70|20|10 Principle and Proficiency Pathways

An Evidence-Based Approach

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Summary

The 70|20|10 principle provides a rough guideline for unifying the spectrum of formal and informal approaches to learning and development within organisations. However, the 70|20|10 principle by itself offers little practical guidance as to how to design a cohesive scheme of learning and development.

Virtues of 70|20|10

The main virtue of the 70|20|10 principle is its emphasis on the need to integrate one-on-many, one-on-one, and self-guided methods of instruction. It recognises two key complementary features of human learning:

- Learning occurs primarily through problem-solving on the job.
- The learner must be actively engaged in acquiring knowledge, skills and attitudes (KSAs).

Limitations of 70|20|10

The four limitations with the 70|20|10 approach can be summarised as follows:

1. As far as can be discerned, the 70|20|10 principle originated in observations of what currently occurs across occupations and organisations (McCall, 2010). Thus, the principle is the transformation of a statement about what is done into a prescription of what should be done.

2. Even if 70|20|10 proportions are accepted as a rough guide, there is diversity and outright ambiguity concerning which activities occur in each of the three components.

3. The 70|20|10 principle only provides at best rough guidelines for allocating time to broad categories of learning activities. To implement the 70|20|10 principle, more precise guidance is needed to order and structure activities into a cohesive learning program.

4. The ambiguities of the 70|20|10 principle also make it uncertain as to which data should be captured and how those data should be used to report on the effectiveness of a program with any degree of certainty and consistency, making benchmarking almost impossible.

What we propose

We are proposing an alternative evidence-based approach - the Learner Proficiency Pathway (LPP™), as a method for implementing the underlying principles and virtues of 70|20|10. There are four key concepts of the Learner Proficiency Pathway to understand:

1. Learning a skill passes roughly through three stages of proficiency – Acquisition, Practice and Application.

2. The order and type of learning interventions and techniques used at each phase make up to a 400% difference to the rate at which proficiency increases.

3. Although this method blends different modes of learning, it does not imply or require fixed percentages of time to be allocated to the modes described for the 70|20|10 principle.

4. Measurement is conducted not in terms of time spent on activities, but through assessing learner proficiency, readiness to progress to the next stage in the proficiency pathway, and ultimately the ability to apply the knowledge and skills in the workplace. This creates a specific, robust measurement framework and enables benchmarking of learning programs across disciplines, organisations, industries and geographies.
Introduction

Our goal is to contribute to the body of knowledge in the field of learning and development, and identify approaches to learning that build the skills, willingness and capability of learners as quickly and reliably as possible.

In pursuit of this goal, we examine the 70|20|10 principle as a guide for unifying the spectrum of formal and informal approaches to learning and development. We examine the 70|20|10 principle, both its virtues and limitations, which can be summarised as follows:

- **Its main virtue** is its emphasis on the need to integrate one-on-many, one-on-one, and self-guided methods of instruction.

- **Its main limitation** is that it appears to be a static, one-size-fits-all approach. However, cutting-edge, scientific research – much of it originating in Australia – demonstrates that learning is dynamic. As a learner acquires proficiency in an area, the optimal methods for learning change.

We then identify four limitations of the 70|20|10 principle and provide an alternative, evidence-based approach to practically address these limitations through the Learner Proficiency Pathway (LPP™) method.

The Learner Proficiency Pathway (LPP™) outlines a method for efficiently progressing a learner through initial acquisition of a new set of Knowledge, Skills and Attitudes (KSAs), their expansion and improvement in guided practice, and their further refinement through their practical application in on-the-job assignments.

For each stage of learning, the practical methods of implementation and the measurement of learning will be briefly described. The paper will close with a description of four key scientific findings that underpin the LPP™ method.

The origins and diversity of 70|20|10

In a generic form, the 70|20|10 principle prescribes that 70% of time for learning and development should be spent in on-the-job training, assigned projects and day-to-day practice; 20% should be spent on coaching, mentoring and developing through others; and 10% should be spent in structured courses.

