

# A Unified Theory of Learning

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## Overview

This *Unified Theory of Learning* is designed to provide a framework for consideration of all Learning Theories and Theorists.

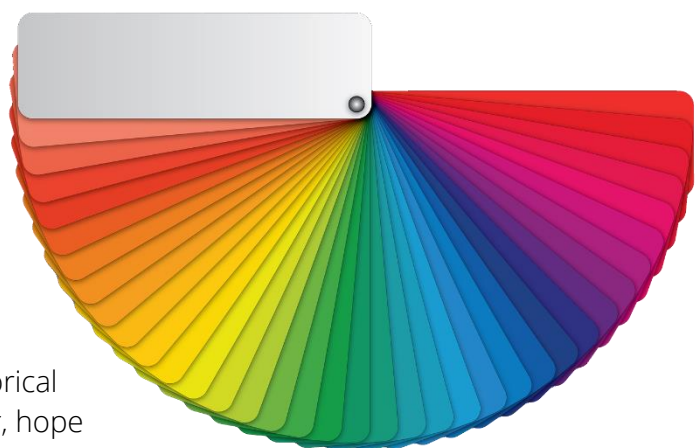
The primary aim of this *Unified Theory* is to help teachers select the right teaching strategies to produce the ideal *Emotional Learning States* we want in our learners, and to address any challenging *Emotional Learning States* we might be presented with (as shown on page 4).

Section 2 contains brief and helpful overviews of the four main learning theories.

In reality, the many theories overlap and interweave, a little like the bottom picture here. This can make it difficult to understand the discrete personality of each theory.

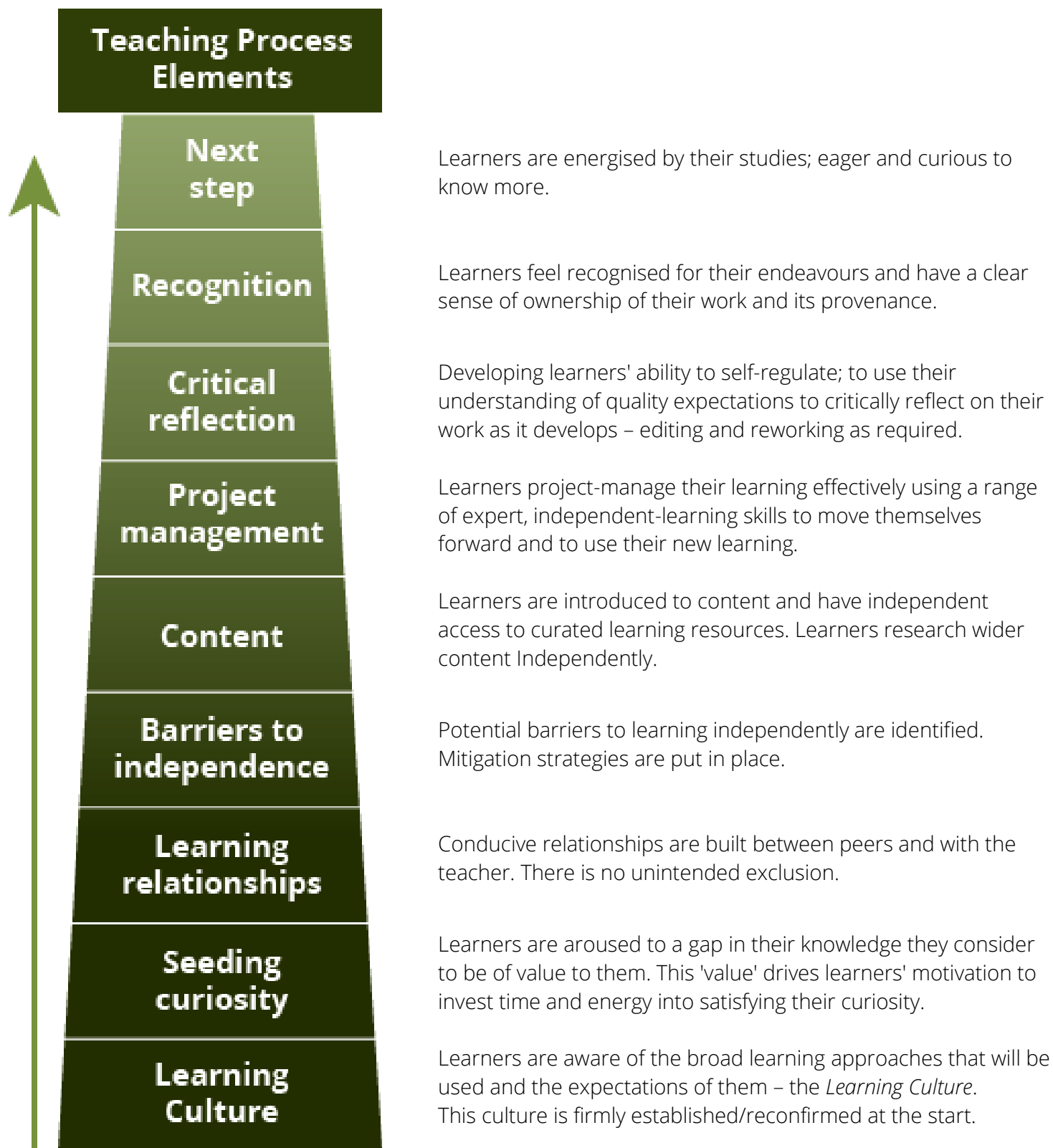
For that reason, this resource offers a 'stereo typical' view of each theory – independent and self-contained – more like the top picture here.

