

TEACH BRILLIANTLY

SMALL SHIFTS
THAT LEAD TO
BIG GAINS
IN STUDENT
LEARNING

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Solution Tree | Press



CHAPTER 3

When *Challenge* Is Just Right, Students’ Abilities *Improve*



Challenge leads to learning. Applied appropriately, it takes students to their next stage of development. Too much challenge creates cognitive overload. Too little lowers expectations.

The sweet spot for challenge is when students are out of their comfort zone but not so far out that the task seems impossible.

Think of it in much the same way as when children learn to ride a bicycle. When they wobble on that bike—but make headway—the level of challenge is just right. They feel a certain level of discomfort but are not so far out of their comfort zone that they refuse to even try. Contrast this with a competent rider cycling by, perhaps so confident that they don’t even have to hold the handlebars (remember those days?), or a child so fearful that they would rather watch from the sidelines than risk falling off their bike. In these two examples, the riders are *not* learning; they are performing or avoiding, but not learning.

Therefore, the optimum level of challenge should cause your students to wobble. In the bike-riding example, this is a physical wobble. In most school contexts, it will mostly be cognitive. Whichever it is, it is the wobble that we should be trying to create. Not all the time, of course; there are times when we want our students to consolidate or perform. But when our intention is to cause students to learn, we should be designing tasks and praising, encouraging, and directing our students in such a way as to cause them to wobble.

THE BLUEPRINT

Purpose

The following are vital concepts about challenge within the learning process.

- Challenge is a vital and necessary condition in the learning process.

- Challenge makes learning stick. The more that students are required to think through and overcome challenges, the more that they are able to retrieve their learning when they need it.
- Students learn significantly more from teachers who hold high expectations for them. These expectations rely on three core principles: (1) setting aspirational goals for all students, (2) using strategies to better understand how students are thinking and what they need next, and (3) getting the levels of challenge just right.
- The Learning Pit is a framework that can help students prepare for and respond to challenge more effectively. It also improves the fluency with which they articulate their learning.

What to Notice

The following lists what is important to notice about challenge.

- **Challenge needs to be just right:** Students need to perceive that, with enough effort and the right strategy, success is within their grasp. If it seems beyond the realm of their own possibility, they are unlikely to engage.
- **The outcomes of challenge are what is desirable:** The impact on long-term retention and transferability of learning makes challenge advantageous; the success of performance and the rate of progress do not, because both of these tend to drop.
- **Increasing challenge doesn't always mean harder tasks:** Varying the conditions of learning can work just as effectively, often more so. For example, using a different style of pedagogy or an alternative setting, reordering instruction so that topics are interleaved, and creating opportunities for students to generate their own solutions rather than presenting prefabricated resolutions will all add desirable difficulty.
- **Extrinsic rewards and profligate praise deter students from choosing challenge:** Studies have shown that merits and plaudits, once thought to be powerful motivators for learning, inadvertently steer students toward easier options.
- **Students expect learning to be linear even though it rarely is:** Progress typically includes performance dips. These can be discouraging if a student thinks they are the only person suffering these setbacks. A model such as the Learning Pit can forewarn and forearm.

Timing

Challenge is not always appropriate. It ought to be in a symbiotic relationship with success. If students fail, fail, and fail again, then challenge is the last thing they need. Reassurance, scaffolding, and guidance will be far more fitting. If, however, they have tasted success and—even more importantly, feel successful—then

bring on the challenge! Researchers Robert C. Wilson, Amitai Shenhav, Mark Straccia, and Jonathan D. Cohen (2019) have calculated the optimum balance is 80 percent to 85 percent success, 15 percent to 20 percent challenge. “Succeed, stretch; succeed, stretch” should be the mantra of every classroom.

3.0 Understand That Without Challenge, There Is No Learning

In a profession filled with complexity, it is rare to be certain, but we know for sure that learning begins at the edge of challenge. Centuries of theory and research prove this to be the case (Bruner, 1957; Dewey, 1916; Feuerstein, Feuerstein, Falik, & Rand, 2006; Lipman, 1987; Montessori, 1967; Vygotsky, 1978). Stay in our comfort zone, and we will not learn. We can rehearse, practice, and revise, but we won't learn—at least not if we understand learning to be the process of acquiring *new* knowledge, skills, understanding, behaviors, values, or preferences.

Therefore, challenge is neither just a nice bonus nor something to help students along the way. It is a vital and necessary condition in the learning process. So long as you challenge your students, then everything that is good will follow! Except that it isn't that easy, because too many students avoid challenge, too many teachers reduce challenge (to make tasks more manageable), and too many parents take on challenges by proxy to ensure their progeny succeed.

So, what conditions should we create so that our students willingly step out of their comfort zone more of the time? Let's start with the reasons for challenge and some of the barriers that get in its way.

3.0.1 Why Challenge Is So Important

The following list describes four reasons why challenge is so important for learning.

1. **Challenge is necessary:** Without challenge, there is no learning. Challenge takes us out of our comfort zone. Psychologists Lev Vygotsky and Michael Cole (Vygotsky, 1978) called this stepping into the *zone of proximal development*. I call it going through the Learning Pit. Vygotsky's assertion was that a child's current ability is their yesterday (of development), and what they can do next is their tomorrow (of development). Challenge, therefore, is the vehicle that takes students into their future (Blackburn, 2018).
2. **Challenge provokes thinking:** Contrary to popular opinion, the brain is *not* designed for thinking. It is designed to save us from thinking (Willingham, 2021b). It uses so much of its capacity for other tasks (the most complex of which is seeing) that whenever it can rely on memory and rehearsed responses, it does so. Its nature is to take the path of least resistance, thus conserving energy for functions of living and surviving. A stimulant that provokes a different response is challenge. When we perceive it safe to do so, our brain stops noticing quite as much of the environment around us and begins working on thinking instead. This is when we become lost in thought.

3. **Challenge is good for us:** Overcoming challenge strengthens us; it boosts self-efficacy—one of the qualities most likely to improve a student’s approach toward, and their subsequent success with, learning (Çiftçi & Yildiz, 2019). It builds capacity. It enhances flexibility. Even adversity is good for us (once we’ve come out the other side)—though this is *not* a call for cruelty in the classroom! The term *desirable difficulty* is a more appropriate term and is described later. But no matter the term we use, challenge for the mind is like resistance for our muscles. It provokes more effort and determination than normal. This, in turn, leads to enhanced growth and development.
4. **Challenge makes learning stick:** The adage, “Easy come, easy go,” is as applicable to learning as it is to money. When we make tasks easier for our students, they finish quicker and also forget quicker, whereas when we increase levels of challenge—for example, by varying the timing, location, and consistency of tasks—the outcomes improve significantly (Roediger, Agarwal, McDaniel, & McDermott, 2011). A representative study involved eight- and twelve-year-old students engaging in a simple throwing task. One group practiced from the distance that all students would be tested from later. The other group practiced from varying distances. All students were prevented from seeing where their shots landed but were given verbal feedback about their success. At the end of the twelve-week physical education program, those who had been required to throw from varying distances performed significantly better than those who had practiced only from the test distance (Kerr & Booth, 1978). Although this sounds like a fun little experiment, a wide range of experiments in many different contexts show equivalent results; be it in mathematics, language, humanities, or the sciences, increased challenge leads to improved learning outcomes (Bjork & Bjork, 2011; Butler, 2010; Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Rohrer, Dedrick, & Stershic, 2015).

