11

Deep Learning

Education is about learning, not teaching. While most teachers pay lip service to this principle, few actually take it seriously in the way they teach. Even fewer consider what kind of learning, and how the right kind of learning can be nurtured and developed. For ministerial formation, the real learning is not what is remembered at the end of a course, but what is remembered five or ten years after taking the course, and even more what shapes in the long term the character and actions of the learner. In this chapter you will be introduced to the concept of "deep learning" – learning that lasts and that impacts life.

An understanding of the nature of memory is the foundation for promoting deep learning. Consequently, you will be introduced to Atkinson and Shiffrin's (1968) widely used model of memory, and some of the associated research. In the process you will be presented with the central discovery that the primary factor in deep learning is whether the student considers the material to have significance for life. A discussion of the implications of deep learning for curriculum, course and lesson design will conclude the chapter.

The Nature of Memory

The brain is a highly complex organ, and a number of theories and models have been suggested to explain how we remember and recall knowledge and skills, and what factors shape the remembering process. Some influential but fairly complex models have been proposed by Baddeley (2000, 2003) and Tulving (2000). However, as an introductory entry into discussing memory and deep learning we will use in this chapter an earlier and simpler model developed by Richard Atkinson and Richard Shiffrin (1968), as it is relatively straightforward to understand and has become a foundational model for the more complex models that have followed.

Atkinson and Shiffrin suggested that there are three fundamental components to human memory (see fig. 11.1): sensory memory, short-term or working memory, and long-term memory. Of course, the key to deep learning is to understand how best to guide students to the last phase of long-term memory and recall.

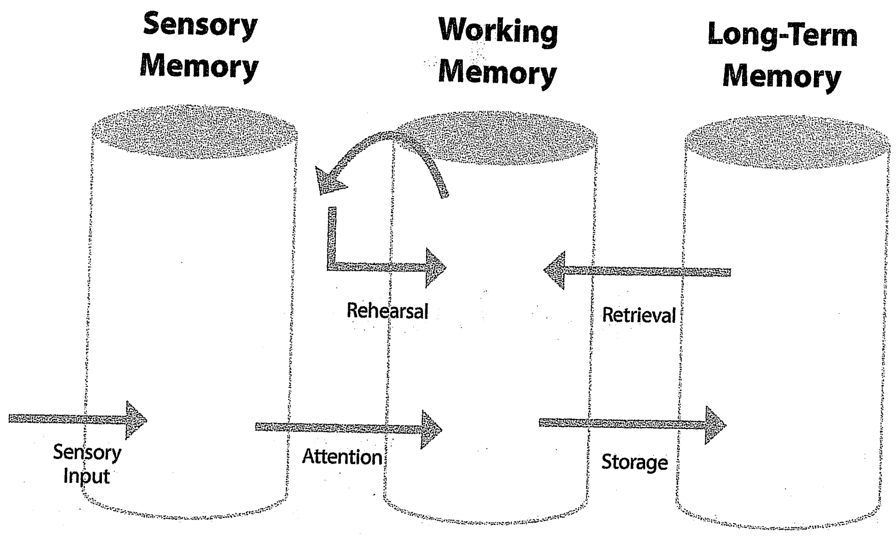


Figure 11.1 Atkinson and Shiffrin's theory of memory

Sensory Memory

According to Atkinson and Shiffrin, sensory memory is what arrives at the brain as stimuli directly from the five senses. If you were to quickly stand up where you are, rapidly turn around and then sit down again, an enormous amount of sensory information would be recorded in your brain – primarily what you saw, but also what you heard and what you felt physically. However, if you were asked to write down what you saw, heard and felt, you would have difficulty remembering more than a minute proportion of the sensory input. Sensory memory is very rich and detailed, but the information is quickly lost unless it is transferred into short-term memory.

Every day, literally millions of sensory stimuli come into your fields of sight, hearing, touch, smell and taste: spring buds on the trees, trains rumbling underground, the heat coming out of a vent, the smell of coffee drifting from a local cafe. You do not process all these stimuli, and most of these sensory stimuli do not remain. Even now, if you were asked to describe what is behind you in the room where you are sitting, while you would be able to describe a few things well, you would at best have a number of vague memory "flashes" of others. We simply experience too many sensory stimuli to process them all for more than a brief moment, and consequently they are lost to memory. In short, most of the information that touches our brains goes no further than the stage of sensory memory of sight, sound, smell, taste and touch. Within moments it is lost for ever.