This resource is not intended to be either a historical record or comprehensive account. I do, however, hope you find it very useful.



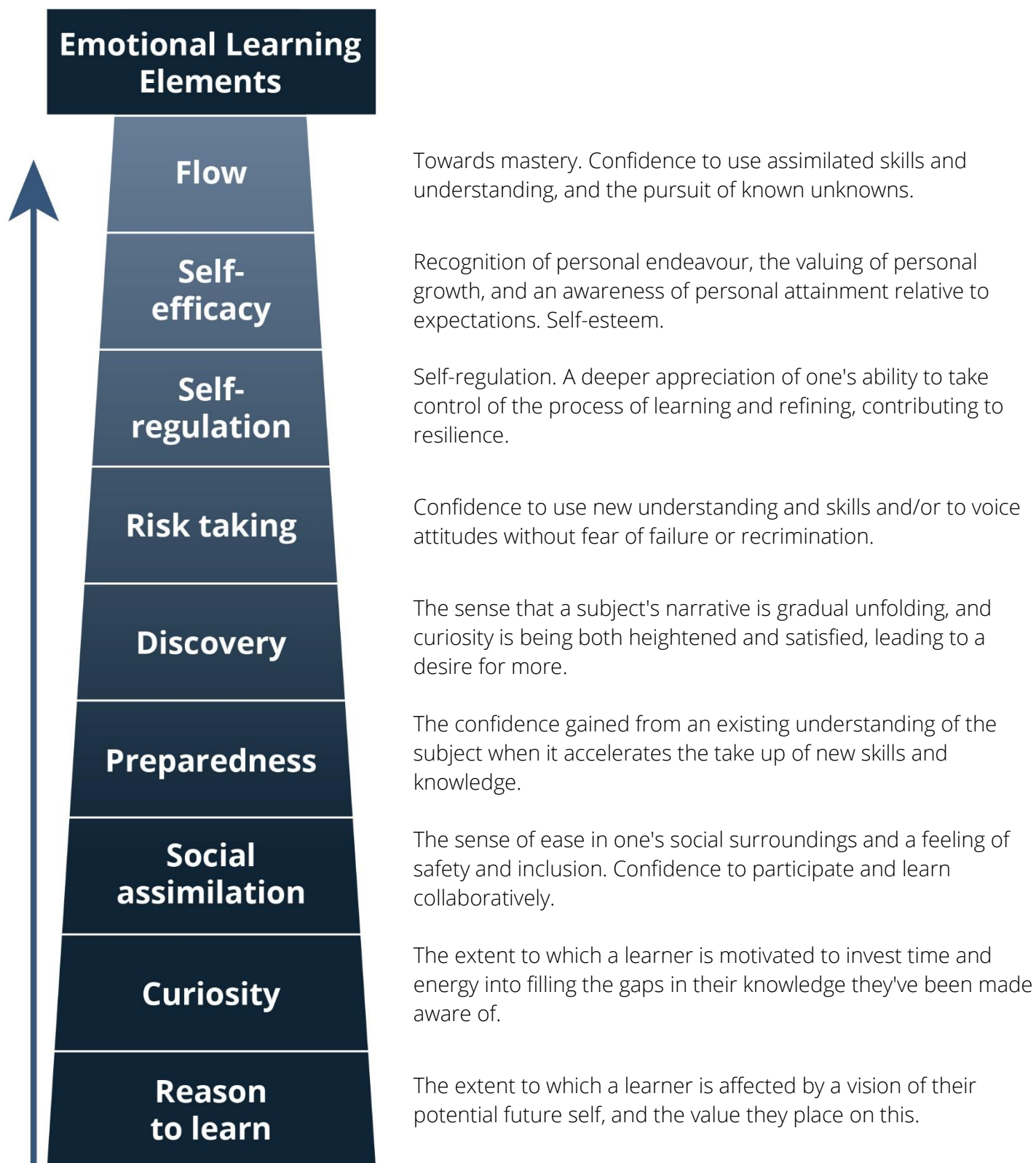
## The Teaching Process Map

The *Teaching Process Map* (TPM) is a *Cumulative Success Framework* for a scheme of work, a plan for an extended learning experience, or a plan for a single lesson. Success at each *Element* level will make success at the next level easier to achieve. While the flow of *Elements* from one to another is important, the TPM, rather than being prescriptive pedagogy, is a set of headings that does not preclude any of the Learning Theorists' ideas.