Challenge, therefore, is good for us—not just good in the sense of being preferable but also good in terms of necessity! Without challenge, there is no growth, and there is no learning. Why, then, do we avoid challenge? What gets in the way of it being a positive feature of every lesson and learning experience?

3.0.2 What Gets in the Way of Challenge

The following list describes five attributes of challenges.

1. **Challenge must be just right:** Our curiosity is provoked by puzzles we believe we can solve. If tasks seem too difficult, we rarely engage. If they turn out to be too easy, we quickly grow bored. Puzzles, therefore, have to be just beyond what we can do routinely. How far beyond depends on a range of factors, including self-efficacy, perceived risk to ego or safety, past experiences, and levels of encouragement. But in whatever way these factors are arranged, the core principle remains constant: for interest to be piqued, the existence of challenge is not enough. It must be the right degree of challenge, for the right purpose, at the right time. Only then will challenge provoke positive circumstances.

2. **Challenge requires trust (part 1):** Typically, we do not appreciate the beneficial effects of challenge until much later. This appreciation requires a lot of trust and foresight. Will our future gains be sufficient to overcome the negative experiences of high effort today? What evidence do we have? If, in general, we feel less successful today (because we are attempting something beyond our comfort zone), do we believe the outcomes will be worth it? If yes, then we might persevere. If not, then prevarication and distraction prevail.
3. **Challenge requires trust (part 2):** Engaging in activities that take us out of our comfort zone represents a risk to our ego. This can feel negative in private and worse if it happens in public. If peers unexpectedly outperform or ridicule us, then any consent to engage dissipates further still. Therefore, trust is required to overcome all of this. Trust that the situation, its purpose, and those who surround us are on our side (or at least not against us).
4. **Challenge requires resolve:** Effort and determination are applied toward challenge when there is the resolve to do so. Without it, challenge remains untouched. Even when the conditions are optimal, those who have no resolution will not engage. They might give the impression of trying, they might encourage others, but they will not directly attend to challenging themselves. This resolution can come from different quarters. Being in the habit of taking on challenges and choosing to take on challenges because it is preferable are the most potent. Being encouraged to take on challenges, or even forced to do so by circumstance, can also work, albeit with less sense of ownership.
5. **Challenge slows progress:** Although growth and progress increase in response to challenge, these tend to be longer-term effects. In the moment, progress can feel as if it is slowing down. For students, this often includes finishing a task later than others, missing out on free time because of these prolonged efforts, having to take incomplete work home to finish, or being awarded lower grades if assessments are timed before their task is finished.



In this video, James summarizes the key points about challenge.

3.1 Make Challenge More Desirable

Earlier in my career, I thought making the case for challenge would be enough. If I could demonstrate that challenge improves learning—and offer ways to make it work—then all that is good would follow. My students would willingly step out of their comfort zones, and my colleagues would ratchet up the incidents of challenge in their lesson plans.

It didn't work out that way. It still doesn't. There are just too many factors getting in the way and too many reasons not to engage in challenge. Just as it is with food and drink, knowing what is good for us and acting in accordance with those beliefs are often miles apart.

So, throughout this chapter, I share some of the most up-to-date research on the topic together with the best practical advice I can offer. I'm sorry to say your students will still dodge challenge, and you will still wonder if you're fighting an uphill battle. After all, staying in our comfort zone as teachers is also easier—much easier—than taking on challenges. Ultimately, though, it is worth it. Developing the right strategies and creating optimal conditions for challenge *will* lead your students into building better attitudes and, therefore, enhanced learning outcomes.

The four pillars of challenge are when your students experience the following.

1. **Making the challenge worth it:** Students need to be convinced that a challenge is worth their investment.
2. **Owning the challenge:** Students have a high degree of control.
3. **Having permission to try:** Students have permission to take risks (and potentially fail).
4. **Being in the habit:** It is just what one does (because students are in the habit of it).

To explain these properly, I will relate them to a challenge I engage with often: swimming.

I try to swim at least four times a week, more if I'm home, and as I can fit it in if I'm traveling for work. Whenever I go, it is a challenge for me to do so—a challenge to find an extra ninety minutes in my day and a challenge to swim the distance and speed I aim for. It would be easier if I didn't go. Not better, but easier. The factors influencing my decisions are shown in the next section, together with annotations that connect with the school context.

3.1.1 Making the Challenge Worth It

By far, the most important factor in my decision to swim is that I've decided it's better to do it than not. I know exercise is important, so of the choices readily available to me, this is the one I choose. I don't go because I love it. If medical science one day revealed that it isn't a heart-healthy activity, I would give up on it. The stress on my body and the monotony of counting laps are just not seductive enough. A vacation pool with a swim-up bar would be a completely different proposal, but my swimming means going up and down, up and down, again and again and again. I don't do it for hedonism; I do it for sagacity.

This isn't just about belief; it is also about evidence. I need to see or feel improvements if I am to continue. In my case, I feel fitter. I don't just feel it but know I am. This makes the efforts worthwhile. Indeed, it is sometimes the only reason I haul my aching body to the pool in the first place!

As with my swimming, the single biggest factor in students' taking on challenge is that it is worth it to them. Duping them sometimes works, but on the whole, students need to be convinced that challenge is the better choice if they are to invest anything other than their bare minimum. They have to see or feel the improvements. They need to be able to reflect on the journey they have taken and be able to notice the gains they have made if they are to continue.

The examples of drawing attention to progress that I mention in section 5.5 (page 240) go a long way toward helping with this.

Challenge does not need to represent the nicer option—often it won't—but your students have to believe there is enough benefit in it to make stepping out of their comfort zone worthwhile.

3.1.2 Owning the Challenge

I choose the amount of challenge I engage with in the pool. I set my targets and try to beat them. On a good day, I push myself; on an off day, I do just enough to make the trip worthwhile. Step onto an ice rink, though, and challenge will come at me whether or not I want it to. Staying upright, building momentum, stopping, starting, and avoiding others—all of these will be a challenge. In the pool, I can put in a good shift without really testing myself. I can add a challenge here and there if the mood takes me. When it comes to ice skating, I will spend considerable energy trying to bring myself back from the b(rink).