Working Memory

For sensory memories to go further and be processed in short-term or working memory, somehow a person must have a reason to pay attention. Say the following string of numbers out loud once, and then look away and attempt to write down as many as you can from memory:

61749581507240631460З

It has been found that after a brief exposure, the majority of people are able to remember only five to nine digits – what has been called the 7 ± 2 phenomenon (Miller 1956). There is simply too much material for most people to heed, and most is lost. But even our short-term memory is limited in capacity and retains information for no longer than thirty seconds unless strategies are exercised to retain it for longer. While most people could recall several of the above digits for five to ten seconds, few would be able to recall even the first two digits the next day. The material entered working memory . . . but went no further.

Learning simply cannot take place without students first paying attention. This has ramifications for syllabus policies on the use of electronic devices, which have been shown to be irresistible, leading to distraction and reduced learning (Ravizza et al. 2016). Even the use of laptops in class may be problematic, especially when used primarily for simple notetaking. Several pieces of brain-based research suggest that writing by hand does more to stimulate attention and build neural networks than typing (Mueller and Oppenheimer 2014).

Most people pay limited attention to what is said or seen, and in order for material to be absorbed more deeply – the next step towards deep learning – some forms of retention technique need to be applied. Of the numerous retention techniques that have been researched over the years, two have been found to be particularly significant: "chunking" and "rehearsal."

Chunking

Chunking involves assembling or "packing," information into groups that can be remembered as single units. It works by making large amounts of information more manageable.

Say out loud the following list of words, and then look away and attempt to write down as many as you can from memory:

Curriculum, programme, Bible, training, church, mission, theology

No doubt you found it easier to remember these words than the earlier list of numbers because they are somewhat interrelated – they are "chunked" around a central theme, and more specifically the theme of missional theological education that is at the heart of this book.

A wide swathe of research has found that our working memory is limited in duration and capacity and only several chunks of information are processed simultaneously (Cowan 2001). Asking students to try to process too many interacting pieces of novel information can easily overload their working memory (Sweller 2010), and learning is unlikely to occur (Lee and Kalyuga 2014). Centring the material around a main idea helps students connect thoughts and retain concepts.

The most significant implication of "chunking" is the need we have as instructors and curriculum developers to group information around central themes and concepts which become "hooks" for student learning. For example, in this chapter a number of key concepts and terms have been introduced as hooks for learning: "Education is about learning, not teaching," "Sensory memory" and "Short-term or working memory." The fewer of these "chunks" you include in a learning session, the more likely the core idea of the "chunk" will be remembered. In chapter 14, when we look at lesson planning, considerable attention will be given to the formulation of "main points," key truths around which lesson content revolves. By chunking the learning around "main points," there is the potential that, while students may not remember every detail from the lesson, they will be able to remember the central concepts, and recall of details will be facilitated through their connectedness to the main points.

The Big Ideas

A much more profound application of *chunking* is the development of "big ideas" in our corpus of teaching, and the repetition of these ideas through multiple courses and even with multiple teachers (Shaw 2014). I saw the impact of this first-hand when I recently visited one of our graduates some eight years after he had completed his studies. It was fascinating to observe that in the course of a sixty-minute conversation he made clear reference to five specific themes he had received in his studies – three from me and two from a colleague. It was not simply the references but the way in which they were shaped and used that fascinated me: the essence was almost verbatim, but the application was local and contextual to his own situation. The graduate's references were of course very gratifying, but the key was the big ideas that my colleague and I had developed.

If an instructor has clarified the half dozen most important ideas in his or her field of study, then these ideas will naturally emerge repeatedly in and out of the classroom. The teacher's clear passion for these "big ideas" and their repetition create a psychological construct in students' minds, such that these ideas are more likely to lead to long-term learning.