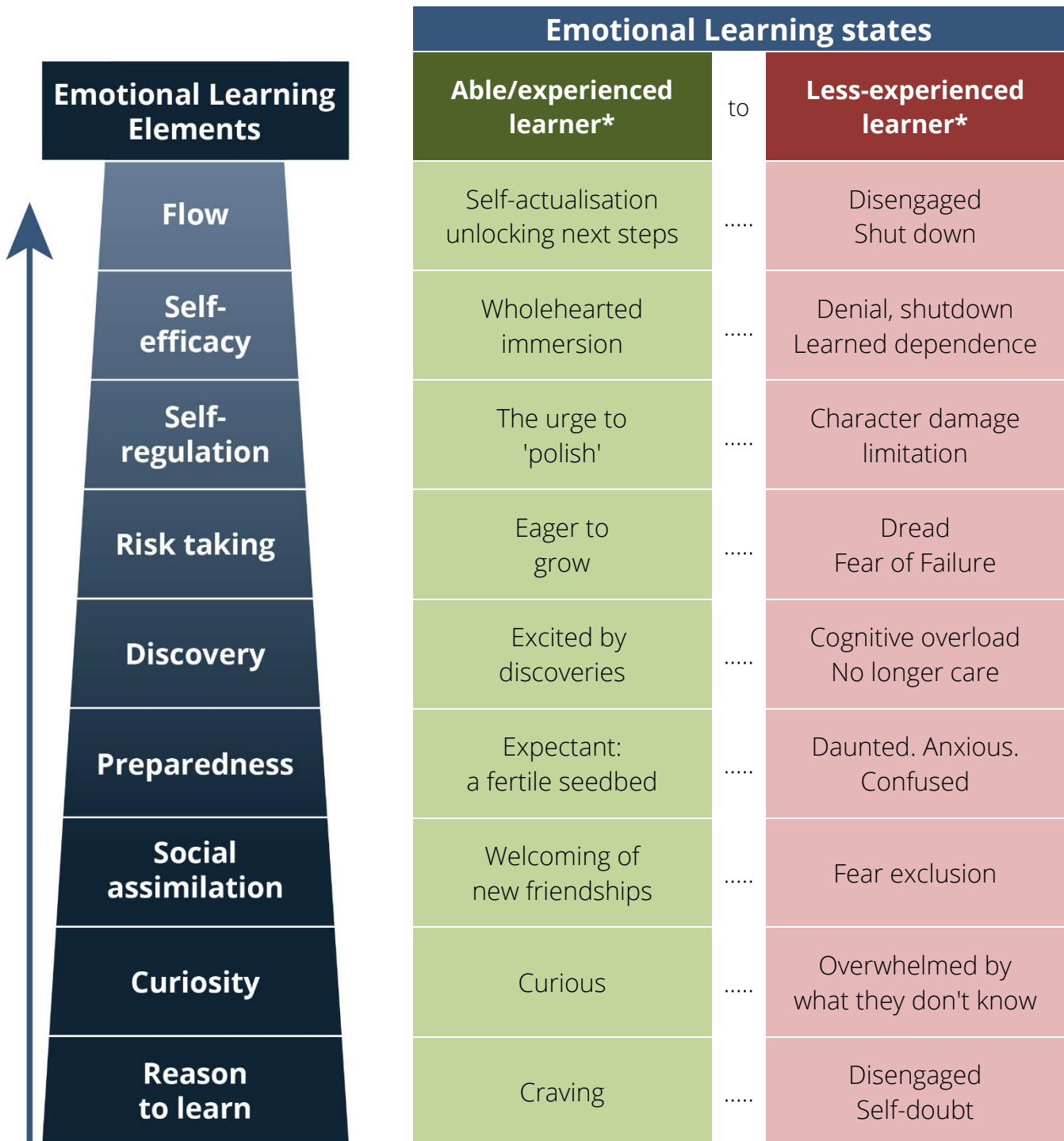
## The Emotional Learning Journey

Like the TPM, the *Emotional Learning Journey* (ELJ) is a *Cumulative Success Framework* – giving us the headings **with which to consider two extreme sets of *Emotional Learning States*** (ELs) (as shown on the following page). Definitions should be read in relation to these potential emotional states. While the ELs and their descriptions are important, their purpose is to allow us to envision the two extreme sets of *Emotional Learning States*.



## The Emotional Learning States

The *Emotional Learning States* (ELs) of the 'able/experienced learner' are the aspiration of the *Teaching Process Map* and should influence the pedagogy choices of the teacher. Similarly, the 'less-experienced learner' ELs represent the challenges teachers may have to overcome.



\* The learner-type labels are used to express the extremes of the emotional continuum. However, they do not refer to an individual, but to how a learner may present in a particular learning *situation*.

For instance, the same learner may present as 'able' in hairdressing, but 'less experienced' in maths. This is referred to as a *Situational Emotional Learning State*.

The following illustration appears to argue a direct causal link between *Teaching Process Elements* and *Emotional Learning Elements*, however, the relationship is not quite so straightforward. For instance, consider:

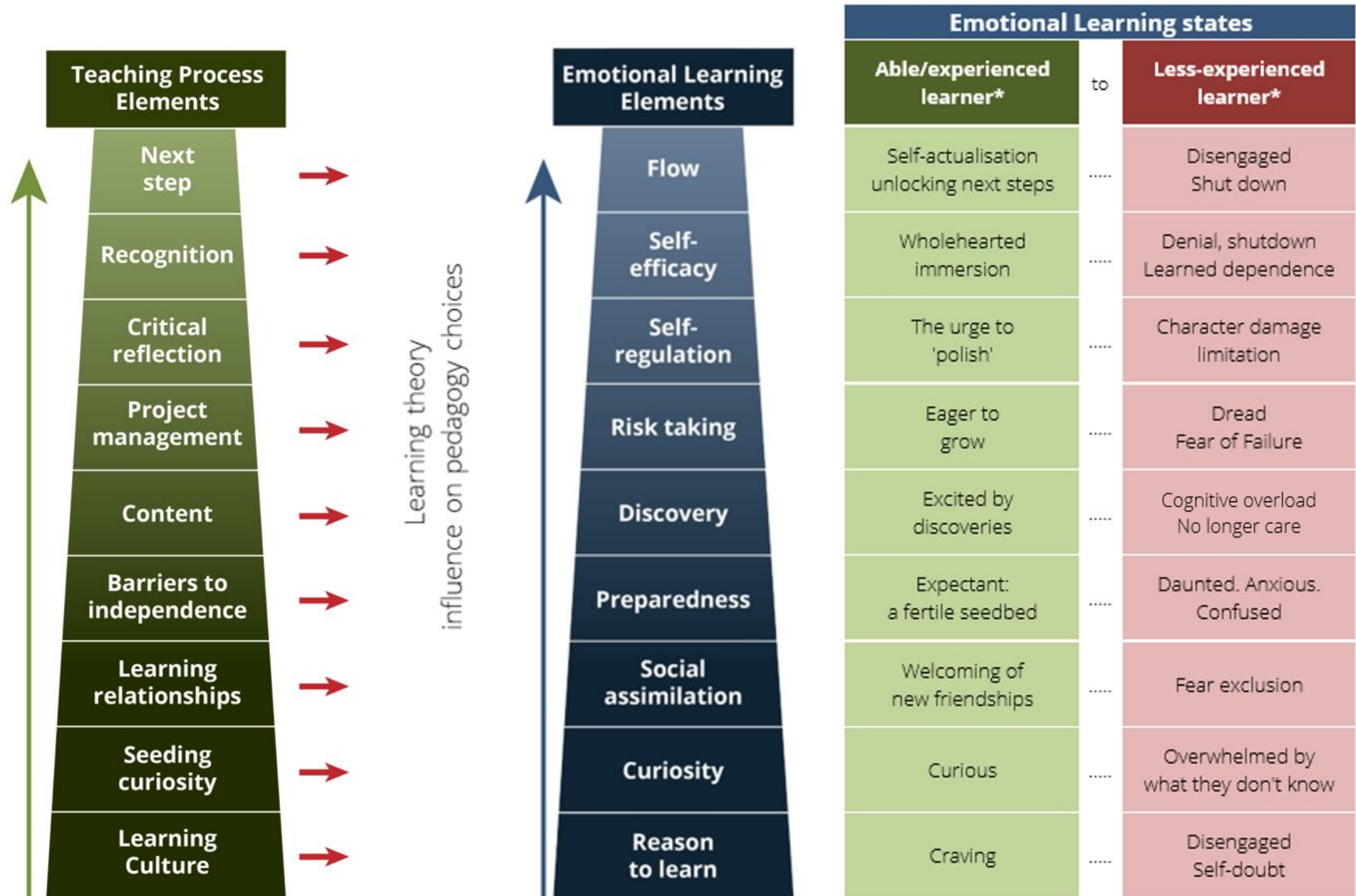


Part of a teacher's responsibility is to develop a *Learning Culture*. Work towards this may most effectively begin in what might be thought of as the *Recruitment* period – even if the learner does not consider themselves as 'being recruited'. This may equally include managing and promoting the reputation of the provision, but also managing and inspiring the aspirations of prospective learners. Ideally, learners would then be clear about their *Reason to learn*. An ideal, if extreme, impact of this might be to create a *Craving* to learn – a *craving* to join the provision; the learner's *Emotional Learning State*.

However, the learner may already have a *craving* to, say, study musical theatre that is wholly independent of anything the teacher might do in establishing a *Learning Culture*. Notwithstanding this clear independence of the *Teaching Process Elements* (TPEs) and the *Emotional Learning Elements* (ELEs), it should still be the aim of the teacher for their provision to become a learner's aspirational destination, and for them to *crave* new learning (or any synonym you would prefer to use).

A more direct causal relationship between TPEs and ELEs might be seen in the need for a teacher's work to overcome challenging *Emotional Learning States*, such as a learner presenting as *disengaged* or filled with *self-doubt*.

In summary, then, teachers will follow a process and learners will go on a potentially independent emotional journey throughout their studies. The rationale behind this resource is to use the work of the Learning Theorists to make informed pedagogy choices to attempt to produce the ideal *Emotional Learning Journey* and where required, overcome the challenging emotional states they may be presented with.







# Behaviourism

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## Is your teaching strategy *Behaviourist*?

	Yes?
Are learners given a clear goal/objective at the start of the learning process?	
Does it require the learning to be observable and measurable?	
Are learners working towards a single correct answer?	
Are learners required to reproduce a procedure accurately?	
Does it include repetition of a process?	
Will learners be rewarded if they do well?	
Is the teaching stimulus designed to trigger an immediate physical reaction? (Shock and awe tactics.)	
Does it break a subject down into bite-sized pieces: A > B > C?	
Does it require learners to master A before moving on to B?	
Does the accompanying assessment strategy include corrective feedback?	
Is part of the accompanying assessment strategy the transfer of learning to a similar situation?	

## Who were the *Behaviourists*?

- John Watson (1878 – 1958)
- Edward Thorndike (1874 – 1949)
- B.F. Skinner (1904 – 1990)

## What is *Behaviourism*?

- The teacher-led modification of behaviour, and transmission of knowledge to the learner.
- Behaviours are learned through interaction with the environment through a process called '*conditioning*'. Behaviour is simply a response to environmental stimuli.
- A learner's behaviour is changed by rewarding positive behaviour. The teacher will reward the learner when the desired behaviour and/or learning is observed.
- Stimulus and response: learners are conditioned to respond to 'discriminate') appropriately to a given stimulus; and the teacher is able to predict what this response may be.
- Learners know there will be consequences for adverse behaviour.
- Behaviour change (learning) is best achieved through small, incremental and often-repeated steps. This is called '*shaping*' and '*chaining*'.
- The teacher is clear about what constituted correct behaviour and right answers.
- Learning is observable and measurable.
- Learning that is not reinforced is lost.
- To use/apply/transfer new learning, the new situation must be similar.



