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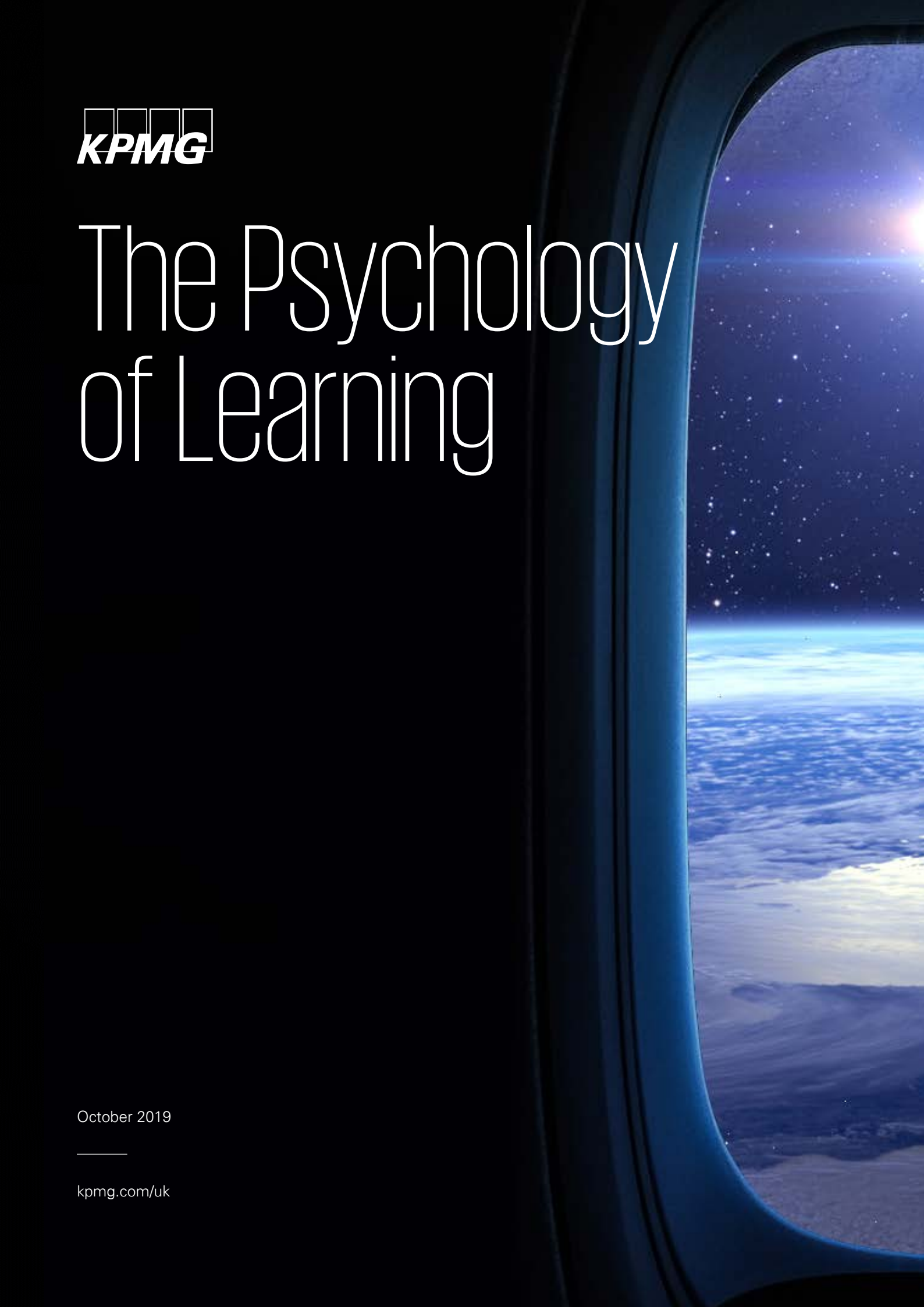
The Psychology of Learning



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The psychology of learning

The ability to learn is now one of the key reasons why individuals will take a new role and remain in that role and organisation. With learning being so critical to the attraction and retention of talent, and the ability to upskill our workforces in times of constant change, we must ensure that we are designing truly people-centric learning that meets the wide ranging needs of diverse workforces.

Psychology and neuroscience offers us the tools to do just that. In The Psychology of Learning we introduce a variety of evidence based theories to help you understand how and why people remember and learn, and therefore how organisations can better design and deliver learning and development offerings.

