DELIBERATE PERFORMANCE: ACCELERATING EXPERTISE IN NATURAL SETTINGS

Peter J. Fadde, PhD | Gary A. Klein, PhD

Deliberate practice—meaning drill-like practice under the direction of a coach—is key to developing expertise in sports and music. But working professionals and businesspeople typically have no time for practice. We propose deliberate performance as a type of practice that professionals and businesspeople can pursue while they work as a way to accelerate their progression to becoming experts. Four deliberate performance exercises are described: estimation, experimentation, extrapolation, and explanation.

COMPETENCE IN ANY business or professional domain requires mastery of a body of knowledge and a variety of job skills that are typically acquired through professional education and on-the-job training. Expertise, however, is often characterized by tacit knowledge and intuitive decision making that are assumed to come only with extensive domain experience. But sometimes "experience" is just not fast enough. Expansion might create an influx of new team members who need to get up to speed. Emerging business or product lines may require everyone to increase their skill levels. Turnover, particularly with the retirement of senior leaders, can put pressure on others to step up. The failure to get people up to speed can ripple through a team. Performance and coordination suffer, and obsolete practices are passed on to newcomers. These kinds of pressures put a premium on methods to build expertise at all levels of an organization rapidly.

As we search for methods of accelerating expertise, it is natural to look to theories of expertise and expert performance that have been developed through academic research and have recently entered public and business awareness as well. At the academic level, the 900-page *Cambridge Handbook of Expertise and Expert Performance* (Ericsson, Charness, Feltovich, & Hoffman, 2006) collects over 20 years of research studies in domains of expertise ranging from music to sports to aviation to nursing to firefighting to physics. On the business level, Ericsson, Prietula, and Comely (2007) have described the implications of expertise research to professionals working in the business community in their *Harvard Business Review* article, "The Making of an Expert." Colvin (2006) elaborated on those ideas in a *Fortune* magazine article, "What It Takes to Be Great" and later expanded the ideas into the *New York Times* best-seller *Talent Is Overrated* (Colvin, 2008). Malcolm Gladwell's *Outliers* (2008) and Daniel Coyle's *The Talent Code* (2009) are among other books that are popular among business readers and draw on academic theories of expertise and expert performance.

All of these books, articles, and studies emphasize the role of deliberate practice, often citing the benchmark of 10 years or 10,000 hours of *deliberate practice* to develop expertise in a particular domain. Deliberate practice is defined as activities that are specifically designed to improve domain-specific skills. It usually involves direction by a coach and typically targets deficiencies in order to improve performance (Ericsson, 2006). Thus, even highly skilled musicians continue to schedule sessions with their coaches who critique their technique and assign practice exercises. They also spend most of their time on the portions of a piece that are giving them the most difficulty. Similarly, top tennis players retain coaches who look for weaknesses in their game that they can work on between tournaments. Deliberate practice is marked by repetition and successive refinement of individual skills. Frequently it involves setting goals for practice sessions and then monitoring performance to try to achieve these goals.

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LIMITATIONS OF DELIBERATE PRACTICE

Significantly, deliberate practice does not include on-the-job performance. In music and sports, the two areas that expertise researchers have studied most extensively, performance on the stage, field, or court does not count as deliberate practice. Rather, it is the everyday practice activities that musicians and athletes of even the highest rank engage in that best represent the concept of deliberate practice.

And therein lies the rub. Few professions outside music and sports have a culture of practice (MacMahon, Helsen, Starkes, & Weston, 2007) that demands and supports deliberate practice activities. Professionals and businesspeople, of course, pursue continuing education and professional development activities, such as reading and contributing to professional journals; attending conferences; and receiving training in organizational procedures, management, and leadership. In addition, organizations increasingly are recognizing and facilitating mentoring relationships in the area of leadership development.

As critical as these professional development activities are to the development of domain expertise, however, they do not meet the criteria for or fill the role of deliberate practice as embodied in the domains of sports and music. Even with the clear potential to accelerate the development of expertise, it seems impractical to expect professionals and businesspeople to practice in addition to doing their jobs. Few of them are likely to engage a coach and pursue practice activities specifically designed to improve their performance, such as setting goals for practice sessions and then engaging in repetitions (i.e., drills) in order to reach these goals.