Teaching Process Elements	<b>A Behaviourist's approach</b>
Next step	Learners are ready for the next set of stimulus-response activities.
Recognition	Recognition (reward and reinforcement) is at the heart of Behaviourism, but arguably limited to the achievement of the prescribed learning and/or the correct behaviour change.
Critical reflection	While critical reflection is an internal, cognitive skill, the teacher will set clear outputs for critical reflection, such as the editing of an artefact to move it closer to that required.
Project management	The teacher is clear about how learners should manage their learning, time and work and rewards them for adhering (responding) to the set learning culture.
Content	The teacher is clear about the content and how it will be delivered.
Barriers to independence	Through a step-by-step approach, with reward for achievement of every step, barriers to independence can be overcome.
Learning relationships	Unacceptable attitudes to learning have been learned as a consequence of stimuli in previous environments. These, then, can be unlearned and replaced with acceptable attitudes. Any shift towards acceptability will be rewarded, and there will be consequences for any maintenance of unacceptable attitudes.
Seeding curiosity	'Curiosity' is internal so not considered relevant. While the actions resulting from curiosity are observable, they could lead to any number of 'answers' rather than the 'correct' version held by the teacher.
Learning Culture	The learner is a blank canvas and can be told what the ideal learning culture is going to be. The teacher's focus is on observing the correct learner behaviour to a given stimulus.

## John Watson (1913 – 1958)

### Methodological Behaviourism

When born, we are a blank slate.

All behaviour, no matter how complex, can be reduced to a simple stimulus-response association. Watson described the purpose of psychology as:

'To predict, given the stimulus, what reaction will take place; or, given the reaction, state what the situation or stimulus is that has caused the reaction.'

The scientific approach to the study of psychology. The theoretical goal is the prediction and control of observable behaviour. It wasn't that behaviourists were uninterested in cognitive activity, they chose not to study it as they couldn't measure it.

## Edward Thorndike (1874 – 1949)

### The Law of Effect

- that consequences, either rewards or punishments, are a necessary condition for learning.

### The Law of Exercise

- that learned behaviour fades without practice and is strengthened with practice.

Rewards, punishment and repeated practice.

For 'transfer' to take place – the application of learning to practice – situations have to be *similar*. Learning tasks and contexts should match the real world.

The scientific measurement of behaviour.

## B.F. Skinner (1904 – 1990)

### Radical Behaviourism

When born, we have some innate behaviours.

Only observable phenomena are allowed as evidence: stimuli and their behavioural responses. No mental events are considered admissible, as they are unobservable. However, Skinner did propose that cognitive events could be explained through the analysis of associated behaviour.

Learning to operate in your environment ('*operant conditioning*'). Positive reinforcement is more powerful than negative reinforcement. Also, withdrawing a reinforced behaviour leads to the extinction of that behaviour.

Asking a learner to complete reams of maths problems without feedback would be against the *Behaviourist* method, as it fails to reward. It would be argued that here the teacher is not 'shaping behaviour'.

Skinner's 'teaching machine' allows learners to practice already learnt skills. His 'programmed instruction' broke material down into small steps, and as performance improved, less and less support was provided.

Sequencing and feedback.

An alternative visual anchor for *Behaviourism* is this simple, but graphic joke about sex (forgive me if this offends): 'That was great for you, how was it for me?' The joke shows that only the observable is valid.

## Bibliography

Watson, J. B. (1913) *Psychology as the Behaviorist Views it*. *Psychological Review*, 20, 158-177.

Thorndike, E. L. (1898) Animal intelligence: An experimental study of the associative processes in animals. *Psychological Monographs: General and Applied*, 2(4), i-109.

Skinner, B. F. (1971) *Beyond freedom and dignity*. New York: Knopf.

# Cognitivism

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## Is your teaching strategy *Cognitivist*?

	Yes?
Does it activity build understanding?	
Does it centre on learners being intrinsically motivated?	
Does it include learning activities independent of the teacher?	
Does it require learners to evaluate information and justify decisions?	
Does it build on learners' personal experiences?	
Does it value the wider picture?	
Does it include learning through reorganising information and finding new explanations?	

## Who were the *Cognitivists*?

- Miller (1920 – 2012)
- Badderley (1934 - )
- Sweller (1946 - )

## What is *Cognitivism*?

- Our behaviour changes in response to thinking and processing information – *cognition*. We *encode* new information.
- *Cognitivism* is 'change in knowledge'.
- At its best, *Cognitivism* moves learning from 'working memory' (short-term) to long-term memory, manifesting as 'ability'.
- The opportunity for learners to build their own understanding.
- It builds knowledge of the topic through active participation and problem solving.
- The teacher choreographs individuals' learning experiences.
- It requires higher-order *thinking* skills (Bloom's taxonomy).
- 'Chunking': categorising logically, sequencing, creating taxonomies, writing precis/thumbnaill overviews, paraphrasing, summarising, synthesizing, highlighting, note taking, visual anchors, verbal rehearsal ... to increase the effectiveness of recall – and the transition from working memory to 'ability'<sup>1</sup>.
- Comparing and contrasting.
- It motivates learners by linking concepts discussed in the classroom with everyday life.
- It involves linking concepts together.
- It's about expert learning (*metacognition*) – training learners in project (learning) management and critical reflection.

