myself to be evidence-informed rather than evidence-based.

Extraneous load – The third type of cognitive load according to Sweller (see intrinsic and germane load). This occurs when students are exposed to irrelevant information that requires extra mental processing, this is negative and linked to the redundancy effect (see below).

Forgetting Curve – Based on the work of German psychologist Hermann Ebbinghaus, where he was able to illustrate how memory decays over time. If we learn new information but don't attempt to relearn or refresh that information then it can very quickly be forgotten.

Formative assessment – The aim of formative assessment is to monitor student learning and progress in order to provide ongoing feedback, instructions and support.

Free recall – This is the act of retrieval practice without any scaffolding, support or prompts (see brain dump above as an example of this).

Germane load – This is the second type of cognitive load according to Sweller (the first is intrinsic, see below). This is the process where information becomes stored in long term memory through tasks designed by the teacher to rehearse and repeat exposure to material.

Hawthorne effect – When people are involved in a study or experiment and they attempt to change their behaviour because they are aware that they are being studied and evaluated.

Interleaving – This is the mixing up of topics within a subject. Doing so helps students make connections between topics and think harder about what the appropriate strategy is for that topic.

Intrinsic load – According to Sweller, this is a type of cognitive load, and intrinsic refers to the mental effort required to understand subject content. This is necessary.

Knowledge organiser – A document that is created to support teachers and students with the essential elements of a unit; this can include key facts, dates, terminology, concepts and more. The aim is that a knowledge organiser provides a condensed but thorough overview.

Learning Objective/Intention/Outcome – They describe and explain what it is we want the learners in our classroom to learn.

Leitner system – This is a method of using flashcards for retrieval practice and spaced over a period of time.

Long term memory – Long term memory is incredibly powerful in terms of how much information can be stored (we do not know the limitations) and also the duration too.

Low stakes – This refers to testing that is the opposite of high stakes – no or low pressure, no formal grading, not stressful but instead informal, regular and enjoyable.

Matthew effect – This concept refers to the vocabulary gap in schools. Originally, the message derives from the Bible, gospel of Matthew, “*For everyone who has will more be given and he will have an abundance. But from the one who has not, even what he has will be taken away.*” In an educational context, Daniel Rigney wrote in his book; *The Matthew Effect*, that “*the word rich will get richer and the word poor will get poorer*”.

Massed practice – *See cramming.*

Memory – How our mind stores and organises information and experiences.

Metacognition – An awareness and ability to critically monitor and evaluate the way we think and the progress we make.

Multi-store model of memory – This is a model of memory by Atkinson & Shiffrin (1968) where they proposed memory consisted of three stores. The sensory register, where information is encoded and passed on to the second store, short term memory. Finally, if information is rehearsed and retained beyond short term memory it is then stored in the long term memory.

Neuroscience – The study of the brain and the nervous system.

Neuromyth – When research and information about the brain/memory is misunderstood or not communicated correctly eg learning styles.

New Theory of Disuse – This refers to the work of Professors R. A. Bjork & E. L. Bjork (1992), they suggest there are two key measures of memory strength; storage strength and retrieval strength – see storage strength and retrieval strength.

Peer review – A rigorous process where literature, such as a research paper, is reviewed by experts in the same field to ensure high quality prior to publication.

Practitioner research – This refers to research carried out by people working in that specific field, so for example teachers conducting research into education in the setting and context of their classroom. This in contrast to full time academics that conduct research to then share with others in that field.

Procedural memory – A type of long term memory that we use on a daily basis, without consciously realising that we do because we know it so well and is linked to automacy.

Redundancy effect – Coined by Peter Chandler and John Sweller, this occurs when students are presented with extra information that is not relevant to their learning. This can also occur when students are exposed to the same information in different formats and can overload their memory, for example a powerpoint slide that contains icons that linked to the subject content (something I have been very guilty of including previously!).

Remote learning – Teaching and learning that takes places out of the physical classroom. This is not in reference to a homework task but instead teaching and learning online in the virtual classroom.

Research summary – This is when a research paper or series of research papers, studies and/or journals are summarised in one shorter and concise document.

Responsive teaching – Linked to formative assessment responsive teaching involves responding to students by asking questions, providing feedback and support all with the aim to support student progress with their learning.

Retrieval practice – The act of recalling information from long term memory in order to enhance and improve long term memory. This is a teaching and learning strategy, not an assessment strategy although high stakes testing does involve the act of recall.