Moreover, most of the examples of deliberate practice involve motor or perceptual-motor skills, whereas most of the skills needed in professional and business jobs involve knowledge work. The recommendations for deliberate practice offer an inviting path to expertise, but they are impractical for the great majority of professionals and businesspeople. Therefore, we are extending the notion of deliberate practice to include learning activities that allow professionals and businesspeople to build expertise while they are performing their work. We call it *deliberate performance.*

DELIBERATE PERFORMANCE

We define *deliberate performance* as the effort to increase domain expertise while engaged in routine work activity. As opposed to deliberate practice, which guides the use of off-line sessions, deliberate performance seeks to guide the learning process online for people who lack the opportunity to engage in deliberate practice. Deliberate performance is closer to just-in-time training that uses job situations as opportunities for learning. Like just-in-time training, deliberate performance is more appropriate for people who are already competent in their jobs than it is for initial learning by novices. The difference between these two approaches is that just-in-time training usually focuses on learning particular skills and procedures, whereas deliberate performance focuses on building the tacit knowledge and intuitive expertise that are associated with extensive job experience.

To illustrate the difference between just-in-time training and deliberate performance, consider a bank loan officer who has been on the job for some time and has largely mastered the variety of loan applications her bank offers. If the bank develops a new type of loan, she may well access just-in-time training on the procedure for completing the new loan application at the time that she first encounters a customer for whom the new type of loan is appropriate. While the new loan application procedure would certainly be added to the off-line training of new loan officers, it is reasonable for the experienced loan officer to be trained online in the context of actual job performance.

The loan officer can also pursue deliberate performance activities in the course of routine job performance. Rather than initially learning a new procedure, however, the focus of deliberate performance is on finding ways of building the tacit knowledge and intuitive expertise associated with experienced loan officers and with higher-level jobs that involve approval of loans in addition to loan processing. While loan approvals at her bank certainly follow formal decision heuristics, it is likely that the process also involves tacit knowledge of the bank's culture and characteristics of loan applicants that are not formally codified but are part of the approval process.

The loan officer can build her tacit knowledge and intuitive decision making by exercising them. For example, she can systematically predict which of the loan applications she forwards will be approved. When her prediction is off—in either direction—she attempts to understand the decision. Was the approval decision consistent with previous decisions

on similar applications? She might check a comparable loan application and consider whether there is a key but nonobvious difference between the two applications. Alternatively, conditions may have changed in the economy or within the bank that led to an unexpected loan approval decision.

This type of deliberate performance exercise may help the loan officer improve performance in her current job of helping customers complete loan applications. However, the far greater benefit is in leading her to consider tacit as well as codified aspects of the loan approval process at her institution, thereby building her mental model and improving what in sports would be called "next-level skills" as a loan officer.

In this article, we describe four types of deliberate performance exercises that professionals and businesspeople can use to build their tacit knowledge and intuitive expertise while performing routine job tasks. We believe that these deliberate performance exercises can help them become reflective practitioners (Schön, 1983) who advance their own careers and improve the organizations they work for by becoming experts.

We consider *expert* to be a level of performance that is the reasonable expectation of a career spent in a particular domain. In the ancient guild model, deliberate performance was intended to hasten the transition from journeyman to expert.

As to what aspects of expertise to target, expertise researchers in domains such as sports (Williams & Ward, 2003) and aviation (Endsley, 2006) have found that experts often have superior situation awareness that is built on tacit knowledge and enables rapid and largely uneffortful (i.e., intuitive) decision making. Research suggests that situation awareness can be systematically trained (Fadde, 2009, 2010), and we target it to help performers more quickly develop intuitive expertise.

DELIBERATE PERFORMANCE EXERCISES

Traditionally the necessary conditions for skill learning are repetition, timely feedback, task variety, and progressive difficulty. These four elements characterize the behavioral drill-and-practice type of learning (Alessi & Trollip, 2001) that is associated with deliberate practice in music and sports. Our challenge is to provide these conditions in the context of deliberate performance:

- *Repetition* is addressed by developing exercises that use everyday work activities and also by including observation of other performers as well as self-observation. Deliberate performance exercises can be engaged in before, during, and after meetings, client or patient interviews, sales presentations, and other business activities. Superimposing deliberate performance exercises on actual work situations also requires that the exercises not intrude on performance of the particular job tasks. This need not be a problem. Consider the example of a truck driver who wants to become more skilled at backing his trailer into certain types of cramped loading docks. He is not likely to have the time or opportunity to spend 30 minutes or an hour practicing regularly. But he will be in a position to work with these kinds of docks, perhaps over several weeks instead of intensively for an hour. The driver will likely have a chance to observe other drivers as well, perhaps while waiting for them to finish up. Learning to use the observed performances of others as deliberate performance opportunities can multiply the number and variability of practice repetitions.
- *Timely feedback* can be a challenge because some tasks may take weeks, months, or even years to prove out, and the longer the delay of feedback is, the more difficult it is to connect feedback to performance (Klein, 2009). One way around this problem is to focus on process rather than product. People can get immediate feedback on process. Thus, a person writing a report can monitor the time taken to get it done, the amount of work that has to be redone, and so forth. Even if the report is not officially reviewed for months, the writer can still learn something from the experience. In general, timely feedback on deliberate performance should not depend on performance review by a supervisor, trainer, or subject matter expert (with some exceptions, such as the review of a draft report). Nonexpert feedback can come from an unambiguous measure, such as the time for completing a task, or can be self-generated judgment. Too often we prepare trainees to depend on external feedback, leaving them vulnerable when they move out of a training environment into an operational environment and have to develop their own source of feedback.
- *Task variety* is important to prevent people from fixating on the way they identify the problems and prevent them from fixating on routine strategies. In natural settings, tasks are performed in varying contexts, so task variety is the norm. Thus, task variety is a counterpoint to repetitions. Even in highly procedural tasks, there is still value in exploring alternative techniques to accomplish the same job. For example, a truck driver might observe that another driver sets up his mirrors differently and might try that same mirror setup to explore how it works.
- *Progressive difficulty* is achieved naturally in many situations because people are given tougher jobs once they have mastered easier ones. Sometimes learners can take the initiative to volunteer for challenges at the next level.

Deliberate performance draws on the natural inclination of developing experts to seek out challenge by making routine tasks increasingly more challenging, and therefore creating opportunities for reflection and growth.

In summary, deliberate performance exercises should:

- Be tied to everyday job performance (without adding excessive time)
- Not impinge on the performance of the job task at hand
- Offer varied repetitions with timely feedback
- Not require expert judgment for feedback

We propose four types of deliberate performance exercises that meet these criteria: estimation, experimentation, extrapolation, and explanation. In practice, people are likely to combine these four types in designing exercises to fit their everyday job tasks and their self-improvement goals. We describe each type of exercise and then provide several examples of typical professional and business work situations that can be used for deliberate performance.

Estimation

Estimation of the time or resources needed to complete a task or a project is an important skill in many professional and business jobs. Beyond the job-specific value, estimation exercises also provide a way to improve awareness of the interrelated elements in a task or work environment.

The design of an estimation exercise was illustrated in a workshop on intuitive decision making conducted for the U.S. Marines (Klein, 2003). Rifle squad leaders at first claimed that they did not make decisions; they only executed decisions made further up the chain of command. When prompted to make a list of routine logistic decisions, however, they came up with more than 30. One was the need to estimate the length of time to move their squad by foot from one position to another. They claimed that this was a highly important judgment; if they underestimated the time, they would be subjected to a barrage of radio calls trying to determine the reason for the delay. In addition, some maneuvers required tight coordination and depended on accurate estimates.

Although a rule-of-thumb is available (2.5 kilometers per hour), the actual duration of troop movements clearly depends on terrain, weather, the presence of enemy forces, and a host of other factors. Thus, the judgment was fairly difficult. Yet despite its importance and difficulty, they never practiced making the judgment, and it was easy for them to practice. The Marine squad leaders simply needed to note their estimated duration for a planned troop movement and then compare it with the actual time after the maneuver (see Exhibit 1). They could get immediate feedback and also engage in diagnosis to see what they had missed if their estimate was off. With enough repetitions, the Marine squad leaders could build their speed in moving a unit and also their intuitive sense for time-distance relationships.

The troop movement estimation exercise is a good example of deliberate performance because it builds tacit knowledge and intuitive expertise, it is easily superimposed on routine job performance, and feedback is timely and unambiguous. Repetitions and variety can be increased and the time-distance estimation skill generalized by having the Marine squad leaders estimate the duration of other squad leaders' maneuvers in addition to their own. Sharing these estimates and outcomes makes a rich body of feedback widely available, inviting deeper analysis by individuals or the group.