For example, in my own corpus of teaching I have developed a series of key themes that run through my teaching, to which I find myself returning over and over again: "Education is about learning, not teaching"; "Holistic learning embraces the affective, behavioural and cognitive domains (the ABC of learning)"; "Less is more" (when we teach less content but go deeper in reflection on that content, more learning takes place); "We live between redemption and consummation"; "The journey of fifty miles begins with one step." You will have encountered several of these themes in this book – a rather inevitable outworking of my commitment to these ideas. It was elements from this repertoire that the graduate referenced and applied in his conversation. My colleague was referenced with two of his key themes: "All theology is contextual"; "The church is a missional community."

Both my colleague and I have several other themes. However, in each case the idea is not simply mentioned once in passing, but reinforced repeatedly in a variety of courses and in out-of-class conversations, such that many students come to associate these "big ideas" with us. Over time, many students come to embrace some of these ideas for themselves. One of the key elements of these "big ideas" is that they are shaped in a simple and memorable form – preferably as a short declarative sentence. My own experience is that the simpler the expression of a profound idea, the more likely it will be remembered. People learn most easily when the instruction is designed to minimize "cognitive load" (Feldon 2010; Winne and Nesbitt 2010), and the brevity of these ideas no doubt contributed to memory and embrace.

Instructors who are serious about long-term learning do well to consider what might be the half dozen big ideas in their field of learning, and then develop each idea into a simple statement which can be reinforced regularly. However, simply because an instructor believes an idea is of value does not guarantee that long-term learning will take place. As we will see in more detail later in this chapter, we also need to help students make connection between the "big ideas" and the students' own personal lives. Shaping evocative "big ideas" that students see as significant for their own lives is more likely to lead to long-term learning.

Rehearsal

Another way to improve short-term memory involves *rehearsal*, the conscious repetition of information, what communication theorists describe as "appropriate redundancy." Let's go back to the list of numbers:

617495815072406314603

This time, say the string of numbers *three times* out loud, and then look away and try to write down as many as you can from memory. It is probable that the repetition helped you remember more than you did at the first attempt. It is even possible that you may be able to remember the first two or three digits tomorrow. The rehearsal, or repetition, has aided retention.

Intensive, short-term learning often feels durable in the moment but then fades away – which is why students can do very well on quizzes, and then do poorly on a cumulative final, and after several months retain virtually nothing. Traditional examinations are particularly problematic in that they promote student cramming. Cramming may be successful for temporary test performance, since information is loaded into working memory. But the practices that work well for short-term memory do not work well for long-term memory

(Brown et al. 2014). The creation of a new memory occurs through the formation of synapses across neurons and new neural pathways. These pathways and bridges degrade over time unless the synapse fires again (Yee and Boyd 2018). Consequently, without spaced exposure, learning dims quickly. Key material should make multiple appearances throughout the course so as to promote retention (Carpenter 2014). When students are asked to retrieve information at periodic intervals after initial exposure, the brain builds more established neural connections, causing learning to crystallize in the mind (Orlando 2021). The more often the students have to retrieve, use and reflect upon the course material, the more opportunities you are giving them to learn it deeply (Lang 2016).

Of course, the time available for learning is limited and we need to be highly selective about what we choose to repeat. The list of numbers given above is largely meaningless, but hopefully the core concepts being presented in your classroom are of far greater relevance. Repetition of key concepts and ideas is essential to memory and learning. Without such repetition, deep learning is unlikely to take place.

Rehearsal is best when it is delivered not only multiple times but in different ways – through multiple senses and approaches that exercise different parts of the brain (Doyle and Zakrajsek 2013). For example, it is more likely that learners will absorb in their memories a main concept when it is both spoken and shown on a PowerPoint slide than when it is only spoken. It is also best if the repetition is spaced sporadically over time (Brown et al. 2014; Butler et al. 2014; Dunlosky et al. 2013; Winne and Nesbit 2010).

"Interleaving" new information with previously covered material supports the retention of material. You are more likely to see students retain knowledge by mixing questions and topics throughout the course in a way that resembles a woven tapestry, than through the traditional linear or building-block approach (Rohrer et al. 2015; Sana et al. 2017). In contrast to the old concept of "right brain – left brain" thinking, neuroscientists now understand that learning involves more the development of *networks* of brain areas, spread across many regions of the brain. This means that while specific brain areas do carry out characteristic kinds of processing, skills for real-world and academic tasks are embodied in the *networks* they recruit, rather than in any one area of the brain. Due to the constructive nature of this process, different learners' networks may differ, depending on individual neuropsychological strengths and predispositions, and the cultural, physical and social contexts in which the learning takes place (Immordino-Yang and Fischer 2011). The analogy of weaving a tapestry describes well this sort of networked learning.