A sense of control is an important factor when it comes to challenge. If students can add challenge to what they are doing *when they are ready to do so*, then their attitude is likely to be a favorable one. This is the case for me in the pool. However, when students find themselves struggling to wrestle control of the many variables, they may well feel overwhelmed. This would be me on the ice.

It is important to recognize the differences in these two situations—and to be aware of how looks might be deceiving. Students in control will seem as if they are performing effectively—and will typically be praised for it, even though they might *not* be out of their comfort zone. But those who are attempting to wrestle control may seem hesitant or even fearful. In these situations, students are often implored to try harder or have another go, even though they are already a long way out of their comfort zone.

3.1.3 Having Permission to Try

I feel as if I have permission to challenge myself in the pool. This belief comes from many sources. First, I have enough capability that I'm not going to make a fool of myself or get in people's way. Neither of these things would be true on an ice rink. I also know the etiquette of my local pool enough to understand what is acceptable and what is not. For example, I know I can challenge myself by using flippers but not by diving from the shoulders of someone else. Just as importantly, I feel as if I'm among friends—I know many of the lifeguards and fellow swimmers well enough that if I were to challenge myself with a brand-new routine, I'm sure they would show curiosity and encouragement rather than disdain or suspicion. In effect, I belong there. I am welcome there. Therefore, I have tacit permission to try new things.

Do your students feel as if they have permission to take on challenges? You give permission, of course, and encouragement, but do their peers? In every subject area? How about the students who do not think of themselves as creative? Do they have permission to try new techniques in art or music? What about the students who do not believe they are sporty? Can they try new techniques in physical education or on the sports field without risking ridicule? Do your students have permission to ask questions if they think of a connection that they'd like to test out?

Do they have a clear enough understanding of what is allowed or expected? Have your students learned how to encourage and show interest in other students who are trying new things? The research is clear that students who believe they fit in and have permission to experiment will do so (Becker & Luthar, 2002; Maslow, 1968; Pittman & Richmond, 2007). Those who don't, don't.

3.1.4 Being in the Habit

I have developed a habit for swimming. By doing so, I need less mental preparation than I once did. It used to be that I had to convince myself swimming was worth it—worth setting an early alarm, worth going tomorrow even if I wouldn't have another opportunity for another week after that, worth putting a bag together with swim gear, showering gear, and work clothes for afterward. My trips were sporadic, and each visit took effort. Then the pandemic hit; I couldn't travel, but I could swim every day. I did it so much that now it feels odd not to. My fellow swimmers expect to see me and ask where I've been if I don't turn up. My bag sits by the front door, just needing a fresh towel, trunks, and a water bottle. Lavish plans about fitting everything in are no longer needed; it's all part of the routine now. Even if my body says no, my mind says I had better get on with it. The last thing I want to do is lose a habit that took so long to build up.

The importance of getting your students into the habit of taking on challenges shouldn't be underestimated. Indeed, this is the answer to the question I am asked time and again about ways to encourage students who avoid challenge: take one small step after another until they are eventually in the habit of rising to challenges. Don't plan a special day once or twice a year (although these are nice bonuses). Instead, add a little challenge every lesson, every day. Increase adding challenge bit by bit until, eventually, challenge is the norm. Make it such an everyday part of your classroom that its absence would be immediately noticeable, and its return requested.

So, there you have them: the four pillars of challenge that, when developed, will encourage your students to engage in challenge. They don't all have to feature in every challenge, although the more that they do, the more likely your students are to take a positive attitude toward challenge. Don't just take my word for it. Instead, let's take a look at the research evidence.

3.2 Learn What Research Says About Challenge

The different meta-analyses about challenge identify the following four categories.

1. Holding high expectations for all students
2. Creating desirable difficulties
3. Setting appropriately challenging goals
4. Giving students control over their learning

I describe each of these categories across the next four sections. For now, here is a summary of each one, together with their relative effect sizes (represented by $d =$).

1. **Holding high expectations for all students ($d = 0.50$ to 1.44):** This is the factor that influences student learning the most. This includes students' skills, prior knowledge, background variables, and attitudes and beliefs. After that, the second most influential factor is the teacher. What teachers and students do together is what drives learning, and right at the core of that are the expectations that teachers hold for their students. The differences in impact between a teacher with low expectations and a teacher with high expectations are astonishing. Those with higher expectations set more aspirational goals, use time more effectively to better understand where students are and how to move them on, and get the levels of challenge just right.
2. **Creating desirable difficulties:** The term *desirable difficulties* comes from Robert Bjork (1994), distinguished research professor of cognitive psychology at UCLA (Bjork & Bjork, 2011). His research shows that when learning is made more challenging, it can lead to additional benefits in terms of long-term memory, skill, knowledge retrieval, and transfer from one context to another. Bjork (1994) recommends four approaches to creating desirable difficulties.
 - a. Varying the conditions of learning (effect size unavailable)
 - b. Spaced (versus massed) learning ($d = 0.65$)
 - c. Interleaving ($d = 0.44$)
 - d. Generation and testing ($d = 0.50$ to 0.96)
3. **Setting appropriately challenging goals ($d = 0.59$):** Challenge should be at the edge of competence—not so hard that students are discouraged but not so easy that they grow bored. Researchers Celeste Kidd, Steven T. Piantadosi, and Richard N. Aslin (2012) call this sweet spot the *Goldilocks zone*. Researchers Robert C. Wilson, Amitai Shenhav, Mark Straccia, and Jonathan D. Cohen (2019) estimate that when challenge is optimal, it will lead students to be able to achieve an 80 percent to 85 percent success rate.
4. **Giving students control over their learning ($d = 0.02$):** This influence is the odd one out due to its low effect size. All the other factors in this section are likely to lead to substantial or very high effect sizes. The conundrum is that although students like choice (and teachers typically like to offer a certain degree of control and ownership), it all too often leads to less learning, not more. This is *not* because choice is a bad thing but because students tend to choose the option that they perceive will be easiest for them to succeed with. In other words, they choose low levels of challenge rather than optimal levels. This doesn't have to be the case—and I share some ways to address this in section 3.1 (page 95)—but nonetheless, research shows that choice typically means less challenge and, therefore, lower levels of learning.



In this video, James introduces the Learning Pit.

3.7.2 The Foundations of the Learning Pit

When I first introduced the Learning Pit to my students, it looked as basic as it does in figure 3.4. I didn't even have a whiteboard back then, so I had to create the original in chalk. Over time, as I shared the idea with colleagues—both in school and at teaching conferences—the model grew in popularity. Eventually, I got around to writing about it, first in an article for the journal *Teaching Thinking and Creativity* (Nottingham, 2007) and then in my first book, *Challenging Learning* (Nottingham, 2010). Now, if you do a search online for the Learning Pit, you will see hundreds of millions of results. So, it would be fair to say my model has become popular.