Teaching Process Elements	A <i>Cognitivist's</i> approach
Next step	Learners are being equipped and challenged continually to think forward, while being made increasingly curious about the next steps.
Recognition	In the <i>Cognitivist</i> teacher's classroom, recognition is both internal and external. Learners will recognise for themselves, and feel pride in, the provenance and ownership of their work. The teacher will provide evidence-based recognition (not praise) for their endeavours.
Critical reflection	With mastery of expert-learning skills (including Bloom's higher-order thinking skills), learners are able to take control of content and use it to learn independently. The <i>Cognitivist</i> teacher seeks to proactively develop these primary skills, using the vocational subject as a learning vehicle.
Project management	'Risk taking' requires a stable platform from which to leap. The <i>Cognitivist</i> teacher develops both social and learning stability, enabling learners to plan and manage their own forays into the wider subject, and beyond the edge of their comfort zone.
Content	Content is curated and presented for consideration by the teacher. Learning happens when learners make sense of the content through active participation. Value is increased by rooting learning in real-life scenarios.
Barriers to independence	The teacher enables learners to set out all potential barriers to the development of expert, independent learning skills. Learners categorise and rank these potential barriers, then self-assess against them; choosing mitigation strategies as required.
Learning relationships	Learners make a personal decision about their openness to social relationships. The teacher's role is to create the 'low-stakes' conditions for social growth, so that learners can elect to form constructive learning relationships with their peers.
Seeding curiosity	This <i>Emotional Learning State</i> is a concrete 'change in knowledge'. Specifically, it is the moment in which the teacher causes learners to recognise what they don't know; something of value to them. The more shocked they are by the missing information, and the more value it holds for them, the greater the potential impact on learning.
Learning Culture	Each learner has a unique set of life experiences. Through carefully crafted learning tasks, such as mind mapping, learners arrive at a definition of a learning culture in which they can thrive.

## George Miller

One of the founders of cognitive psychology.

'Chunking' makes it easier to understand and remember. So remembering TVFBIJFKCIAIBM is far more difficult than TV FBI JFK CIA IBM.

Creating our own 'chunking' increases the effectiveness of recall. This could include categorising logically, creating taxonomies, writing precis/thumbnail overviews (paraphrasing, summarising, highlighting, note taking), visual anchors.

## Alan Baddeley

Working memory has three components:

1. Executive decision making
2. Verbal rehearsal loop
3. Visuospatial sketch pad

## John Sweller

Cognitive Load Theory: how working memory deals, or doesn't deal, with new knowledge. There are two major limitations of working memory: capacity and duration. First, it is very limited in capacity as we are only capable of dealing with between two to four elements held at any one time, when trying to solve a problem. Second, we can only hold information for around 20 seconds.

However, we also have and rely on our larger long-term memory as our major resource, which has no real limits on capacity or duration. Long-term memories can be taken back into working memory with relatively little effort, often instantly. This is why it is vital that we get knowledge and skills into long-term memory<sup>2</sup>, so that we can utilise them quickly in working memory. Once we get information into long-term memory, we're transformed.

## Tony Davis

<sup>2</sup> [I feel that talking in terms of 'long-term memory' as an ultimate goal has the strong potential to make us as educators miss the point. It is all too easy for us to equate 'long-term memory' with no more than the ability to recall facts. In turn, this could go some way, at least, to explain how \*checking recall\* dominates and distorts so much of our system, from the issues with learning-outcome writing, to Q&A in lessons, to the systems of assessment used by awarding bodies.](#)

[How, then, would the impact on our work change if we augmented the idea of long-term memory by imagining information being \*encoded\* and \*assimilated\* into a set of skills and abilities deep in our brains? The more we practise and hone these skills, the easier they are to apply at a moment's notice. The almost effortless application of our abilities enables us to achieve a sense of 'flow' in our work. Would learning outcome writing and Q&A in lessons, then, move away from working on learners' ability to simply 'recall', to the practise and honing of higher-level skills? So while the mechanics of memory might not be up for debate, I feel the impact on us as educators certainly is.](#)

## Bibliography

Miller, G.A. (1956) *The magical number seven, plus or minus two: Some limits on our capacity for processing information*. *Psychological Review*, 63, 81-97.

Baddeley, A. D. (2007) *Working memory, thought, and action*. Oxford: Oxford University Press.

Sweller, J (1988) "[Cognitive load during problem solving: Effects on learning](#)". *Cognitive Science*. 12 (2): 257-285.



# Social Constructivism

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Is your teaching strategy *Constructivist*?

	Yes?
Does it involve learners learning ( <i>constructing</i> meaning) from experiences?	
Does it involve learning collaboratively?	
Are some learning outcomes unpredictable?	
Does it include learning that is independent of the teacher?	
Does it include the use of group discussions, problem solving and the giving of evidence-based opinions?	
Does it produce novel, creative work that is new (to the learner at least)?	

Who were the *Constructivists*?

- Vygotsky (1896 – 1934)
- Bruner (1916 – 2016)
- Donaldson (1926 – 2020)

What is Social *Constructivism*?