Retrieval cues – Cues and prompts to aid retrieval and recall. The prompts can include images, key terms or sentence starters. This makes the act of retrieval easier to do.

Retrieval strength – Retrieval strength refers to how accessible (or retrievable) information is, this is taken from the work of Bjork and Bjork (see New Theory of Disuse).

Retrieval induced forgetting – Retrieval-induced forgetting is a memory phenomenon where remembering specific information can lead to forgetting of other information in memory. To combat this we simply ensure that all of the essential information we want students to remember and not forget is tested regularly with retrieval practice.

Rosenshine's Principles of Instruction – This is based on the work of Barak Rosenshine. Rosenshine wrote about ten key principles that he argues underpin an effective approach to instruction in lessons. The principles include review, questioning and modelling.

Schema – This refers to how much we already know and how we explain the links between them.

Semantic memory – Our knowledge base or our own encyclopaedia of facts, information, words and concepts. Knowledge that Rome is the capital of Italy is semantic, my memories of eating gelato at the Trevi fountain as episodic.

Semmelweis effect – The Semmelweis effect or reflex refers to the notion of rejecting or ignoring new evidence or knowledge because it goes against firm held beliefs and current practices. Named so after Hungarian Doctor Ignaz Semmelweis who insisted that doctors wash their hands and become more hygienic before working with patients but initially some thought this ideas was absurd!

Short term memory – This refers to immediate memory where storage is limited both in terms of capacity and duration. This term was more widely used before the introduction of the 'working memory' concept.

Storage Strength – Storage strength is how well learned something is, taken from the work of Bjork and Bjork (see New Theory of Disuse).

Spaced practice – See *distributed practice above*.

Split attention effect – This can occur when students have to refer to two different sources of information simultaneously whilst learning material. This adds extra load to the already limited working memory.

Spotlight effect – This is another cognitive bias where individuals believe other people notice their behaviour more than they likely do. In the classroom context this can prevent some students from engaging in discussions and answering questions.

Success criteria – The criteria that we use to support students during the teaching and learning process, as well to evaluate their performance and learning too.

Summative assessment – The aim of summative assessment is to evaluate student learning at the end of a unit, term, course or year.

Synchronous instruction – Synchronous teaching and learning refers to students all learning at the same time but not in the same place, for example a Zoom lesson where students are in different locations but learning at the same time.

Testing effect – This is the term used in academic literature when referring to the benefits of self-testing/retrieval practice. Due to the negative connotations associated

with testing and being high stakes the term retrieval practice is more commonly used as it is intended to be a regular low stakes teaching and learning strategy.

TPACCK model – I developed the TPACCK model (2019), previously known as the PCK model (1986) then TPACK model (2007), from the work of Arthur Schulman, Punya Mishra and Matthew J Koehler. TPACCK explains how teachers need to have strong knowledge and confidence in the following areas; technology, cognitive science, content (subject material) and pedagogy.

Transfer – This is the application of learned information, concepts or materials to a new/different context, also known as the transfer of learning.

Working memory – Both short term and working memory refer to immediate memory, being limited in both duration and capacity; how much information can be held and for how long. Working memory is a term coined by Baddley and Hitch as they believed the concept of short-term memory was too simplistic.

Zeigarnik effect – Based on the work of Russian psychologist Bluma Zeigarnik, this suggests that people tend to remember unfinished or incomplete tasks better than those completed. Students can be reluctant to begin tasks that may seem overwhelming such as an extended essay or coursework assignment. The Zeigarnik effect suggests that the key to overcoming this dread and procrastination is to simply just get started as it doesn't have to be completed all at once.

ACRONYMS USED IN EDUCATION

There are many acronyms used in education, as there are in all specialist fields, but compiling this list made me realise how many there are and not all acronyms are included! Some of the acronyms are more well known than others but hopefully this will be a helpful reference for you.