In a more traditional business setting, Klein (2009) described how he deliberately sought to improve the revenue estimates he generated each year for a small company that he founded. His initial estimates were unpleasantly inaccurate, but with repetition, and especially by diagnosing the reasons for his inaccuracy, he was able to achieve a surprisingly high level of accuracy in his estimates.

Estimation exercises need not involve work activities in which estimation is a direct skill. For example, business meetings offer a context to practice estimation skills. If an agenda is issued before the meeting, the learner (meaning a professional or business person who is self-directing learning activities) can note the time that she expects will be taken by each agenda item and also estimate, on a scale of 1 to 5, the degree of resolution that each item will receive. Although estimating meeting agenda outcomes

EXHIBIT 1 ESTIMATION EXERCISE CHART

INSTANCE	VARIABLE	ESTIMATED	ACTUAL	DISCREPANCIES
Noncombat, 20 men, armor	Time	2.5 hrs	3.75 hrs	Road breaks slowed armor. Should have noticed in aerials and accounted for in estimate.

With enough repetitions, the Marine squad leaders could build their speed in moving a unit and also their intuitive sense for time-distance relationships.

does not have the direct utility of estimating troop movement times, it does lead to increased awareness of what types and depths of topics can be reasonably dealt with in a specific amount of time and what circumstances lead to topics being adequately or inadequately resolved. Such skills may be directly applied when the learner is planning and managing a meeting of her own. In addition, she improves her sense of how people with different interests and agendas interact in a meeting.

We recommend initially conducting estimation exercises when learners are participating in, but not managing, a business activity in order to build situation awareness. Metacognitive self-awareness is more advanced and can be addressed by practicing estimation when the learner is in control of the meeting.

Experimentation

Experimentation is "probably the most important learning process we engage in" (Schank, 2009). Practitioners try a new way of doing something and, on seeing the results, adopt the new way, reject it, or adapt it and try again. Much is made of the logical categories of induction, deduction, and abduction, but trial-and-error learning is easily on a par with the others as an important aspect of reasoning and discovery.

Schön (1983) describes experimentation as essential to developing reflection-in-action and describes three kinds of reflection-in-action experiments: "When action is undertaken only to see what follows, without accompanying predictions or expectations, I call it *exploratory experiment.* Exploratory experiment is the probing, playful activity by which we get a feel for things" (p. 145). Next are *move-testing experiments* in which a person takes an action in order to produce an intended change. The move is affirmed or negated based on how it achieves the intended change and the desirability of the additional changes that might accompany it. For example, giving a child a quarter to stop crying will likely produce the intended result of stopping the child's crying. But it may have the undesirable effect of producing an expectation in the child of being able to "earn" more quarters by crying more often. A third kind of reflection-in-action experiment is *hypothesis testing,* which tries out and compares competing hypotheses.

Routine experience can spontaneously generate experimentation, such as when a professional truck driver's usual route is unavailable and the driver must use his knowledge of the area along with navigational intuition to improvise a new route. The experimental route may be successful and generate an adaptation to the driver's standard route. Or it may fail because it takes too much time or trouble. Either way, the experiment expands the driver's navigational sense.

These three experimentation strategies create more opportunities for experimentation than natural experience might generate, such as adding an arbitrary time limit on completing a routine task just to see what happens (exploratory experiment) or trying a new strategy, such as a Marine squad leader seeking to reduce transit time by 20% through the use of a new scouting method (move-testing experiment). A meeting agenda can become an opportunity for experimentation if the meeting planner alternates putting a high-priority item first or last on the agenda to see if the time spent on the item or the level of resolution is improved (hypothesis testing).

Organizations such as WalMart and Google pilot-test new ideas in limited markets in order to learn more. For deliberate performance, the pilot tests are done during a work activity to try new variations and strategies. Experimentation can come into play when a performer hits a plateau and then becomes a learner. Rather than continuing to rely on the same strategies, a learner might deliberately abandon these strategies, trying some alternative methods that others have described. By exploring different ways to do the same thing, learners can strengthen their mental models of how to get things done.

Learning through experimentation is good for both maintaining and developing expertise. Although it is often desirable for a professional practitioner to become a specialist by encountering certain types of situations again and again, the repeated performance that deepens the performer's automaticity and reduces errors also decreases learning because of lack of surprise. The purpose of deliberate performance experimentation, then, is to generate more surprises and more opportunities for reflection-in-action.