A Practical Suggestion: Repetitive Quizzes (Shaw 2019)

Every year at ABTS I taught a compulsory first-year course on the basics of psychology. A component of this course was an introduction to developmental psychology. A few years back I began teaching an advanced elective course on child psychology. To see what students remembered from the introductory course I conducted a pretest. I discovered that very few students remembered much of anything. Pretty depressing!

After wrestling with a number of possible antidotes, I came up with a method I have found highly successful in establishing long-term retention of basic knowledge in the minds of my students: repetitive quizzes. The approach is rooted in the finding that frequent low-stakes assessments that require students to practice retrieving information forge pathways to long-term memory (Sutterlin and Baxter 2020). Regular repeated quizzing of key concepts is one of the most effective means for reducing "knowledge decay" (Bunce et al. 2011) and enabling students to reconstruct course material (Roediger and Pyc 2012). Predictable repeated quizzing reduces anxiety and has been found to be far more effective in the support of long-term learning than single-instance or pop quizzing (Batsell et al. 2017).

The first step was to determine the foundational knowledge for the course. What are the absolute basics around which the course is built? What do I want my students to be able to repeat verbatim five years later, so that from this basic content they can rebuild the details? I tried to take a somewhat minimalist approach in selecting this information, as I knew that long-term retention is always limited. Consequently, the more I could minimalize the material to the absolute essentials, the more likely the students would be able to remember these essentials.

For example, in my material on developmental psychology, my essentials were Piaget's four stages of cognitive development, Erikson's eight stages of psychosocial development, and four key governing themes that I saw as significant for human development. I then created a quiz that tested student knowledge of this core material. The students were not being asked to remember swathes of information, but rather the basic rudiments. My goal was that by the end of the course the students would be able to complete the quiz in five minutes or less, with most attaining 100 percent.

As the first-year students walked into class for the first of our four sessions, I gave them the quiz. I also told the students that they would be given the identical quiz at the beginning and end of each session, as well as at the end of the course several weeks later. Only the quiz given at the end of the course would count towards their grade. In each case they were given a maximum of five minutes to complete the quiz.

For the opening quiz, I occasionally had one or two students who could answer perhaps one or two questions. Some years, none of the students had any clue. But the benefit of this opening quiz was twofold. First, it enabled me to pretest the students to see what, if anything, they already knew. Second, in that the students knew that they would be quizzed again multiple times, the quiz gave a framework for the class. Consequently, I found that the students paid far closer attention to the content. My experience was consistent with other research that points to students learning more when pretested on material before they have even started learning the material (Carey 2014). I generally gave the answers to the quiz very quickly, and then posted the answers on our Moodle site. Naturally, in the actual course we covered far more than these essential elements. However, if the students could retain this basic content, I knew that they would be in a good place to retrieve other elements of the course materials.

In a sense the quiz worked cumulatively, with the early material being repeated so often that it became second nature. With the later material the students held it more firmly because by the time it came in class the students were primed to pay attention and remember the content. Also, in that there was a space between the penultimate and final quizzes, this contributed to a potentially deeper level of long-term learning.

My experience was that students enjoyed these quizzes, and many saw it as a challenge to see who could complete the quiz the fastest. Even the slower students appreciated having an element of the course in which they knew they could excel. There was something of a positive emotional mood to the process. Since initiating these repetitive quizzes I found a dramatic increase in long-term retention. Results in the pretesting for advanced courses improved notably, and students were also able to recall a substantial proportion of the details from the introductory courses.

The Primacy–Recency Effect in Learning

A feature of working memory that also needs to be noted is what is called the primacy–recency effect. Stated simply, it has been found that we remember best that which comes first, second best that which comes last, and least that which comes in the middle. In other words, a person's ability to pay attention and transfer material into the working memory is strongest at the beginning, next best at the end, and minimal in the middle (Craik and Tulving 1975).

Figure 11.2 gives an approximate picture of how the primacy–recency effect works during a forty-minute learning episode (Sousa 2006, 89–94). As you can see, there are two prime times for learning: the best period at the beginning and a lesser stretch at the end of a learning period. In the middle is a time period when not much is retained.