Underneath this generic statement, however, there is a wide range of opinion as to the exact proportions and each component’s composition (Kajewski & Madsen, 2012; McCall, 2010).

Notwithstanding the diversity of opinion, the 70|20|10 principle implicitly recognises two complementary features of human learning:

1. **Learning occurs primarily through problem-solving on the job.** Although rote memorisation has its uses, the ability to proficiently perform and grow in a job requires the flexible adaption of knowledge and skills in changing circumstances. Even the most routine problems constantly have new wrinkles that can provide useful lessons.

2. **The learner must be actively engaged in acquiring Knowledge, Skills and Attitudes (KSAs).** Learning cannot be delivered like a package at the door. Readings, lectures and other materials in formal classroom settings will only be effective if individual learners each organise them in their memory stores. For many learners, the prospect of practically applying KSAs in their workplace provides both positive motivation and a focus for actively organising the material.
Four limitations of 70|20|10

Beyond the previously mentioned foundational features, the 70|20|10 principle has limitations, mostly ambiguities that are masked by its seeming mathematical precision. There are four limitations:

1. As far as can be discerned, the 70|20|10 principle originated in observations of what currently occurs across occupations and organisations (McCall, 2010). Thus, the principle is the transformation of a statement about what is done into a prescription of what should be done, with no systematic evidence for asserting that it is optimal practice, rather than the common wisdom parading as “best practice.”

   There is no guarantee that common “best practice” is necessarily the optimal practice. Rigidly apportioning activities in an enterprise-wide learning program according to fixed percentages may be counterproductive. In fact, distinctly different proportions, e.g., 40:30:30 or 50:20:30, are used in some organisations as a better fit to their specific operating environment (Kajewski & Madsen, 2012).

2. Even if 70|20|10 proportions are accepted as a rough guide, there is diversity and outright ambiguity concerning which activities occur in each of the three components.

   For example, Kajewski & Madsen (2012) report that some organisations see the 20% as variations on “coaching, mentoring, developing through others”, whilst McCall (2010) reports that these other people were nearly always “either excellent or terrible bosses and senior executives who, more often than not, were neither good coaches nor mentors”.

3. The 70|20|10 principle only provides, at best, rough guidelines for allocating time to broad categories of learning activities. However, to implement the 70|20|10 principle, more precise guidance is needed to order and structure activities into a cohesive learning program.

4. The ambiguities of the 70|20|10 principle also make it uncertain as to which data should be captured and how those data should be used to report on the effectiveness of a program with any degree of certainty and consistency. At present, data capture and analysis is usually only conducted on a case-by-case basis, which would prevent benchmarks from being formulated within an organisation and certainly across an entire industry.
Background to the Learner Proficiency Pathway (LPP™)

Cutting-edge research demonstrates that learning is dynamic. As a learner acquires proficiency in an area, the optimal methods for learning change. There are now increasingly well-established findings which have undergone rigorous scrutiny and can provide a base of theory and evidence for implementing the 70|20|10 principle in a more dynamic fashion that will produce more effective pathways to proficiency.

The LPP™ method is an integration of evidence-based principles of instructional design that progresses a learner from introductory acquisition through to advanced development (van Merriënboer, Clark, & de Croock, 2002). This method can satisfy individual learner needs that can nevertheless be managed at scale across large numbers of employees in an organisation.

In beginning to understand this method, there are four overarching concepts to understand.

The four concepts:

1. Learning a skill passes roughly through three stages of proficiency – acquisition, practice, and application.

2. At each stage of proficiency, different types of learning interventions optimise the rate at which proficiency increases.

3. Although this method blends different modes of learning, it does not imply or require fixed percentages of time to be allocated to the modes described for the 70|20|10 principle.