- The development (*construction*) of learning through (*social*) dialogue resulting in learning from multiple perspectives.
- Collaborative research and the collaborative building of vocabulary.
- Learning built on prior knowledge, including the resolving of misconceptions.
- The designing of scaffolding and environmental conditions to broaden learners' comfort zones.
- Discovery learning followed by learners' critical reflection and self-determined next steps.
- The synthesizing of knowledge gained from disparate experiences to resolve a given challenge.
- The use of teaching methods that reflect the target learning outcomes.
- Interdisciplinary: the designing of learning experiences that generate multiple perspectives and the carrying out of 'real' roles. The anchoring of learning in meaningful contexts.
- Classifying, analysing, predicting and creating.
- Critical thinking and inquiry through the asking of thoughtful, open-ended questions; by the teachers and/or of each other.
- Requiring learners to be ready to learn.
- The *scaffolding* of learning resources and the provision of access to them.
- That thought is intimately bound up with emotion.

Teaching Process Elements	A <i>Constructivist's</i> approach
Next step	<i>Constructivist</i> teachers choreograph the cycle of curiosity, discovery, review and mastery, 'laying down' layers of experience and <i>Subconscious Functional Routines</i> that enable learners to experience a great sense of 'flow' in their work.
Recognition	An overall aim is to create learners who can think divergently and learn independently. This emphasis on forward thinking rather than mere recall of facts produces resilient learners who take pride in their work, with the ability to use their thinking processes and store of <i>Subconscious Functional Routines</i> in any new situation.
Critical reflection	Along with contributing to their resource of life experiences, a major part of the learning that comes from individual and collaborative projects is learners' critical reflection of the artefacts and/or experience, leading to decisions about next steps.
Project management	One of the <i>Constructivist's</i> main roles is to invest heavily in the design of experiences that develop learners' expert learning skills, with the aim of ever increasing the 'size' of their comfort zone. It could be argued, then, that Risk-taking is central to this learning theory.
Content	Content is curated by the teacher and made available to learners. Access to this content may be through autonomous research or it may be used as a resource to support a collaborative discovery project.
Barriers to independence	Teachers prepare resources and learning experiences for their learners, along with <i>scaffolded</i> support strategies to help them overcome any barriers they may have to independence.
Learning relationships	Productive and supportive learning environments are central to the success of the <i>Constructivist's</i> approach. Much investment, then, will be made at the start of the course (and also a lesson) to produce conducive environments in which learners feel safe to contribute and 'perform'.
Seeding curiosity	Through the teacher's careful design of collaborative learning experiences, learners will begin to question what they know and discover what they don't, leading them ever deeper into new experiences and revelations.
Learning Culture	A learning cohort is a collection of unique life experiences. Through activities such as: discussion, mind-mapping, ranking and ordering – choreographed by the teacher – learners will be able to help establish an effective learning culture for their group.

## Lev Vygotsky

Social constructivism: the idea that learning is fundamentally a socially mediated and constructed activity.

Focus on being aware of the learner's needs, so that they can 'construct' their own learning experience, changing the focus of teaching towards guidance and facilitation as learners are not so much 'educated' by teachers, as helped to construct their own learning.

Vygotsky's *Zone of Proximal Development* (ZPD) is, for all practical purposes about a learner's learning age. It is the difference between:

- what the learner knows, and
- what the learner is capable of knowing, or doing with *mediated* assistance.

So the ZPD of a 14-year old will be a lot wider than that of a 4-year old.

## Jerome Bruner

Bruner thought that learners, in problem solving, used different processes and that these vary from person to person and that social interaction lay at the root of good learning. The background to his theories on instruction is the social constructivist view of development: the gradual exposure to socially mediated narratives and explanations.

He encourages learners to come to enlighten themselves through reflection.

His theory of instruction addresses four principles:

1. Readiness: The learner must have a predisposition to learn, so their experiences and context must be considered.
2. Structure: The content must be structured so that it can be grasped by the learner.
3. Sequence: Material must be presented in the most effective sequences.
4. Generation: Good learning should encourage extrapolation, manipulation and a filling in the gaps, just beyond the learners' existing knowledge.

Bruner also gave us the word 'scaffolding' in educational theory, and the recognition that learners need to be either self-aware or helped to build on existing knowledge.

## Margaret Donaldson

The underplaying of emotion in learning. Unlike most learning theorists, Donaldson sees that *thought* itself is intimately bound up with *emotion*. The affective mode in education is too often ignored in favour of a purely rational approach. To ignore the affective side of learning is to ignore what many need to be motivated in learning.

## Bibliography

Vygotsky, L.S. (1962) *Thought and Language*. Cambridge, MA: MIT Press.

Bruner, J. S. (1960) *The Process of Education*. Cambridge: Harvard University Press.

Donaldson, M (1993) *Human Minds: An Exploration* Penguin.



# Connectivism

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Is your teaching strategy *Connectivist*?

	Yes?
Is an essential part of the learning culture a distributed network of connections?	
Does it require learners to nurture and maintain their learning networks?	
Does it include training on how to build and use learning networks?	
Does it require learners to judge the accuracy and/or currency of the information they are given or discover?	

Who were the *Connectivists*?

- George Siemens
- Stephen Downes
- Clarissa Davis
- Earl Edmunds
- Vivian Kelly-Bateman

What is *Connectivism*?