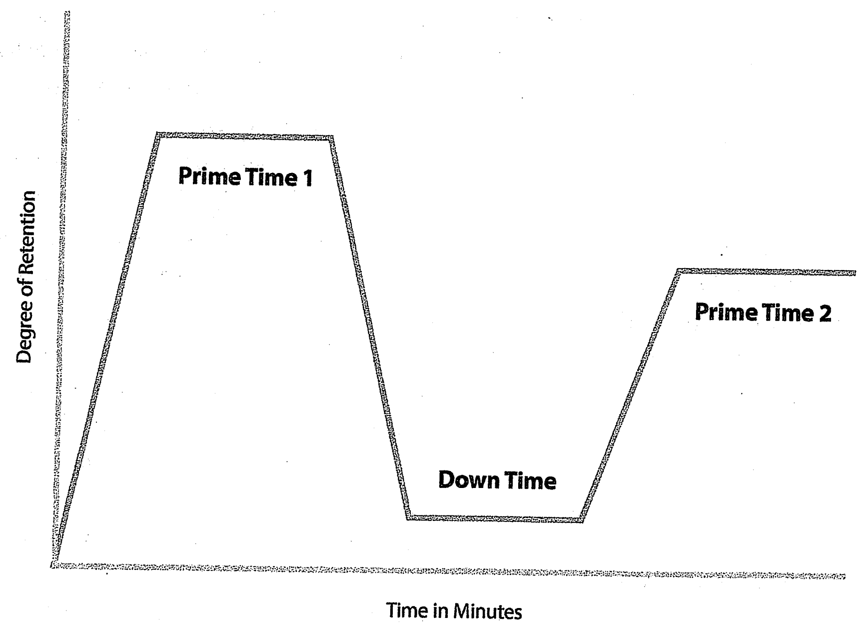


Figure 11.2 Retention during a learning episode (adapted from Sousa 2006, 90)

There are important implications of the primacy–recency effect for teaching. Significant information or skills should be taught first, during the first prime time. Students are most likely to remember information coming at this time – whether important or not. In one observed class (Sousa 2006, 90), the teacher began by putting on the board the literary term "onomatopoeia," and asked students to guess its meaning. Many of the students' *wrong* guesses appeared in the follow-up test. In another class, the teacher began by calling the attendance. In interviews after the class, the *only* thing many students remembered from the class was who was and who was not present in class! How do you usually begin your classes? How you begin will largely influence what is learned.

Sousa's estimates (figure 11.2) are probably optimistic. Back in 1996, a major piece of research (Middendorf and Kalish 1996) documented minute by minute the attention of college students during a typical class period. It was found that students needed a three-to five-minute period of settling down, which would be followed by ten to eighteen minutes of optimal focus. Then, and no matter how good the teacher or how compelling the subject matter, there would come a lapse in which the students' minds wandered. Attention would eventually return but in ever briefer packets falling to three or four minutes towards the end of a standard class. Given that this research was done prior to the age of texting and tweeting, it is probable that the attention spans of younger people today have become even shorter, or certainly more challenged by distractions. These patterns of student attention urge shorter learning episodes for greater learning. Short is sweet. Students do not pay attention continuously for ten to twenty minutes in a class. Instead, their attention alternates between being engaged and non-engaged in ever shortening cycles throughout a teacher-centred segment (Bunce et al. 2010). Teachers who are concerned about education for learning will break their classes up into five- to ten-minute packages to help students better retain important material. These short packages of learning can be created by shifting into a new activity that engages the students, such as a case study, role play or forum discussion. Even showing a short video clip accompanied by a few short reflection questions can create the opportunity for a new learning episode. If you have substantial material to present, stop every five to ten minutes and have students discuss a reflection question in pairs and triplets. You may cover less material in teaching, but almost certainly you will sustain greater student engagement and learning.

Remember: education is about learning, not teaching. Education for deep and significant learning must grab the attention of learners, moving from fleeting sensory memory to working memory, and then must give a reason for learners to process the material into long-term learning.