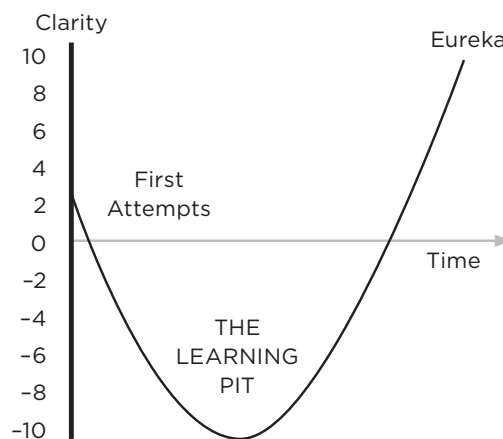
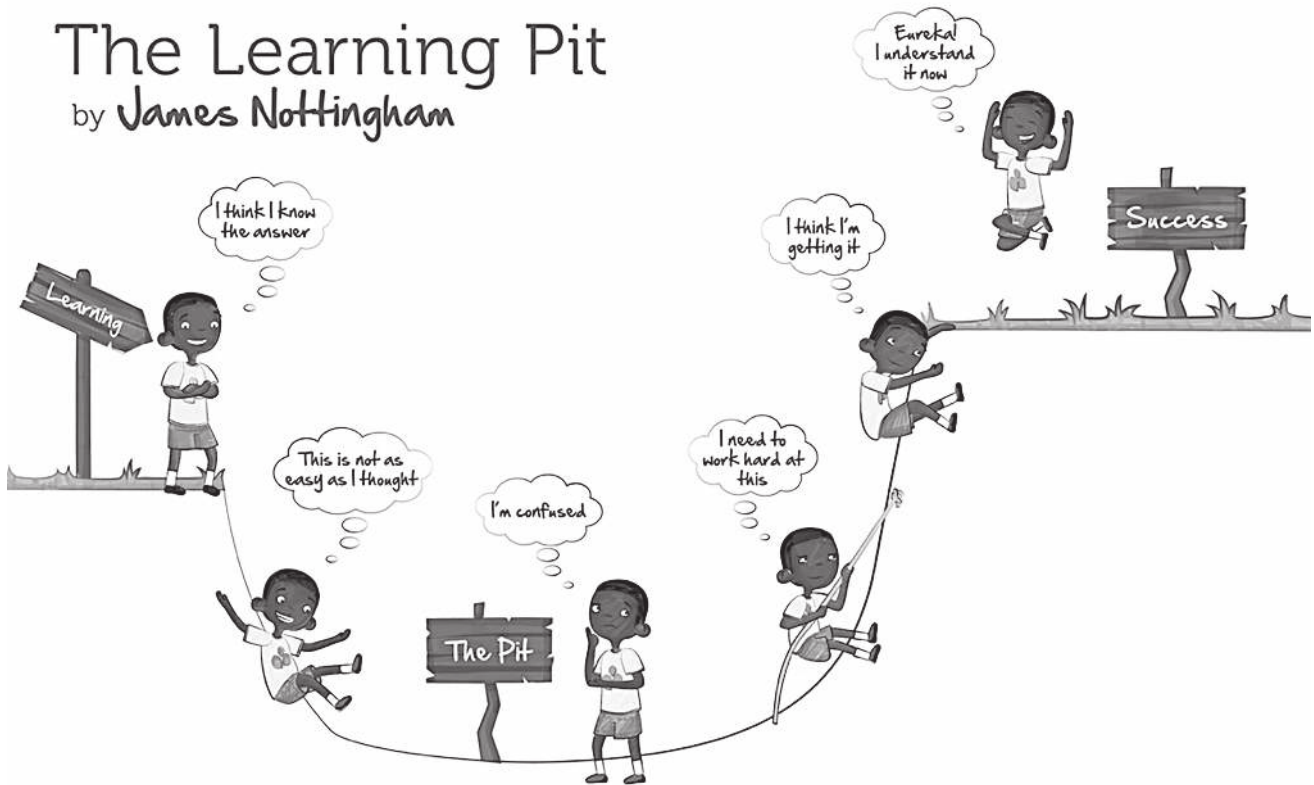


Figure 3.4: The Learning Pit original illustration.

Approval of this model has been helped by mentions in many quarters, including *The New York Times* (Anderson, 2022), the *Financial Times* (Green, 2016), BBC Radio 4 (January 11, 2020, 4:15 p.m.), Cambridge Assessment International Education (Whyte, 2016), and the Finnish Broadcasting Company (November 13, 2018, 6:43 a.m.). The model appears in books by King's College London visiting professor of education Guy Claxton (2017) and Stanford University professor Jo Boaler (2022). It is recommended by Ron Ritchhart (2023) of Harvard University's Graduate School of Education, John Hattie (2017) of the University of Melbourne Graduate School of Education, and Carol Dweck (2016), the Lewis and Virginia Eaton Professor of Psychology at Stanford University.

Since those early days of chalk pits melting on a playground wall, the illustrations have improved markedly. There are now four main types, examples of which are shown in this section.

By far the most popular version shows the thoughts someone is likely to experience as they go through the Learning Pit (figure 3.5). Please note that the Learning Pit is generally a collaborative experience, so this version would be even better if it featured a group of students thinking about their experiences.