Extrapolation

Extrapolation refers to the way people recycle prior incidents, including examples they have heard from others,

The primary goal for extrapolation is not to avoid repeating any mistakes but to build a stronger mental model. Therefore, the details of the prior incident are not as important as the lessons that can be extracted from what could have happened.

to extract lessons learned. Surprises lead to reflection, and failures lead to the most intense—and therefore most valuable—reflective learning experiences. However, in many domains of performance, failures are (fortunately) relatively rare. Air traffic controllers and airline pilots log thousands of incident-free hours. But the same controllers and pilots experience near misses much more regularly. Indeed, the Aviation Safety Reporting System (http://asrs.arc.nasa.gov/) maintains a database of near misses that "captures confidential reports, analyzes the resulting aviation safety data, and disseminates vital information to the aviation community." Although the system represents an ideal, it still illustrates the value of learning from potentially catastrophic events, particularly in settings where people do not fail often.

The primary goal for extrapolation is not to avoid repeating any mistakes but to build a stronger mental model. Therefore, the details of the prior incident are not as important as the lessons that can be extracted from what could have happened. We are not suggesting that the details of the prior incident do not matter. But skilled performance grows out of understanding causal relationships, not recalling details.

Working professional and business performers can find incidents in routine job performance that had enough "red flag" conditions in place that one more unanticipated or undesirable condition could have triggered a failure. Learners can ask themselves where they, or somebody they are observing, could have lost a client or a patient or a negotiation and learn deeply from those real or imagined near misses.

Extrapolation exercises can help to counter the inertia effect—the tendency to do things as they have been done. Learners can imagine a sequence of events, based on daily job situations, in which failure resulted from things being done "as they always are" (Thaler & Sunstein, 2008) and try to imagine an alternative strategy that might have worked better. And, of course, instances of failure are a rich, if unpleasant, opportunity for "woulda coulda shoulda" ruminations.

Lovallo and Kahneman (2003) have described an outside view perspective that is a form of extrapolation. A planning team, in reviewing cost and schedule estimates for a new project, can search for related projects; if these other projects took longer or cost more than was planned for, the planners of the new project can ask why it will be different this time. By engaging in this outside view, the team is recycling prior incidents and using them as a basis for learning.

Explanation

Explanation is routinely pursued by professionals and businesspeople who want to improve their performance and domain expertise. In a group context, conducting an analysis of a recent meeting or a sales presentation has clear value. It is (or should be) done naturally in the course of job performance and is intended to improve future performance on similar job tasks. Our primary interest in explanation within the context of deliberate performance is showing how estimation, experimentation, and extrapolation can generate more opportunities for reflective explanation, either internally by individual performers or with team members.

We note that explanations sought for deliberate performance purposes are not necessarily accurate. Klein and Hoffman (2009) have described a research program aimed at explanation in natural settings where there is no single answer. As opposed to situations that allow detectives to solve a crime (there is a culprit) or medical professionals to diagnose an illness (there is a disease), most professional and business situations are indeterminate. Thus, a major challenge for deliberate performance is to practice making sense of the available feedback (see Klein, 2009, for a discussion of the difficulties of interpreting feedback).

PRESENTATION EXPERTISE AS AN EXAMPLE OF DELIBERATE PERFORMANCE

Many professionals and businesspeople would like to be more effective and engaging presenters. Achieving these goals certainly involves specific presentation skills, which can be improved through offline deliberate practice. Indeed, many executives pursue training in public

speaking and even acting in order to improve their presentation skills (Colvin, 2008). Presentation skills can also be improved online by seeking out presentation opportunities in the work environment and overlaying deliberate performance exercises—for example:

- *Estimation:* Predict the duration of your presentation or the length of time needed for each portion of the talk. Predict the audience reactions to various parts of the presentation, and verify these predictions using feedback forms or the opinion of a trusted observer. Repetition and variety can be added by taking a peek at colleagues' slides and predicting if and when they will run out of presentation time or audience attention.
- *Experimentation:* If you have an opportunity to give a talk several times, try it with and without slides. Try inviting questions during the talk or reserving questions for the end. Try injecting different examples to see audience reactions. In other words, keep "fixing" a presentation that may not appear to be broken just to see if you can make the presentation better and become a better presenter.
- *Extrapolation:* Listen to other talks at a conference specifically in search of effective techniques that you can use. But also be highly attuned to moments when the observed presenter seemed to be losing the audience for a moment. Extrapolate that moment to a worst-case scenario, such as attendees walking out on a presentation. What conditions might lead to such a catastrophic presentation failure? Are some of the same elements in place in your own presentations as seeds for disaster? Learn from the failures, or potential failures, of others.
- *Explanation:* Seek out the judgments of others as to why an observed or delivered presentation was particularly successful or not. Seek explanations from both experts on presentation skills and also typical target audience members.