Long-Term Memory

Long-term memory is a relatively permanent type of memory that stores huge amounts of information for a long time. Long-term memory is complex. However, research suggests that long-term memory comprises two foundational substructures which have been termed "explicit memory" (remembering who, what, where, when and why) and "implicit memory" (remembering how).

Explicit memory is the conscious recollection of information such as specific facts or events. Examples might include recounting the events of a movie you have seen, or describing salvation history or the meaning of the kingdom of God to someone.

Implicit memory is memory we don't think about but which affects our actions – skills and perceptions that enable us to do such things as play tennis, drive a car, speak our own language using correct grammar, or even recite the Lord's Prayer without thinking about the words. Implicit memory comprises habitual actions and attitudes, and includes such things as complex synthetic and evaluative thinking skills, as well as empathetic and aesthetic responses.

The key to effective Christian teaching and training is the deep-learning goal of developing significant long-term *explicit* memories that are a continuous resource for life, and, even more importantly, substantial and theologically sound *implicit* memories that have come so much to shape the person that life decisions are habitually formed by healthy reflective practice. It is the retrieval of these long-term explicit and implicit memories that forms the basis of life decisions and actions.

Criteria for Long-Term Storage

But the big question is, "How?" How might we develop teaching, such that what is genuinely important does not simply drop out of the short-term working memory but is stored for future recall and use – or even better, becomes a habitual practice of implicit memory? On what bases does the working memory make that decision?

It has been found (Sousa 2006, 48–49) that what we need to survive is readily recorded in long-term memory. For example, you do not need to relearn every day that walking in front of a moving bus or touching a hot stove can injure you. Beyond survival, there are three elements which contribute to deep and transformative learning: emotional connection, sense, and significance (Barkley 2010, 101).

Emotional Connection

When people learn, their brains encode not so much their experiences as their reactions to those experiences, which are expressed as emotions (Shackleton-Jones 2019, 24). Strong emotional experiences have a high likelihood of being permanently stored (Willingham 2009, 44–45; Barkley 2010, 101). Consequently, while we forget most life experiences we can remember many details of the best and (even more) the worst things that have happened to us. The reason is the strength of emotions we felt at the time.

Thought and emotion are inseparable brain processes. There continues to be a belief that learning should be a purely rational exercise, in which we seek "objectivity" by leaving our feelings temporarily checked at the classroom door. However, researchers have found that the functions of cognition and emotion are so intertwined in the brain as to be indistinguishable from each other. In fact, a portion of the brain's emotion system called the hippocampus is in charge of transferring information into memory. This means that information associated with positive emotions and values will be more readily learned (Davis 2007).

However, it is important to minimize negative emotions. A substantial body of research indicates that emotions such as stress and fear cause the brain to be flooded with cortisol, a chemical that seriously impedes the ability of the hippocampus to retain new or call up old information. When this occurs the brain will abandon the complex thought processes of the neocortex and revert to the reflexive behaviours of the limbic system (Davis 2007).

Strong emotions lead to strong connections in our memories. In the classroom strong emotions are elicited in learners through experiential learning activities such as field trips, case studies and role plays. Emotional connection entails an approach to learning that seeks integration between text and context, between theory and life.

Sense

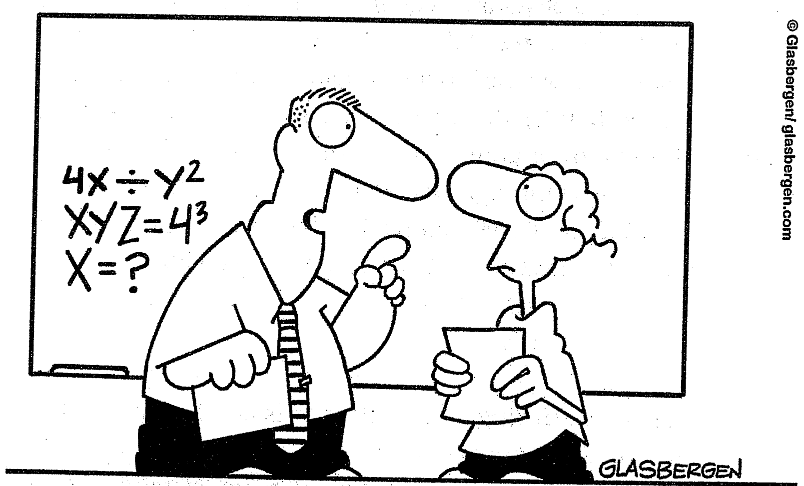
For deep and transformative learning to take place, it is also important that the learner understands what is being said and can connect it to past experience (Sousa 2006, 48–49). Where strong foreign or dialect accents make it difficult to understand a teacher, it is likely that learning will be deficient. But the use of technical or theological jargon can equally create a barrier to learning. Explaining concepts in simple everyday terms is essential to learning. When a student says, "I don't understand," it means the student is having a problem making sense of the learning and is unlikely to process it beyond working memory.