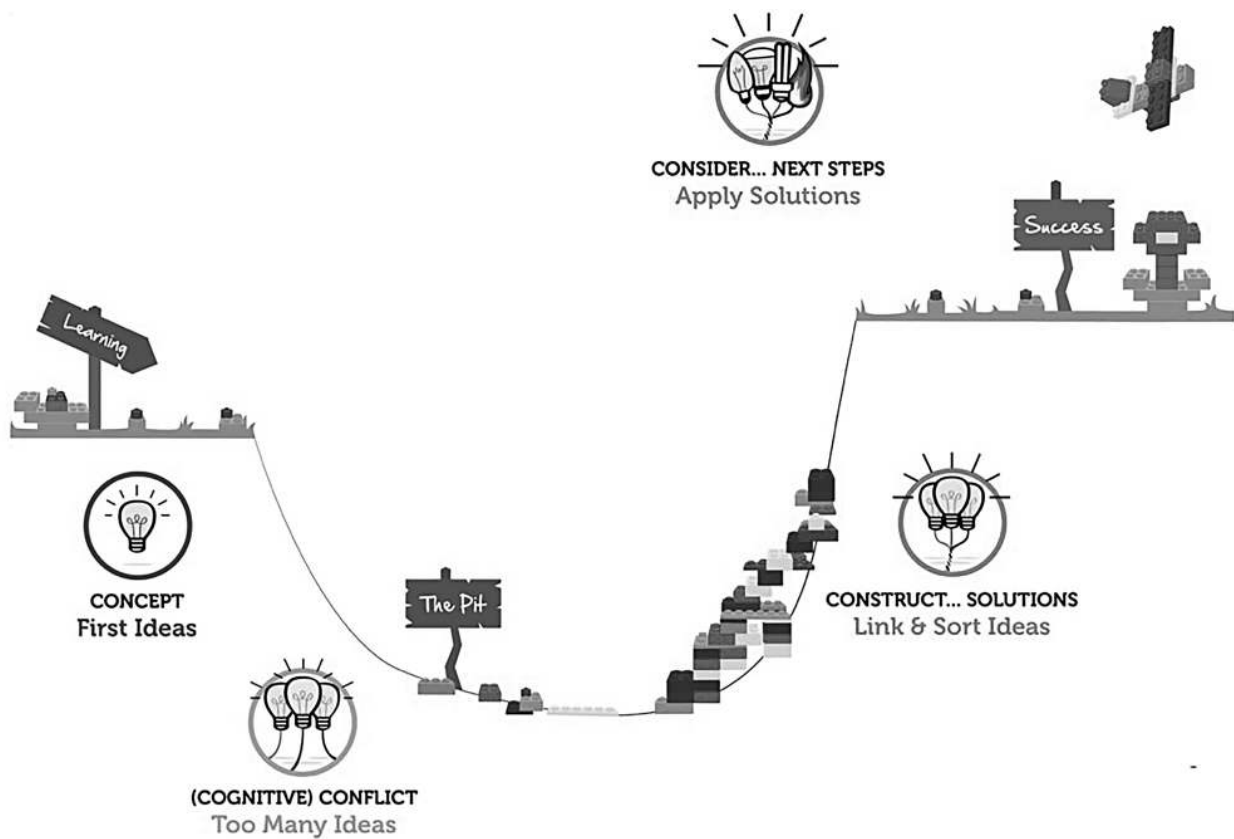
Source: James Nottingham.

Figure 3.5: The Learning Pit, version 1—Thought bubbles.



Use this QR code to download high-resolution color images of figures 3.5 to 3.8 and 4.13.

Another popular version is blank apart from a few labels. Students stick photographs or cartoons of themselves on whichever part of the pit they believe they are in currently. Figure 3.6 shows a template for this approach. You can also find lots of examples of completed versions online.



Source: James Nottingham.

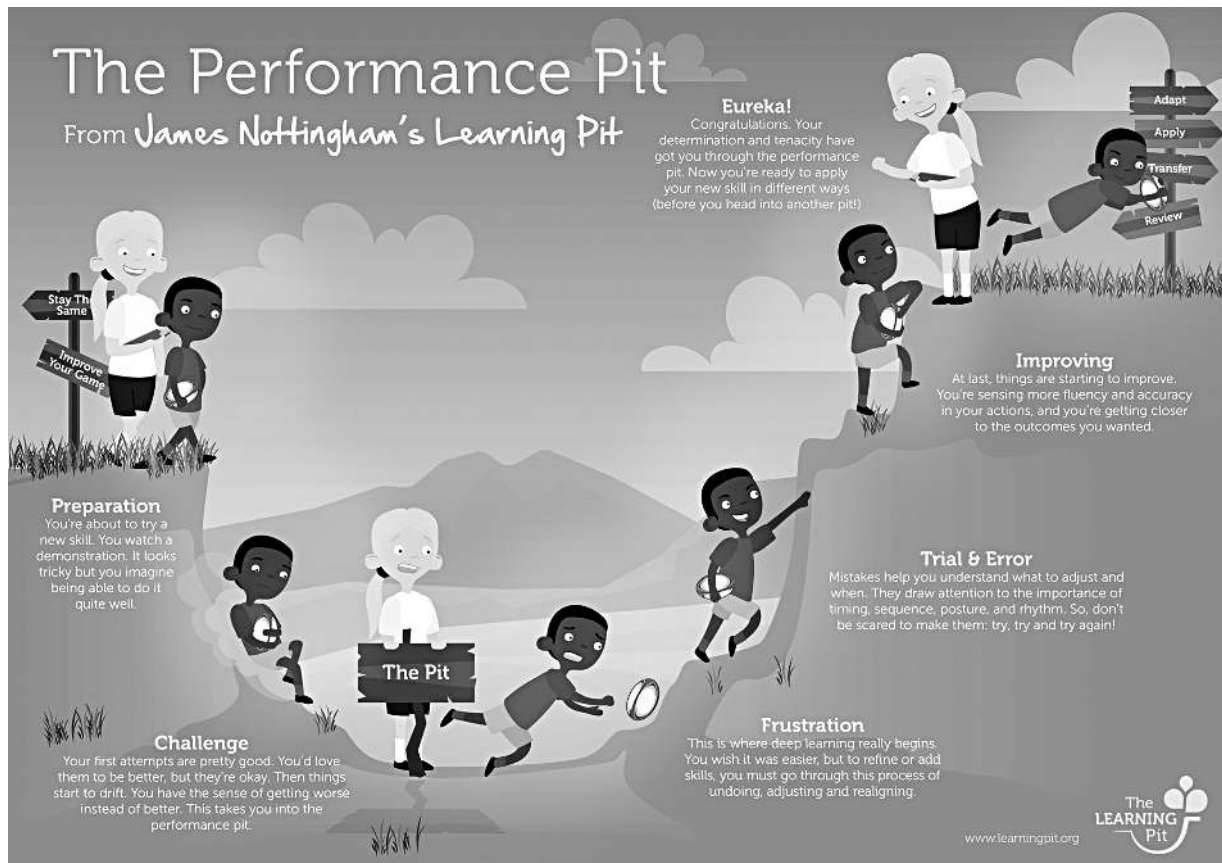
Figure 3.6: The Learning Pit, version 2—Progress template for students.

The third version includes a lot more detail. Figure 3.7 (page 118) shows an example that I created for a rugby foundation in New Zealand. In section 4.8 (page 195), you will also see a Learning Pit with lots of detail shown.

A category recently added and proving to be very popular is the bilingual version, as in figure 3.8 (page 119). Not only are these bilingual illustrations great resources for language teachers, but they also show respect for context.

All these images are available for download from my website, LearningPit.org (<https://learningpit.org>). I designed them, then had the fabulous team at <https://ideographic.co.uk> illustrate them for me. You are very welcome to use them for educational purposes with your students. Use the code ST-JN2024 to gain full, free access. Alternatively, you could design your own version and send it to me so that I can ask Ideographic to turn it into the house style. This approach has been used for all the bilingual versions you can find on my website.

One final category that I should mention includes misleading versions of the Learning Pit. A classic example of this is an illustration that has been reposted thousands of times, although I can't find the original source. It has a brick wall in the middle; I'm not against that per se, but



Source: James Nottingham.