By taking these often complex theories, and distilling them down to a set of basic principles, you can help ensure better knowledge transfer, memory retention, employee engagement with learning, application of learning, and ultimately a greater return on your learning investment.

How do we learn?

We learn by forming memories. Creating memories allow us to express the knowledge we have acquired and understand its application.

01

Encode

The process by which we transform information into something meaningful so it can be stored and later retrieved.

02

Store

How we hold onto information – This requires a physiological change in our brains.

03

Retrieve

Reversing the encoding – bringing the memory out of storage.

How do we remember?

We remember things for a number of different reasons, including the natural tendency to remember the first and last piece of information shared. There are a number of principles that impact learning and memory.

- **Primacy effect** – information that occurs/appears first is typically remembered better
- **Recency effect** – often the last piece of information you receive is remembered because not as much time has passed
- **Distinctiveness** – if something stands out from the information around it, it is likely to be remembered better. It's easier to remember something distinctive than something mundane
- **Frequency effect** – rehearsal results in better memory. The more you practice something or try to learn it/remember it, the more likely you are to learn it
- **Associations** – when we associate or attach information to other information it becomes easier to remember
- **Reconstruction** – sometimes we fill in the blanks in our memory. We sometimes make up the missing parts, which is often based on our schemas i.e. past experiences that imply what logically makes sense (this can also of course, lead to false memory formation)

When it comes to our long-term memory, the number one influencing factor is personal relevance.

Passing something from your short term memory to your long term memory usually requires that information having some sort of significance. For you to remember something in the long term, it needs to be in some way important and relevant to you.

Our brains are social organs

Brains are 'designed' to learn through **shared experiences**

They grow best in the context of **interactive discovery**

Learning isn't just about forming memories. Our brains are wired for social interaction.

Studies have shown that the area of our brain responsible for cognitive processing is engaged when we perform cognitive tasks. However, as soon as we finish a task, the social region of our brain immediately switches back on. In short, our brains are constantly primed for social interaction.

It is therefore no surprise that our brains grow best in the context of interactive discovery (Cozolino and Sprokay, 2006).

This can also be described as social learning, and is likely one of our oldest forms of learning. At its core, social learning is the continuous process of learning from other people. We are learning socially when we observe other people, ask questions, have discussions and share knowledge resources.

Social learning is about leveraging the expertise and knowledge around you to learn as and when you need it (just-in-time). This might be asking the person next to you a question, engaging in online forums or searching on Wikipedia. The immediacy of social learning then enables learners to apply their learning quickly to their task at hand.

What does this mean for designing and delivering learning?

— **Do not lecture** – provide the opportunity for group discussion and asking questions

— **Provide opportunities for social interaction** and collective problem solving e.g. online forums for during or after the course, group tasks and challenges, and action learning sets

— **Promote mentoring and buddy networks**, providing learners with subject matter experts with whom they can talk through challenges and ideas

Learning is about making connections

Learning is about making connections, particularly between our executive brain and emotional brain.

Top-down convergence is the process by which we integrate the orbitofrontal region with the limbic region – in other words, connecting the executive brain with the emotional brain. Therefore, associating learning with positive emotions can help to reduce stress and enable better learning.

Emotions have a strong influence on attention and how we focus our attention. This attentional and executive control is strongly linked to learning processes, as our limited attentional capacities are better focused on relevant information, making this an effective learning method. Emotions also facilitate encoding and help retrieval of information efficiently. Recent neuroimaging findings have indicated that the amygdala and prefrontal cortex cooperate with the medial temporal lobe.

The connection between cognition and emotion is critical, Immordino-Yang (2016) stated that "It is literally neurobiologically impossible to build memories, engage complex thoughts, or make meaningful decisions without emotions" (p. 18). We only think deeply about the things we care about (Immordino-Yang, 2016). Helping learners to therefore care about what they are learning is difficult, but essential for intrinsically motivated and effective learning. Meaningful learning is about helping students and learners to connect these new isolated skills to intrinsically emotional, subjectively meaningful experiences.

If the emotion that we connect to a new cognitive skill is positive (e.g. interest), that skill will be enhanced. However if it is negative (e.g. fear) then that skill will be negatively impacted. If a learner had negative experiences at school learning a subject, and connects certain skills or topics with negative emotions, this will go on to impact their learning as an adult. The good news though is that emotions develop with maturity, and can be enhanced and changed, even if it can be challenging to reverse those past experiences. So it is up to us as learning professionals to ensure that our learners associate new skills with positive emotions.