ADD – Attention Deficit Disorder	GCT – General Teaching Council
ADE – Apple Distinguished Educator	H&S – Health and Safety
ADHD – Attention Deficit & Hyperactivity Disorder	HE – Higher Education
AFL – Assessment for Learning	HMI – Her Majesty’s Inspector
ASCL – Association of School & College leaders	HoD – Head of Department
CAMHS – Child and Adolescent Mental Health Services	HoF – Head of Faculty
CAT – Cognitive Ability Test	HT – Headteacher
CEO – Chief Executive Officer	IB – International Baccalaureate
CLT – Cognitive Load Theory	IEP – Individual Educational Plan
CPD – Continuing professional development	ITT – Initial Teacher Training
CRB – Criminal Records Bureau	INSET – In-Service Education & Training
DFE – Department for Education	KS – Key Stage
DHT – Deputy Headteacher	KO – Knowledge Organiser
DI – Direct Instruction	LA – Local authority
DSL – Designated Safeguarding Lead	LAC – Looked After Children
EAL – English as an additional language	LTM – Long Term Memory
ESOL – English for Speakers of Other Languages	MAT – Multi-Academy Trust
EBacc – English Baccalaureate	MFL – Modern Foreign Languages
EBD – Emotional and Behavioural Difficulties	MLD – Moderate Learning Difficulties
ECF – Early Careers Framework	NC – National Curriculum
EEF – Education Endowment Foundation	NEU – National Education Union
EYFS – Early Years Foundation Stage	NPQ – National Professional Qualification (<i>NPML</i> – middle leadership/ <i>NPQSL</i> – Senior leadership/ <i>NPQH</i> – Headteacher)
FE – Further education	NQT – Newly Qualified Teacher
FSM – Free School Meals	OECD – Organisation for Economic Cooperation & Development
GB – Governing Body/Board	

OFSTED – Office for Standards in Education,
Children’s services & skills

PDR – Performance Development Review

PGCE – Postgraduate Certificate in Education

PMLD – Profound and Multiple Learning
Difficulties

PPA – Planning, Preparation and Assessment

PR – Peer Review

PRU – Pupil Referral Unit

PSHE – Personal, Social and Health
Education

QTS – Qualified Teacher Status

RI – Requires Improvement

RQT – Recently Qualified Teacher

SAT – Standardised Assessment Test

SCITT – School-led Initial Teacher Training

SDP – School Development Plan

SEND – Special Educational needs &
disability

SENDCO – Special Educational Needs
Coordinator

SEMH – Social Emotional Mental Health

SI – School Improvement

SLD – Severe Learning Difficulties

SLT – Senior Leadership Team

SM – Special Measures

SMT – Senior Management Team

SoW – Schemes of Work

SPaG – Spelling, punctuation and grammar

SS – Storage Strength

STM – Short Term Memory

TA – Teaching Assistant

TLR – Teaching & Learning Responsibility

VP – Vice Principal

WAGOLL – What a good one looks like

WM – Working Memory

EVIDENCE – INFORMED RECOMMENDED READING ... BOOKS

Make It Stick: The Science of Successful Learning.
Peter . C. Brown, Henry. L. Roediger III. Mark. A. McDonald. (2014)

The Ingredients for Great Teaching. Pedro De Bruyckere. (2018)
Psychology in the Classroom

Understanding How We Learn. A Visual Guide. Megan Sumeracki.
Yana Weinstein. Oliver Caviglioli. (2018)

Powerful Teaching: Unleash the Science of Learning. Pooja. K. Agarwal.
Patrice Bain. (2019)

How Learning Happens: Seminal Works in Educational Psychology and
What They Mean in Practice. Paul. A. Kirschner. Carl Hendrick. (2020)

The Science of Learning: 99 Studies that every teacher needs to know.
Bradley Busch. Edward Watson. (2021)

EVIDENCE – INFORMED BLOGS

<https://theeffortfuleducator.com/> – Blake Harvard

<https://achemicalorthodoxy.wordpress.com/> – Adam Boxer

<https://teacherhead.com/> – Tom Sherrington

<https://missdcoxblog.wordpress.com/> – Dawn Cox

<https://tomneedhamteach.wordpress.com/> – Tom Needham

<https://www.learningscientists.org/> – Learning Scientists

<https://teachreal.wordpress.com/> – Mark & Zoe Enser

<https://3starlearningexperiences.wordpress.com/> – Paul A Kirschner

<https://www.innerdrive.co.uk/>

RESEARCH SUMMARIES

Retrieval Practice guides

– Professor Pooja K Agarwal

Principles of Instruction

– Barak Rosenshine

Strengthening the Student Toolbox: Study Strategies to Boost Learning.

– Professor John Dunlosky.

Teaching & Learning Toolkit

– Education Endowment Foundation (EEF)

What makes great teaching? Review of the underpinning research.

The Sutton Trust, Professor Robert Coe et al.

Cognitive load theory: Research that teachers really need to understand.

– Centre for Education Statistics and Evaluation.

The Great Teaching Toolkit: Evidence Review.

Evidence Based Education.

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