Figure 3.7: The Learning Pit, version 3—Detailed descriptions.

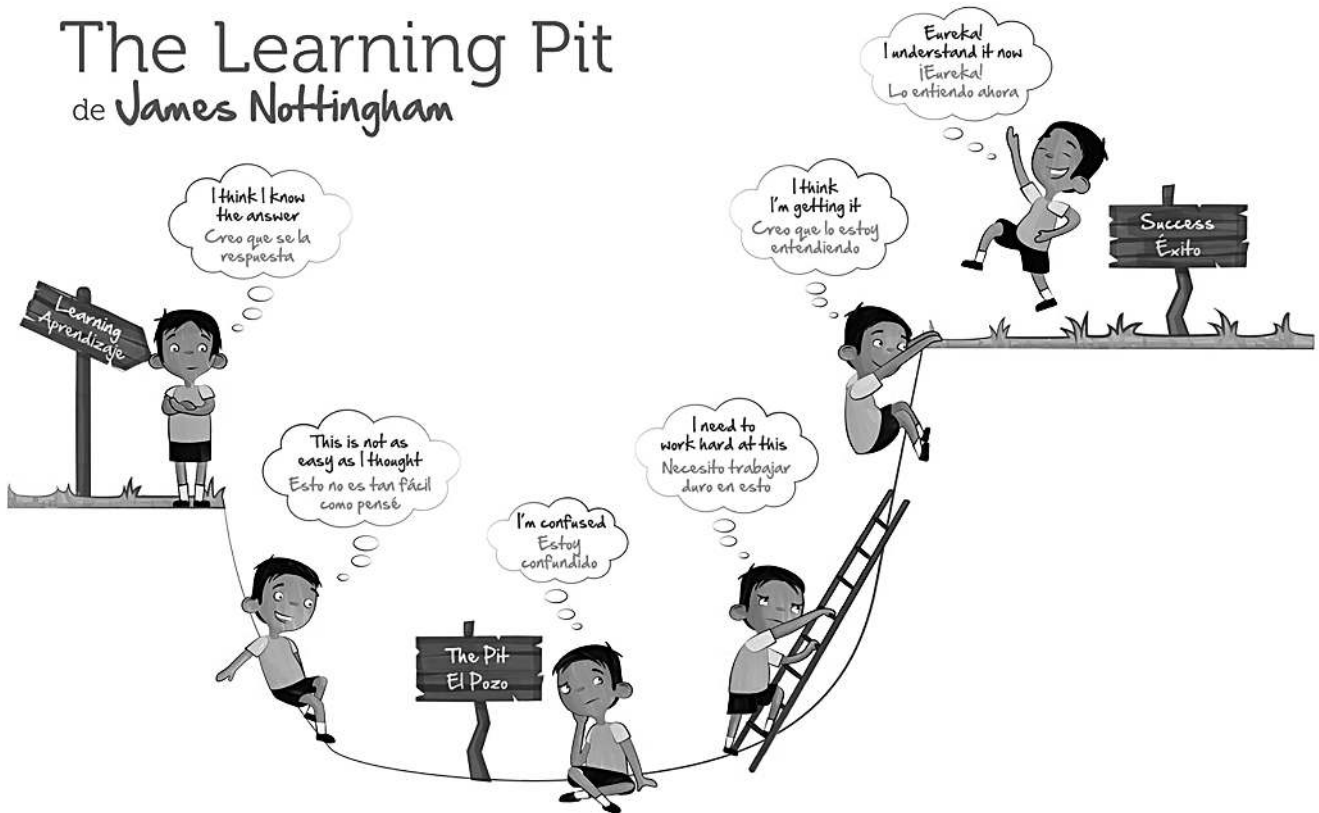
it makes the version I'm talking about easily identifiable. The reason I don't like that illustration, apart from its lack of attribution, is that its finish point is at the same height as its starting point. Some students find this odd. They wonder what the purpose is of going through all the effort to work their way through the pit only to end up at the same level of understanding. They argue it would be better to bypass the pit or skip over it rather than go through it. Granted, only students who are literal in their thinking or have a particular fondness for detail really worry about (or even spot) this inference, but I want the pit to be fully inclusive, so I think the implication is important.

Figure 3.9 (page 120) shows the difference I am describing. The image on the left is similar to versions I see in many classrooms. The one on the right is a more accurate representation of the concept I originally envisaged.

A quick note before we continue: As you may have noted on the phrase's first use in the introduction (page xi), I hold a registered trademark for the Learning Pit (Patent & Trademark, Reg. No. 6,381,157). This seems heavy-handed, particularly in an educational context. If good ideas can help improve learning experiences, then I think they should be

The Learning Pit

de James Nottingham



Source: James Nottingham.

Figure 3.8: The Learning Pit, version 4—A bilingual illustration.

made freely available. That said, attribution doesn't go amiss! So, here's some information to help you with that.

- If you are using any of the images downloaded from LearningPit.org, then you should include the following: "© 2021 The Learning Pit by James Nottingham."
- If you or your students create your own illustrations, then any posted online or made into a display should have this message: "Illustrations by [your name or class name] from James Nottingham's Learning Pit."
- If you wish to quote the first time the Learning Pit appeared in print, then you could use "(Nottingham, 2007)" to refer to this source: Nottingham, J. A. (2007). Exploring the Learning Pit. *Teaching Thinking and Creativity*, 8:2(23), 64–68.

However, if you want to refer to my use of the Learning Pit in any of the twelve books I have written, this one included, then you can use the normal referencing convention.