4. Measurement is conducted not in terms of time spent on activities, but through assessing learner proficiency, readiness to progress to the next stage in the proficiency pathway, and ultimately the ability to apply the knowledge and skills in the workplace.

The goal of the LPP™ method is simple: optimise the structure of learning interventions so that learners can rapidly develop competence. The following pages describe each stage in the learner proficiency pathway in detail, along with some practical guidelines for implementation to form a cohesive learning program.
Optimal learning methods and measures by phase

1. Acquisition Phase

**Acquire**
knowledge & skills

**Practice applying**
knowledge & skills

**Apply**
knowledge & skills

**Acquisition™**

**Summary**: The learner is new to a concept or context (i.e. new process). The goal here is to help the learner optimise the load on working memory and facilitate learner engagement.

**Optimal learning methods for this phase:**

- **Self-paced learning**
  
  Up to 25-30% more effective than an instructor-dictated pace of consumption of material such as is done in a face-to-face workshop, for example.

- **Step by step examples**
  
  20-30% more effective than initially asking learners to solve problems themselves.

- **Visual schemas for organising information**
  
  Up to 4x more effective than providing text only instruction.

**Measures of readiness to progress to next phase:**

- Learner confidence to start practicing the concepts
- Engagement levels with the learning process
- Passing basic test of knowledge and skills (through a multiple choice quiz, for example)
2. Practice Phase

**Summary:** The learner has a basic grasp of the underlying concepts and now has to practice them in a safe environment.

**Sequence of optimal learning methods for this phase:**

1. **Learning through comparing examples**  
   Up to 2x more effective than one example or no examples.

2. **Introducing practice one step at a time**  
   (whilst learner observes facilitator/coach/instructional material completing the rest of the steps)  
   20% more effective than presenting an example then asking the learner to practice by solving new problems from scratch.

3. **Problem solving and interactivity**  
   Up to 25% more effective than a learner observing completely step-by-step examples with no opportunity to practice.

**Measures of readiness to progress to next phase:**

- Learner confidence to start applying the concepts in the workplace to similar problems or situations that were practiced
- Engagement levels with the learning process
- Demonstration of KSAs in simulated environment like a workshop, role play, online simulation or presentation
3. Application Phase

**Optimal learning methods for this phase:**

- **Learning through experience and reflection** (McCall, 2010).

- **Ensuring on the job application of KSAs is tightly linked to training**
  
  Instruction in the acquisition and practice phases needs to incorporate the systems and processes the learner will encounter when applying the KSAs on the job. Failure to ensure this alignment of training and application can almost entirely negate the benefits of training.

- **Ongoing monitoring of learners**
  
  By their direct manager to ensure consistent application of KSAs and identification of any potential performance issues.

**A note on this phase:**

- Where individuals change job context, such as often occurs with promotions and job rotation, learners will often regress back to the acquisition phase and need direct instruction on how to succeed in their new work context.

- Failure to address this realignment through a learning intervention can leave learners to “sink or swim” and research shows they are more likely to sink than swim (Goodman, Wood, & Chen, 2011).

**Measures of progress in this phase:**

- Learner confidence to apply KSAs to other similar problems and situations in the future

- Engagement levels with the learning process

- Ability to demonstrate KSAs consistently in the workplace

**Summary:** the learner is ready to attempt applying the KSAs in the real world.
1. Acquisition phase

More than ever, the only thing certain for enterprises in all sectors is change. Everybody constantly encounters change in technology, processes, personnel, and/or environment. These changes often require that new KSAs be acquired and added to one's existing KSAs.

When the changes are relatively large and the KSAs are unfamiliar, the learner can be easily overwhelmed. Only a limited amount of information can be processed at any one time. When cognitive overload occurs, learning can be stymied. Unfortunately, for fear of running out of time, it is all too common to find training that asks too much and too quickly.