CHALLENGES FOR DELIBERATE PERFORMANCE

Despite opportunities to increase skills, people commonly get stuck and fail to progress beyond a mediocre level of performance. They do not try new behaviors, view problems in new ways, seek out different kinds of feedback, or develop better self-understanding or situation awareness. One reason for these kinds of fixations is that their work does not provide incentives or encouragement to get beyond the journeyman level. The work is not sufficiently engaging to stimulate an expertise reflex. Someone who might practice diligently to increase a bowling average or success at poker is not necessarily moved to practice in the workplace. We will set aside motivational and organizational factors here and address two specific aspects of developing expertise even when people are engaged by the tasks: feedback and coaching.

Feedback

Feedback is difficult to obtain and interpret in natural settings (Klein, 2009). One problem with it is the difficulty of obtaining feedback on tacit knowledge. We do not have direct ways to measure the quality of our mental models or our perceptual skills. Therefore, we have to make inferences based on cruder feedback, usually about the outcomes of our performance. Because feedback tends to be about the outcome, not about the process, people are left to puzzle out what they did wrong and diagnose the reasons for their failures. Also, feedback is often distorted: if a supervisor dislikes a product, it may be because the product was poorly implemented, or it could be that the supervisor was angry with the person or was in a bad mood. If a presentation goes poorly, as evidenced by low performance ratings, it could be that the delivery was poor, or the ideas were not good enough, or the ideas were too revolutionary for the audience, or the room was too hot or too cold, or the talk was scheduled at a time when audience members were fatigued.

On top of these difficulties, people may be unwilling to accept feedback. Leaders may resist negative feedback by becoming defensive or by becoming fatalistic (*There was no way for anyone to succeed at that job,* they may think). In many situations, though, feedback about flaws and failures offers rich opportunities for learning. Failures can help people discover flaws in their mental models (Klein, 2009). A deliberate performance mind-set seeks to harvest these lessons, whereas a defensive or fatalistic mind-set seeks to deflect them. Deliberate performance helps performers overcome natural defensiveness and learn from mistakes in the context of low-risk exercises that are judged only by the performer for the purpose of self-improvement.

Deliberate performance depends on the ability to navigate through these difficulties, draw inferences, and make diagnoses based on outcome data. The challenges of obtaining and understanding feedback explain why so many people remain fixated at a mediocre level of performance. If they are content with mediocrity, they can take refuge behind the ambiguities of feedback. But when they sincerely want to gain mastery, they can frequently find ways to use the available practice situations and the available feedback. Deliberate performance reduces these sizable challenges to the level of exercises.

Deliberate performance principles help professionals and businesspeople coach themselves by designing their own practice opportunities out of work routines and providing their own feedback.

As in physical conditioning or weight training, substantial improvement can be achieved through small but consistent behaviors.

Coaching

Coaching is an essential component of deliberate practice. We see it in the proliferation of music and athletics coaches. However, coaching is not as common in professional and business settings. In an ideal situation, teachers, trainers, instructional designers, and human performance specialists would help to design, monitor, and reward programs of deliberate performance. That can happen through organizational or individual initiatives. A Wall Street trader might arrange for a trusted manager to oversee her performance on the trading floor and even pull her off the floor if she seems to be struggling. Such opportunities for expert coaching should certainly be pursued whenever possible. But as corporate coaching guru Jane Creswell (2008) notes, "Coaching takes advantage of just-in-time learning . . . in order to discover new insights" (p. 5). Since an expert coach is not always available at just the right time, learners must often be their own coaches.

Deliberate performance principles help professionals and businesspeople coach themselves by designing their own practice opportunities out of work routines and providing their own feedback. While deliberate performance is designed to work without expert feedback, it can also be used to make more efficient use of expert feedback when it is available. For example, a fireground commander notes that, early in his career, he tried to anticipate what his commander would do in difficult situations. Often he was right, but sometimes he was wrong, and on those occasions, he would circle back to his commander once they were back in the station and ask for the rationale. Because he had made an exercise out of predicting his commander's decisions, he could ask pointed questions that allowed him to get maximum benefit from the commander's coaching with minimal intrusion on the commander's time.