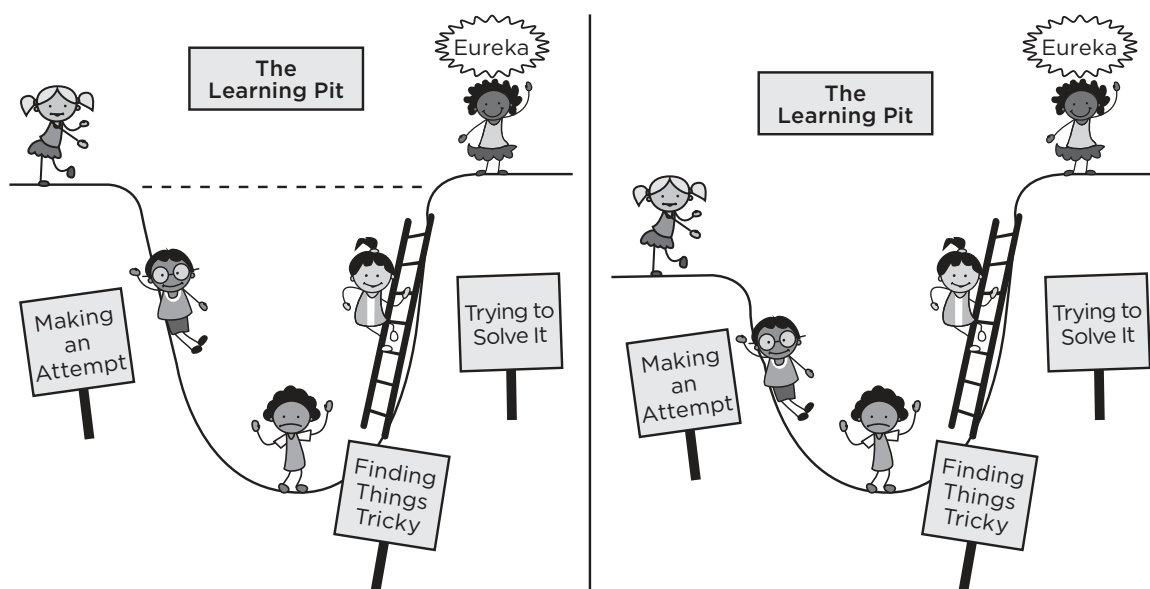


Figure 3.9: The wrong way (left) and right way (right) to draw a Learning Pit.

3.7.3 Students' Introduction to the Learning Pit

There are three ways I recommend introducing the Learning Pit to students. First, if you work with learners in the seven- to thirteen-years-old range, then I'm delighted to say that I have posted an appropriate introduction video online.



In this video, James introduces the Learning Pit.

Second, if you work with students over thirteen years old, then you might want to get them to do some online research first. Reading *The New York Times* article “Learning the Right Way to Struggle” (Anderson, 2022) and comparing some of the different Learning Pit images available on the web would be a good way to start.

Third, over the next few pages, I share some key points that I encourage you to use when introducing the Learning Pit to your students. This is not a script! You do not need to follow it word for word. Sharing *something* like this, however, will help make the starting point an effective one.

Example Narrative To Use When Introducing the Learning Pit to Your Students

I want to introduce you to the Learning Pit. It is an illustration of the path we often take when learning something new.

A lot of people think that learning is a series of steps, each better than the one before. Unfortunately, that's not normally the case. Instead, we tend to take two or three steps forward, and after that, we feel as if we're going backward for a while. This can be really dispiriting if we think we're the only ones suffering these setbacks, but it turns out that everyone experiences this. Think of any of your favorite performers, online personalities, or sports stars. Look hard enough, and you will find they all have stories of struggle—how they had to dig deep to overcome challenges, how they felt like giving up but didn't. And look at where they are now.

In school, these dips happen all the time. For example, I show you a new technique in [subject], and it all seems to make sense. You have a go, and it works. Some people even call this beginner's luck. But then, when you try it again for homework or return to it a few days later, it doesn't seem to work as well. Maybe you've forgotten a crucial aspect of it, or maybe you've gone from the first, simple version to the more accurate (but complicated) version. Whatever the reason, you feel as if you've gone backward rather than forward. This is called going into the Learning Pit.

Being in the Pit Is Good for Us

When you find yourself in the pit, do not worry! Remind yourself that this means you are learning. In fact, there is a lot of research to show that the more you struggle with something, the longer lasting your learning will be. Researchers call this **retrieval**. So, sometime in the future, when you need to retrieve what you've learned, your brain is more likely to remember it if it was a challenge when you first came across it. One of the best-known researchers, Robert Bjork, even calls this **desirable difficulty**! Of course, it doesn't feel very desirable when you're struggling, but what he means is the results are desirable because memories last longer, understanding deepens, and learning habits strengthen.

Being in the Learning Pit is therefore good for us, so good that I'm going to try to get us into it as much as possible. [Add an evil laugh for full kitsch effect.] I'm going to use questioning to get us to think more rather than give hints to make things easier. I will design lessons that purposefully take us out of our comfort zones and into the Learning Pit. I won't make things so hard that we won't know where to start; I will try to get the balance just right.

The best balance for learning is that after lots of trial and error, you succeed with about 80 percent of what you are trying to do. That means 20 percent should be just out of your reach. Of course, we all want to succeed as much as possible—and when it comes to performances that matter (for example, competitions, exams, shows, and so on), acing them is fabulous. But when it comes to learning, we should be engaging in things that are just a little beyond us right now.

Have you noticed that I keep saying “our learning” and “get us into the Learning Pit”? That is because I plan to go into the pit with you. This will give me insight into your thought processes. It will show me what you understand and what you need more help with. All of this will give me a much better idea about what to teach you next.

So, you’re likely to hear me say things such as, “I’m sorry, I don’t understand. Could you give me more information? Or an example? Or a reason?”

When I do this, don’t worry that you’re not making sense. Just think to yourself that what I’m trying to do is get us all to think more.

The Learning Pit Is a Collaborative Endeavor

I mentioned earlier that I’m aiming to get everyone into the Learning Pit. However, you do not need to wait for me to do this. I want you to do it for yourself and for each other. So, if you’re finding things easy, look for ways to make things more challenging for yourself. Maybe add or subtract a variable, try it in a different way, use a nondominant strategy, rearrange the sequence, look for exceptions, or find reasons. Find any challenge that will make you think harder. Try not to think of lessons as things to get through just because you have to be here. See them as opportunities to improve your learning abilities, to strengthen your learning muscles. Get yourself into the pit as often as you can.

I also want you to do the same for each other. When you engage in group work, your job will not be to agree with each other. Do not make things easier for your classmates. Instead, you should get them to think more. Ask them questions. Encourage them to give examples, reasons, and meanings. The more you cause them to think, the more they will learn. The better they become as learners, the more they will be able to challenge you—and so everyone’s standards of learning will lift.

Next Steps

At the beginning, you will get lots of opportunities to try things out without pressure. So, don’t worry—you will have time to explore. Only after you’ve made a good start will I try to get you into the pit.

When this happens, it will feel as if I'm moving you from straight-forward to complex, or from easy to challenging. At least I hope it will because that's what I will be trying to do with and for you all!

Once you're in the Learning Pit, we will find ways to problem-solve. Throughout this school year, I will teach you lots of ways to do this. It will include sorting ideas, ranking things from best to worst (and deciding what **best** means), looking for similarities and differences, identifying cause and effect, hypothesizing, rearranging sequences and noting the effect, and analyzing concepts.

A combination of these strategies will help us find better solutions, which, in turn, will take us out of the Learning Pit. Sometimes, this will best be done by yourself, and other times, it will be a collaborative exercise.

Taking Care of Each Other in the Learning Pit

Everyone can make progress. We know this for sure. Research proves it, and experience shows it time and again. Today, some of us will start further ahead than others, but that's because they have already made lots of progress. They've put in lots of hours, worked at something for longer, thought about it more. Others haven't had those advantages—yet. So, when we all get into the Learning Pit, we will do so from different vantage points.