From the perspective of instructional design, the learner should be helped to encode the information and organise it in their long-term memory. The research indicates, for learning new KSAs, the most useful device is to step through a series of fully-worked examples, ideally in a self-paced fashion. As the learner gains a little skill and confidence, more explanation and extension through class-room presentations by instructors can be added. To some extent, e-learning can be substituted here for one-on-one tutorial coaching. Evidence for learning and readiness for progression can be assessed by conventional multiple-choice quizzes and modest extension problems.

2. Practice phase

Often practice is confused with rote drill. For some KSAs, rote drill is worthwhile. However, for many other KSAs, practice is the stage in which the concepts and examples are ramped up in their sophistication. This stage is marked by "expertise reversal"; fully-worked examples become less useful for the learner, while problem solving becomes more useful and engaging. Gradual fading from fully-worked examples into partially-worked examples and eventually full-blown problems can be conducted.

Throughout this stage, the need for instruction and corrective feedback remains relatively constant at least in the early portions of this stage. Too often, students receive sound basic instruction during acquisition but are immediately left to their own devices on a sink-or-swim basis. However, without guidance and assistance, sinking will be more common than swimming.

Measurement of success or failure during this stage will revolve around the ability of the student to demonstrate their ability to use their new knowledge and skills in complete but safe versions of the tasks that will occur on the job. Depending on the particular set of KSAs, individual or collective simulations can be used in a desktop or computer environment. These simulations can entail guided planning exercises, partially scripted role plays, or computerised business games. Both quantitative results, e.g., market share, profit, and ratings by subject-matter experts, e.g., senior managers, can be used.
3. Application phase

The application stage begins when each student is proficient enough that they can safely be given a suitable, on-the-job assignment to complete. From the LPP™ perspective, the students should view each assignment as an opportunity to expand and refine their new KSAs. Although the student will be largely responsible for their own continued learning, neither they nor their managers should adopt a back-to-business-as-usual attitude.

Instead, the on-the-job assignment can be managed as a component within a larger project of learning and development for each student. The conventional milestones for an on-the-job assignment may, for example, include a brief after-action review of lessons learned to promote deliberate learning by the students. Learning and Development staff may also continue to support the students in remediating or refreshing any gaps in their KSAs. Support for learning will be worthwhile, similar to the way that world-class athletes use coaches to ensure their skills are maintained and further refined (cf. McCall 2010).

Measurement at this stage should focus not only on the organisational outcomes, but also the process. With regard to organisational outcomes, did the student achieve the goals of the on-the-job assignment? With regard to process, did the student achieve those outcomes using the KSAs they acquired or did they adopt other methods? It is highly likely that the students will use a mixture. If so, the next question should be whether or not other methods are innovative adaptations to challenges outside the KSAs. Together these measurements can be used to compute a return on the investment in training the students (ROI).

Some words of warning

Just as the 70|20|10 principle can viewed as a guideline rather than a rigid prescription, the LPP™ method should not be viewed as a rigid prescription of how a learner should be progressed through the three stages. Learning is an uneven process; students will have their good days and bad days. Moreover, at any one time, true professionals will be at different points in their development of different KSAs.

Even within one set of KSAs, an individual may be starting acquisition of one component, practicing another, and applying yet another. Even proficiently applying a set of KSAs on the job, there will be times when a bit of further 'just-in-time' acquisition will be required in order to either update knowledge, refresh an infrequently-used skill, or expand the existing KSAs. This acquisition can be achieved through self-guided consultation of available resources, via a Google search, online e-modules, asking a colleague, or, in extremis, reading a manual.

In other cases, more extensive acquisition training guided by Learning and Development specialists is required.

The science underpinning the LPP™

In learning, training, and development, there is no shortage of ideas, often based in the advocate's personal experience. These ideas are uniformly heartfelt and sincere. Nevertheless, their basis in systematic observation and hard-nosed evaluation is usually limited. In other cases, systematic evaluations have been conducted, but only the chief findings are reported. The methods, data, and statistical analyses are proprietary and rarely available for outside scrutiny.