*TD – Information health warning: I'm utterly unconvinced (as are many other commentators) by Siemens' and Downes' assertion that Connectivism is a new and separate learning theory. To me, it is a blend of Social Constructivism, Humanism and Andragogy. It might be better understood as a significantly augmented toolkit for independent learning. The text below, then, is written from this standpoint.*

- Knowledge is distributed across a network of *connections* – a *Personal Learning Network*.
- The learning process is the independent use of your *connections*.
- Networks include people and knowledge banks.
- The proactive contribution to a learning network.
- That a network strengthens through validity, diversity of opinions and quantity. The more time a learner spends in their network, the more potential for effective learning and growth of their connections.
- Learners' *capacity* to know more is more critical than what is currently known.
- The nurturing and maintenance of networks.
- Seeing connections between fields [*a deliberately open term*], ideas and concepts.
- Recognition that if the underlying conditions used to make a decision change, then the decision itself may no longer be correct.
- An understanding that the span of time between learning something new, being able to apply it, and finding that it is outdated and no longer useful continually decreases. This is what Gonzalez refers to as the "half-life" of knowledge - the time span from when knowledge is gained until it becomes obsolete.

Teaching Process Elements	A <i>Connectivist's</i> approach
Next step	In the <i>Teaching Process Map</i> , 'next steps' and 'flow' are the final element. However, if <i>Connectivism</i> achieves its goal, learners may achieve <i>flow</i> very early in the process due to the emphasis on a blend of autonomy and connectivity.
Recognition	The recognition learners receive, and so their sense of self-efficacy, may be volatile in the <i>Constructivist's</i> world. 'Likes' are an all-too-easy proxy for effectiveness, and ill-considered criticism (and maybe even verbal abuse) can be all too hard to ignore. The teacher's role, then, is to help recognise, and build resilience against, this volatility.
Critical reflection	Inherent to the <i>Connectivist's</i> approach is the development of learners' discernment over the content that's presented or discovered. The concept of the <i>half-life of knowledge</i> and learners' constant evaluation of validity and currency could easily be a useful addition to a definition of 'self-regulation'.
Project management	As can be seen below, if learners are constantly aware of building connections that are both valid and diverse – [ <i>and, I'd add, safeguarded and supportive</i> ], then learners' ability to develop their leaning-management skills should be (relatively) risk free.
Content	Content can be found anywhere and 'everywhere'. The <i>Connectivist's</i> art is to both curate content ( <i>knowledge cells</i> or <i>banks of knowledge</i> ) and facilitate learners' own content-curation activities. Learners will also broadcast content to their network.
Barriers to independence	Due to the autonomy implicit in <i>Connectivism</i> , the teacher will have a wide range of tools at their disposal to help learners see what might hold their learning back, and to see how their network may need to grow to support success. Learners' preparedness for learning sessions will be the cultural norm.
Learning relationships	Learning Relationships are <i>the</i> core of <i>Connectivism</i> . While the theorists may claim their work is about the connections not the meanings these produce, this might be as useful as visualising a pint of beer without a glass. A network's support for the emotional journey is surely as important as its knowledge base.
Seeding curiosity	A network in which others broadcast creates inherent curiosity. The <i>Connectivist</i> teacher's art is to build on this, proactively <i>making</i> learners curious, the satisfaction of which is achieved by learners using their networks.
Learning Culture	Show, through modelling, the power of a learning culture based on a network of social connections and knowledge banks. Enable learners to evaluate their current network for its relevance to their learning journey and to devise a plan for its growth.

## George Siemens and Stephen Downes

Siemens and Downes developed the concept of 'Connectivism', the idea that "knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks". They see it as an alternative to behaviourism, cognitivism and constructionism.

Downes makes it clear that he is **not a social constructivist**. 'Connectivism' is very different from 'constructionism', as the focus is on the connections, not the structures or meanings that are being connected across networks. Learning consists of the practices, by both teachers and learners that result in the creation and use of successful networks with properties such as diversity, autonomy, openness, and connectivity. This was a real challenge to the existing paradigms, that takes into account the explosion of network technology, as well as presenting a new perspective on the learning process. It has similar characteristics to those that believe in extended consciousness and cognition across technological networks.

*[TD – Despite their assertion that they are not Social Constructivists, I feel this is just rhetoric. By definition, Social Constructivism is the building of social networks through which all can learn. What Connectivism does, however, is broaden the scope of the connections from simply those in your locale, to anyone in the world who is connectable (by this I guess I mean 'online', though this shouldn't be restrictive as phones and correspondence still work). Connectivism also include 'knowledge banks' as components of your connected network.]*

If the underlying conditions used to make decisions change, the decision itself is no longer as correct as it was at the time it was made. "The ability to recognize and adjust to pattern shifts, therefore, becomes a key learning task" (Siemens, 2005, para. 18).

## Clarissa Davis, Earl Edmunds and Vivian Kelly-Bateman

### Half-Life of Knowledge

New technology forces the 21st century learner to process and apply information in a very different way and at a very different pace from any other time in history. As a result, the span of time between learning something new, being able to apply it, and finding that it is outdated and no longer useful continues to decrease. This phenomenon is what Gonzalez refers to as the "half-life" of knowledge - the time span from when knowledge is gained until it becomes obsolete (2004). Since the advent of technology, from the radio to the internet, the half-life of knowledge has decreased significantly. Gone is the era when it takes days, weeks, months, or years for something to catch on with the general population. Something that may have taken that long just ten years ago can now reach literally millions of people around the world within a matter of seconds.

## Bibliography

Downes S. (2007) *Connectivism* <https://www.downes.ca/cgi-bin/page.cgi?post=38653>

Siemens, G. (2017) *Connectivism Foundations of Learning and Instructional Design Technology*.

Davis, Edmunds, & Kelly-Bateman (2008) *Connectivism*

<http://epltt.coe.uga.edu/index.php?title=Connectivism>