Some ways in which we will take care of each other as we go through the pit include the following.

- We will encourage each other. There will be no making fun of someone for struggling with or not knowing something. If they are in the pit, we should cheer them on, not poke fun at them. Ever.
- If you find that you're the only one in the pit, ask someone else to join you (notice that I didn't say, "Ask someone to rescue you"). Invite them to examine the conundrum you are working on to see if they can make sense of it. Ask them questions, and look for examples together. What works and what doesn't? What reasons can you both find?
- If you see other people going into the pit, but you haven't gone in yet, look for ways to challenge yourself. Remember that the optimum balance for learning is 80/20, with the 20 percent representing things beyond you right now that cause confusion or frustration. So, ask others to help challenge you. Or look at what is perplexing them to see if they've found something that will help challenge you more. Help each other out—not by giving each other the answers but by challenging each other more!

3.8 Create Challenge With the Learning Pit: A Step-by-Step Guide

I have written four books focused entirely on ways to guide students through the Learning Pit. The most in-depth guide is *The Learning Challenge* (Nottingham, 2017). The pocket guide is *The Learning Pit* (Nottingham, 2020). I have coauthored two books with lesson guides and resources: *Learning Challenge Lessons, Elementary* (Nottingham & Nottingham, 2018) and *Learning Challenge Lessons, Secondary English Language Arts* (Nottingham, Nottingham, & Bollom, 2019). So, if you want a much broader set of resources and examples from across the curriculum, choosing one or more of these books would be the best way to go.

For the purposes of this book, I will show you how to get started with the model and indicate ways in which it helps create optimal levels of challenge for your students. The following guide centers on concepts, but the approach can work just as well in performance-based contexts such as physical education, music, art, and drama. Indeed, wherever there is challenge within learning, being in the pit can be a helpful reference for students.

Originally, I conceived four stages of the Learning Pit. Since then, I have added extra steps within stages 2 and 3 that I will also show you. Figure 3.10 illustrates these stages.

1. **Concept:** The Learning Pit begins with a concept that students are familiar with. This concept should be relevant to their current studies. Examples are shown in section 3.8.1, page 126.
2. **Conflict:** Once students have expressed their early ideas about the chosen concept, questioning is used to create cognitive conflict. This happens when students hold two or more conflicting beliefs about the same thing. The dissonance they experience creates the feelings of being in the pit and provokes the use of higher-order-thinking skills.
3. **Construct:** Experiencing cognitive conflict helps students think deeply about concepts. At some point, though, they need to create a resolution that builds their understanding. This stage is focused on doing just that by connecting, analyzing, sorting, and categorizing and grouping ideas into an arrangement that is accurate and functional.
4. **Consider:** Having constructed a stronger, more nuanced understanding of the concept, students will have emerged from the pit. They can then look for ways to apply their new ideas to different contexts. They should also engage in metacognitive thinking by reflecting on their learning journey and considering what they have learned and how.

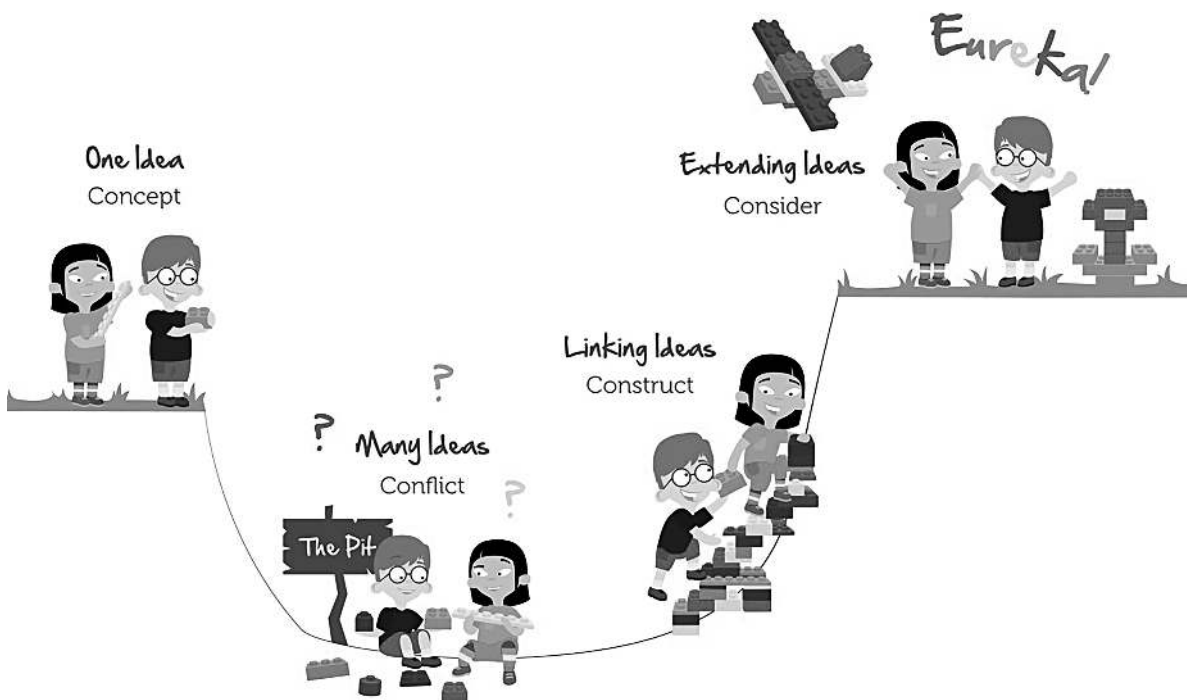
In performance-based learning contexts, these four stages can be thought of as the following.

1. Preparation and goal setting
2. New technique (that seems to conflict with well-rehearsed techniques)
3. Trial and error
4. Application and reflection

The four stages of the Learning Pit match these stages in the SOLO Taxonomy (see section 2.3, page 56).

1. Unistructural (few ideas)
2. Multistructural (lots of ideas)
3. Relational (connecting ideas)
4. Extended abstract (transferring ideas)

John B. Biggs and Kevin F. Collis (1982), the creators of the SOLO Taxonomy, showed a role for cognitive dissonance at *every* stage of SOLO, not just at stage 2. I agree with this interpretation—after all, challenge provides the necessary catalyst for movement from *any* stage of learning to the next. So, when I match stage 2 of the Learning Pit with stage 2 of the SOLO Taxonomy, I do so to emphasize the number of ideas available to students at the time. I have heard people use the phrase *being in the pit* to mean that they know nothing, whereas the correct interpretation is that they know lots.



Source: James Nottingham.

Figure 3.10: The four stages of the Learning Pit.