The LPP™ method, in contrast, is informed by the latest research that has undergone rigorous peer review and is available for outside scrutiny. Although there are many more studies that informed the development of the LPP™, this section will describe four key findings that underpin the LPP™ method.
Learning takes time: Patience makes perfect

A hidden, but vital, assumption of the 70|20|10 principle is that learning takes time. There are no quick fixes, and even the steepest learning curve requires that the individual take time to acquire the necessary knowledge and skills. This requirement may seem obvious, however, learners, instructors, and other facilitators are often impatient with the rate of acquisition and eager to find shortcuts, which do not exist.

With some exceptions, learning curves for most complex tasks in business are sigmoidal, meaning that, at first, changes in knowledge and skills are nearly invisible (Figure 1). However, with patience and further experience, the changes begin to accelerate and proficiency grows rapidly. As one reaches the top of the learning curve, achievement of top-grade expertise becomes a slow process of refinement, taking 10,000+ hours distributed over 10 years (Ericsson, Krampe, & Tesch-Römer, 1993). Patience, along with practice, makes (nearly) perfect.

Figure 1: Typical learning curves

Most learning curves have a period early in training in which there will be negligible improvements in performance before performance accelerates.

The LPP’s three stages partition the learning curve into three components:

**Acquisition** corresponds to the initial, more-less-flat portion of the curve. In most cases, this portion need not be very long, but it cannot be skipped. Only very simple skills, for example, memorisation of lists, will have no discernible acquisition stage.

**Practice** corresponds to the portion of the curve in which progress in learning is very rapid. As a word of caution, the smooth curves in Figure 1 are idealised. Learning of both simple and complex skills usually proceeds in fits and starts, often two steps forward and one step back.

**Application** corresponds to the upper portion of the curve where the learner can now display competence in a consistent manner. As another word of warning, the idealised curves in Figure 1 show that proficiency does reach perfection. Be reminded that perfection is rarely achieved. Even among experts, refinements continue to occur.
Learning processes change with proficiency:
The expertise reversal effect

The latest evidence, much of it collected in Australia, is consistent with the 70|20|10 principle that structured guidance is required. This evidence provides insight into how guidance should be implemented as the individual progresses up the learning curve, to ensure that the most efficient learning occurs (e.g., Goodman, 2009 #3490; Kirschner, 2006 #2490; Sweller, 2007 #2488).

One of the most effective forms of guidance is the opportunity to step through fully-worked examples of a complex skill either individually or even in small groups (Kirschner, Sweller, & Clark, 2006; Retnowati, Ayres, & Sweller, 2010). These examples include recipe-like set of instructions, step-by-step case studies, and/or video-taped demonstrations (e.g., Pollock, Chandler, & Sweller, 2002; Sweller, van Merrienboer, & Paas, 1998; van Gog & Rummel, 2010). After such study, the learners can be tested with an unsolved problem commensurate with the examples that have been studied. Then, the process can be repeated with more advanced examples and more advanced unsolved problems.

As a learner gains proficiency, however, the benefits of worked examples fade. Ultimately, “expertise reversal” occurs; self-guided problem solving progressively becomes the faster path up the learning curve (Kalyuga, Ayres, Chandler, & Sweller, 2003; Kalyuga, Rikers, & Paas, 2012).

This expertise reversal effect is illustrated in Figure 2. Two groups of students were given training in mathematical problem solving. One group (Worked Examples) progressed through cycles in which they studied a worked example and then solved a similar problem. The other group (All Problem Solving) was given formulas but otherwise had to solve all problems on their own. The figure shows the percentage correct on the test problems across five cycles of training. As can be seen, the Worked Examples group initially showed a higher level of performance than the All Problem Solving group. However, this difference disappeared by the third cycle, and, during the fourth and fifth cycle, the All Problem Solving group showed the higher level of performance.