A significant part of understanding is the ability to connect new material with previous concepts and ideas. People learn new knowledge most easily if it relates in some way to previous learning (Ambrose et al. 2010; Bransford et al. 1999). Does it "fit" into what the learner knows about how the world works? Famed educational psychologist David Ausubel (1968, vi) once asserted, "The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him (sic) accordingly." Students are more likely to engage with new learning when it is presented either as an extension of or even an antithesis to previous learning, as they feel a sense of mastery in the face of new challenges that nurtures engagement and retention.

The mind integrates new information not as a collection of facts and figures but into a pre-existing structure of learned knowledge. Without having a structure for the material in their heads, students fail to comprehend and retain what they hear and see. Without having a clear mental pathway for organizing what they learn, students process our course content superficially and quickly forget it. Providing students with the organizing frameworks for our teaching helps them make sense of the material and store it in meaningful cognitive structures (Nilson 2016, 8–9).

Significance

While emotional connection and sense are important, ultimately students will only make an effort to remember material if they find the material relevant and significant for life, that is, if they believe that it is important enough to do so (Orlando 2020, Persellin and Daniels 2014).



"Algebra class will be important to you later in life because there's going to be a test six weeks from now."

Unfortunately for most students, the only level of significance they are ever given is "It's going to be in the exam." And so they make the effort to engage with the material for as long as it is significant – which is until the end of the course. As soon as the examination is over, the material is no longer significant, and what has been learned quickly drops out of memory (Zull 2002, 181). While faculty members might feel good when students score well in their examinations, teaching for recall yields little long-term fruit (Ferris 2016). We must seek deep learning in students, and deep learning will only take place if the student considers the material to have significance for life.

Why should you pay attention to this chapter on deep learning? Why should you remember what is being presented? If you don't see this material on deep learning as important, if you don't see it as being able to help you become a more effective teacher or ministry leader, you will finish this chapter and within a few days you will forget most of what has been presented. And even if you remember some of the material in this chapter, it is only those elements that you find meaningful and valuable for your life and ministry that have any chance of being remembered and used five years from now.

Implications for Learning in Leadership Training

So how do we deal with this in practice? How do we develop and present material so that those who participate in our leadership training programmes actually engage at a deep level of learning that impacts life? There are three basic areas that must be taken seriously.

The Curriculum: "Context to Text"

The first is the curriculum. Most of us, irrespective of where or whom we teach, begin shaping our curriculum based on what we are familiar with – and that is the classic theological curriculum with divisions of Bible, theology, history, and applied or pastoral theology. It is a shape that is overwhelmingly "text to context" – that is, beginning with the set texts and moving (hopefully) to the context of the student (although in practice the last step often does not take place). It is a profoundly fragmented shape that gives a lot of information but little in the way of tools for filtering life through biblical and theological lenses. In short, the deep learning value of the traditional curriculum is questionable.

The average age of learners in theological schools and training programmes has been steadily increasing. Most are adults who bring to the classroom significant life experience and major life questions. Many have only minimal spare time, who given any choice will study only the material that they see helps them answer their questions or gives them tools for effective service and living – in short, the material they consider to be useful. Consider the true case of a college where two community courses were offered simultaneously – one in background to the New Testament, and the other in child development and Christian parenting. The first drew an initial attendance of six, which dropped to two by the end of the course; the latter drew an initial attendance of fourteen, which grew to eighteen by the end of the course. Those who came had little spare time and were looking for tools for life, not only interesting information.