The dialogue with a coach will be different in deliberate performance than in deliberate practice, where the coach usually takes control of the sessions. The self-coaching learner is more likely to have informal access to just-in-time coaches during meals or work breaks. Rather than asking for overall performance critique, the learner who is engaged in a deliberate performance approach can seek less comprehensive, but potentially more revealing, input from the expert. For example, a learner might relate a recent near-miss work experience and then ask more experienced or higher-positioned coworkers for recollections of similar mistakes that they made early in their careers. Such stories often reveal the implicit knowledge and intuitive expertise that come with the hard lessons of experience.

CONCLUSION

The deliberate performance framework is consistent with experiential learning theory (Kolb, 1984), which emphasizes four processes: starting with concrete experience, then reflective observation (which aligns with the process we have described as explanation), and then on to abstract conceptualization in order to prepare for future application of the learning (an extrapolation), and including active experimentation (which aligns with the experimentation process we have described). Allen and Kayes (in press) have used experiential learning theory to understand the way U.S. Army small unit leaders in Iraq developed leadership skills. They found that in addition to these four processes, the learning was also marked by intense emotional responses, particularly during successes and failures.

Consistent with experiential learning theory that describes how people learn through experience, deliberate performance provides an instructional method designed to accelerate the process by making it more systematic, that is, more drill-like (in the fashion of deliberate practice). In cases where typical job performance is routine, deliberate performance exercises can add some intensity—and therefore learning value—by introducing an element of surprise. In some cases, such as the unit leaders in Iraq, deliberate performance exercises may also provide a way to lessen the intensity of highly stressful on-the-job performance by treating successes and failures as learning opportunities to develop the expertise of the performer.

Whether in the heat of an active military theater or more typical professional and business contexts, conducting a program of deliberate performance can open a window to systematically building the tacit knowledge and intuitive expertise that are widely valued but are generally assumed to come only with innate talent or amassed experience. Deliberate performance not only targets these elusive aspects of expertise, but does so at very low cost for both individual performers and their organizations. Professionals and businesspeople do not need to be pulled from the field for offline training. Instructional designers do not need to simulate the workplace in a workshop setting. Subject matter experts are not asked to generate direct instruction for intuitive and reflective skills that are best learned implicitly. Rather, human performance and training professionals can cultivate conditions of learning that lead performers to codify the tacit knowledge that they acquire in the course of job performance and become more aware of the metacognitive strategies and rules-of-thumb that underlie intuitive expertise.

We hope we have presented these exercises and examples in enough detail for the principles of deliberate performance to be clear, without assuming that we understand the particulars of fitting deliberate performance into the unique work situations of various professionals and businesspeople. Deliberate performance programs and exercises are best worked out by individual performers and the human performance or training professionals in their organizations. We invite an iterative exchange of theory and practice so that we can learn more about the real-world application of deliberate performance principles and methods.

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PETER J. FADDE, PhD, is an associate professor of instructional technology and instructional design at Southern Illinois University-Carbondale (http://web.coehs.siu.edu/units/ci/faculty/pfadde/). He earned his doctoral degree in instructional research and design from Purdue University. He worked for many years in video analysis for major sports teams and has conducted research in the training of perceptual and decision skills in sports. He has developed expertise-based training as an instructional approach that repurposes the methods of expertise research in order to train expertise and expert performance in professional education and practice. He may be reached at fadde@siu.edu.

GARY A. KLEIN, PhD, is a senior scientist at MacroCognition LLC. After receiving his PhD in experimental psychology from the University of Pittsburgh, he was an assistant professor of psychology at Oakland University and then a research psychologist for the U.S. Air Force. In 1978 he founded his own R&D company, Klein Associates, which was acquired by Applied Research Associates in 2005. He developed the recognition-primed decision model to describe how people make decisions in natural settings. He was instrumental in founding the field of naturalistic decision making. He has written *Sources of Power: How People Make Decisions* (1998), *The Power of Intuition* (2003), *Working Minds: A Practitioner's Guide to Cognitive Task Analysis* (Crandall, Klein, & Hoffman, 2006), and *Streetlights and Shadows: Searching for the Keys to Adaptive Decision-Making* (2009). He may be reached at gklein@ara.com