In practice, a fading strategy can be adopted. Start acquisition alternating between fully-worked examples and similar test problems. As the students begin to display some proficiency, the proportion of worked examples can be progressively reduced in favour of a greater proportion of unsolved problems.

Figure 2: The expertise reversal effect
In early training-test cycles, the study of worked examples yields the higher level of correct performance.

In later cycles, self-guided problem solving yields superior performance. In application, one could switch from one tactic to the other as proficiency grows.
Learner control of cognitive load: Self-paced works best

Optimising the load on a person’s working memory is a vital key to learning in formal and informal settings. The optimal load is small, three to four items at any one time (Cowan, 2010). One efficient way of optimizing this load is to allow the learners to control the pace and complexity of their information intake (Mihalca, Salden, Corbalan, Paas, & Miclea, 2011; Salden, Paas, & Merrienboer, 2006).

Figure 3 shows the results from an experiment in which four groups of learners were presented information with an explanation in auditory form (spoken) or visual form (written). Three groups were presented the information at a fast, medium, or slow pace, which was dictated by a computer program. The fourth group (self) controlled the rate at which they received the information.

The figure shows the results of a test in which the learners were asked to reproduce key features of a diagram from the instructional material. As can be seen, the self-paced group showed the highest level of correct recall. The value of self-pacing is a powerful argument for devoting the bulk of time to individualised learning versus collective-classroom learning.

Figure 3: The self-pacing effect
Allowing learners to control the pace at which they process instructional material – whether auditory or visual – produces higher levels of performance than a fixed, pre-selected pace, whether it is fast, medium, or slow.
Contextualisation: Necessary for results

Even in experienced individuals, learning usually occurs in a contextually-specific manner (Molesworth, Tsang, & Kehoe, 2011; Tulving & Thomson, 1973). As a result, knowledge and skills stored in memory are not easily applied to novel circumstances, even when appropriate. This difficulty in transfer is often a source of frustration to instructors alike, giving rise to indignant statements beginning, “You should have known that ……” Despite this frustration, contextual encoding means that, under the 70|20|10 principle, all its components must be well aligned with the circumstances in which the learning will be used.

Figure 4 illustrates this point. A group of qualified pilots was given rehearsal in a simulator to conduct a search for a target on the ground (cars) while remaining above 500 feet as dictated by Australian aviation rules. They were tested a week later in searches for the original target (cars) and new targets (a train, a truck). Another group of pilots was given the same task but without prior rehearsal. As can be seen in the right side of the figure, the rehearsed pilots applied the 500-ft rule and generally stayed above that minimum. However, when the target was changed, the pilots did not consistently apply the rule and, on average, descended to about 400 ft. They only applied the rule slightly better than an unrehearsed group, who should also have obeyed the rule. The unrehearsed group descended to an average of 300 ft.

**Figure 4: Contextual specificity.**
The figure depicts the mean of the minimum altitude above ground that the rehearsed and unrehearsed pilots attained when searching for different targets on the ground. The rehearsed pilots had previously been given a flight searching for the cars. As can be seen, they only consistently complied with the 500-ft minimum rule for the rehearsed target. All pilots were aware of the rule.
Conclusion

Worthwhile implementation of the 70|20|10 principle is challenging for all concerned. Learning requires a sustained, active engagement of the individual. At the same time, learners cannot usually be left to their own devices. Their efforts, especially at the start of each new set of problems, need guidance and support aligned with their current on-the-job assignments.

Managers, mentors, and coaches should be prepared to stay well attuned to the learner's task and be able to offer specific job-related advice, especially applicable examples, while at the same time having the patience to allow the learners to progress up their individual learning curve at their pace.

For the learning-and-development specialist, formal training should be individualised as far as possible to help its application to the learner's on-the-job tasks. Likewise, collective classroom training, even if it cannot be highly individualized, should be aligned with the organisational culture and work patterns. Generic classroom training that is merely “delivered” will be rarely transferred back to the job, except in the most haphazard, inefficient manner.
References