A serious appreciation of the nature of deep learning calls for a greater emphasis in the curriculum on "context to text" than now exists. For deep learning to be promoted, curriculum development must begin not with the shape that has always been used in the past, but by asking ourselves, "What are the major life concerns and questions that our potential learners have?" and "What are the life and ministry skills our potential learners need?," and then developing courses that seek to answer these questions through the texts of Scripture, history, theology and the social sciences.

How is your curriculum? Is it predominantly "text to context," or have you taken seriously the questions, needs and contexts of the learners in building a strong "context to text" component? If you are serious about deep learning, the latter must be a priority.

Course Syllabi: Why Even Bother?

The second area that must be taken seriously is how we shape our courses. Too often, learners enter courses because they want the diploma – not because they want to learn.

Too often, students are not really sure why they are studying a particular course, but do so simply because it is a part of the required curriculum. Too often, students see what they are studying as fundamentally a waste of time. But then again, instructors also are often not sure why they are teaching what they are teaching! Roland Barth (2001, 4) has commented that "most of what teachers teach is of no real interest to them; it is only what teachers think someone wants students to know."

By way of example, one of the greatest tragedies of theological education is the high proportion of students who find church history to be one of the most useless subjects in the curriculum (VerBerkmoes et al. 2011). What a loss! But then again, how many church history instructors have ever themselves thought through why students should care about church history – beyond that you cannot have a theological programme without it? There are profound and significant reasons for teaching church history; for example, (1) so that we can better see God's sovereign hand through good and evil, and so deepen our trust in him; (2) so that we can better understand how we have come to be who we are – that is, identity formation; (3) so that we can better understand how others have come to think and behave differently from us and hence appreciate diversity in the people of God; (4) so that we (hopefully) can learn from the lives and the mistakes and successes of those who went before us. But do students understand these reasons – and even more importantly, is the material taught as though these reasons are actually important?

Research has revealed that courses that tend to result in a surface approach to learning have the following characteristics (Rhem 1995):

- An excessive amount of content. The instructor is so focused on delivering the body of information that little time is left for the complex reflection necessary for deep learning. Students learn the material that is required to pass the course, but there is little personal ownership.
- Relatively high class-contact hours. The education paradigm is teacher-oriented rather than learner-oriented, with the focus being on what the instructor delivers rather than on the learning the student personally generates.
- An emphasis on passive rather than active learning. Students spend most of the time listening and watching rather than actively engaging with the material.
- A lack of choice over subjects and a lack of choice over the method of study. The learners see themselves as disempowered and consequently as recipients rather than active agents in the learning process.
- A threatening and anxiety-provoking assessment system. Our commitment to grades serves to undermine intrinsic motivation in students. Deep learning is better served through multidimensional rubrics that both affirm areas of strength and challenge areas of weakness in students.

A serious commitment to deep learning will present less content, challenge students to reflect deeply, empower students through providing a variety of appropriate learning options, and defuse anxiety through learning-oriented assessment practices.

Lesson Plans: Why Even Bother?

Knowing why a course is important to a learner is highly strategic – but not enough. *Every time we engage in teaching* we must understand and communicate why the material is important and significant for the life of the learner.

Why should students study the "we and you" patterns of Ephesians 1–3? Why should they study the development of the creeds? Why should they study the contemporary faces of postmodern philosophy? Why should they wrestle with Piaget's stages of cognitive development? If you as a teacher cannot answer this sort of question, you can be pretty sure that your learners will not be able to. And unless the answer is speaking to real-life issues and real-life concerns, it is probable that deep learning will not take place.

The starting point for promoting deep learning is to know the deep concerns of the learners. This is one of the reasons why the teacher–student relationship is an essential element in quality education. If you want students not merely to complete the course but to be transformed by the material being presented, you must know the learners well and must repeatedly ask yourself the fundamental question: "How will this material help my learners to live well in the face of their daily concerns and needs? How will this material help my students not only to know their faith but also to live their faith?" Only when students consider that the material has significance for life is deep learning likely to take place.

Conclusion

Research into how the brain receives, processes, stores and recalls material suggests that much of our current educational methodology is ineffectual. Serious educators must appropriate patterns that best facilitate deep learning – learning that lasts, learning that impacts life. Whether it is in the curriculum as a whole, in the design of a course or in the delivery of a specific lesson, deep learning can occur only if students value the material as significant for life. The search for meaning and purpose in our teaching is the key to transformative learning.