Age matters

How we learn and our neural plasticity change over time. Our brain is a physical organ that adapts throughout our life. When we learn, our brain physically changes, making new connections and building on previous patterns of neuronal interactions. Our brain's ability to physically restructure itself is what's known as neural plasticity.

This ability has been shaped by evolution to continually adapt to our changing world (Cozolino, 2002). As we get older, our memory and neural plasticity starts to decline. Memory in particular, begins to decline between the ages of 25 and 30. Research into the aging brain has identified processing speeds slowing down, concentration becoming harder and reduced working memory capacity (Rogers et al., 2009) (although significant variation exists across different adults (Rabbitt, 1993). However, it should be noted that Goldberg (2005) predicted that older adults' brains become better at pattern recognition in complex situations, as well as intuitive decision making, and Cohen (2005) believed that older adults can become experts in 'higher level reasoning'. Generally speaking though, memory and processing decline does come with age.

Despite this, older age is now becoming an increasingly more active phase of peoples' lives – with the average life expectancy of a man in the UK rising from 65 years in 1951, to 91 years in 2050 (Future of an ageing population, 2016). Not only are we becoming more active in 'elderhood', we are also staying in work longer. At present, approximately one third of workers are over 50 years old (approx. 10 million people), and over 1 million workers are over the state pension age of 65 (Future of an ageing population, 2016). So what does this mean for learning? As the age-span increases for workers, it also increases for learners. We need to be designing learning for a range of age groups, all of which will learn in different ways and have different needs.

Research has shown that acquiring a fundamentally new skill that cannot be derived from skills already possessed is most effective before adolescence (before ~12 years of age) e.g. learning a language, new sport, musical instrument etc. (Janacsek, Fiser, & Nemeth, 2012). We are slower and less accurate at doing this after this point. As we get older, our ability to learn becomes more dependent on what we already know and experiences we have already had. Adults can use this to their advantage, but are of course also disadvantaged when facing an entirely new skill.

Research has found that **younger** and **older** adults use different brain circuits to do the same visual recognition task.

1. **Young adults** use **anterior brain centers** (often used in perceptual decisions).
2. **Older adults** use the **posterior part of the brain**, which is in charge of the ability to attend to and select a target from irrelevant clutter.

Age matters (cont.)

Our attitudes to learning also change with age. Research has found that older workers may perceive themselves as 'untrainable' and lacking the capacity to learn new skills. As a result, they may be less likely to engage in learning, due a lack of confidence and fear of not being successful. Research has found that this lack of confidence means older learners are less likely to put themselves forward for training programmes (Rosen et al, 1965). This will also be exacerbated by the fact that in many cases, employers perceive their older workers as 'lacking confidence to train' (Pillay et al, 2008).

So we need to be mindful of the potential difficulty that both adult and elder learners will have when faced with an entirely new skill set. These individuals will potentially need longer to learn the new skill, and more support during the process. Research has shown that learning activities that directly support remembering are particularly helpful and encouraging to older adults. Drawing on memory techniques e.g. around primacy, recency and association will help older adults learn despite potential memory decline, and more focus needs to be paid to designing learning to capitalise on these influencers on memory. Knowledge gained through experiential learning also appears to be well remembered across ones life (Hedden & Gabrieli, 2004), therefore the more practical and creative activities we can provide to older learners the better.

We need to ensure that older learners feel confident and able to put themselves forward for learning opportunities. More thought should be put into the pre-training communication and advertising of courses, making a particular effort to target older workers. Line managers also need to be upskilled to have development conversations with their older employees, and to focus on recommending learning and development to these individuals.

Learning also has great benefits as we get older. The more we learn, the more connections we create, therefore the greater our neurological buffer against age-related neurological decline. As we get older, novelty declines and familiarity increases through experience. The key is to not just get better at what we already know, but to take on novel challenges. Engaging in new and challenging learning as an adult encourages plasticity. Our brains can even generate new brain cells in adulthood (neurogenesis).

Summary

1. **Design learning to capitalise on how our brains remember. Bitesize learning, visual distinctiveness and opportunities for rehearsal are just a few of the mechanisms that we can use to help embed new knowledge and skills.**

2. **Provide opportunities for social interaction and discussion.**

3. **Identify and talk to the intrinsic motivations of your learners – if it doesn't matter to them as an individual, they won't engage with the content.**

4. **Ensure that learners have an emotionally positive learning experience with you.**

5. **Design your learning to be inclusive and appropriate for all ages. Ensure you consider your audience when deciding on the course length, technology and delivery method.**

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