Learning at the Moment of Need

An examination of the practical and financial benefits of process-embedded learning technologies and practices.

"I hear, and I forget. I see, and I remember. I do, and I understand."

Confucius

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1.0 Introduction

Knowledge workers today are required to adapt to ever changing systems and procedures, and the relevancy of this knowledge is often fleeting because of rapid changes in the way companies are doing business in order to remain viable and competitive. From a business standpoint, more important than attaining knowledge for knowledge's sake is application of knowledge to help workers carry out their job tasks with greater efficiency. As Roger Schank, Director of the Institute of Learning Sciences at Northwestern University puts it, "What you know is trivial. The real issue is what do you know how to do?"[1]

In this short statement, Schank accurately summarizes one of the greatest challenges faced by most organizations today—what do our workers really *know how to do*? With the substantial technological requirements now associated with most job descriptions, how much knowledge should we realistically expect them to retain? What is the best way to ensure that they are able to gain access to relevant information when they need it to assist them in developing and maintaining their job-related competencies? How do we retain our knowledge pool when there is so much employee attrition, and, therefore, so much need for ongoing training?

An often cited study developed by Dr. Robert Kelley, Adjunct Professor of Business at the Graduate School of Industrial Administration at Carnegie Mellon University, puts the knowledge retention dilemma into perspective. Dr. Kelly concluded that in 1986, workers could retain in memory as much as 75% of what they needed to know to perform their job tasks. By 1997, knowledge retention dropped dramatically to 15%-20%. In 2006, it was estimated that as little as 8%-10% of what one needed to know to perform their job tasks could, on average, be retained in memory.[2]

Why the dramatic shift in knowledge retention? One could argue that the primary reason is that there is simply too much to know. We are bombarded with the need for application and procedural knowledge to the point that in many cases, we don't really *want* to know more. However, an equally compelling argument for the decline in worker knowledge retention is that workers are no longer really required to know everything related to their job tasks because of all the knowledge access tools that are now available to help them find information.

Search engine Google is a prime example. Although the company is only nine years old, many would be hard pressed to imagine life without Google or other search engine tools, like Yahoo and Live Search. Why? Because they have opened the floodgates to nearly instantaneous fingertip knowledge on a massive scale and in ways that were simply unimaginable and unattainable only a decade ago.

Exciting innovation that is specifically tailored to learning and that is designed to address complex knowledge access and retention challenges head on is emerging very rapidly. In some respects, we are witnessing a new frontier in learning, one that will dramatically shift how organizations develop and maintain their knowledge assets. For more than a decade, significant discussion has been centered on a concept called "process-embedded learning,"

more commonly referred to as "performance support.." Technologies that surround this concept, commonly referred to as Electronic Performance Support Systems (EPSS), have advanced, in quite dramatic fashion, to the point at which effective performance support, once unattainable for most organizations, is now an affordable alternative to traditional instructor-led training and e-learning. The purpose of this paper is to explain the concept of performance support while outlining reasons why a process-embedded solution can bring dramatic positive change to an organization by empowering workers with resources that will significantly improve their performance.

2.0 What is a Performance Support System?

The term "Electronic Performance Support System" (EPSS) is commonly used to describe a system or environment in which learning and assistance resources are embedded within the business process or workflow and are made available at the moment of need. Knowledge workers receive enabling resources that help them carry out their job tasks more effectively and independently, and without extensive training or heavy reliance on traditional forms of support.

Dr. Conrad Gottfredson, Ph.D. in Instructional Psychology and Technology and performance support thought leader, provides the following definition:

> "Performance Support is providing intuitive, tailored aid to a person at his or her moment of need to ensure the most effective performance."[3]

In her book, *Electronic Performance Support Systems*, Gloria Gery makes the following statement about the goal of performance support:

> "The goal of an electronic performance support system is to provide whatever is necessary to generate performance and learning *at the moment of need*…and to make it universally and consistently available on demand any time, any place and regardless of situation, without unnecessary intermediaries involved in the process."[4]

Many traditional forms of instruction rely very heavily on costly human interaction. Such forms of learning typically require the worker to commit workflows, processes, procedures, methodologies, principles and best practices to memory—a most daunting task in today's rapidly-changing and technology-dependent work environments.

In contrast, a performance support system, as its name implies, emphasizes improved performance—helping employees complete the task at hand—not necessarily on cultivating expert users of systems or tools, as is so often the case with course-based instruction. Performance support allows learning to be self-directed. One learns while actually performing the task. Rather than a single learning event, there are many learning moments as one uses the performance support system to continually develop his or her job-related competencies to the point at which proficiency and mastery are achieved. *Simplicity*, *relevance* and *context* are the hallmarks of a performance support system.

Is a Performance Support System the Same as a Traditional Software Help System?

Considering that the mission of an effective performance support system is to provide an on-demand, moment-of-need learning experience, many often compare performance support to traditional software help. In the most general sense, there are some similarities since both provide learning or assistance resources that guide workers through completion of software tasks.

However, despite surface level similarities, there are several major distinctions between these two very distinct types of information systems. Gery states in her book that the common denominator that distinguishes performance support from other systems is the degree to which it integrates *information, tools and methodology* for the user.[5] Therefore, unlike software help systems which are usually limited to descriptions of application-specific procedures or features, performance support is much more encompassing than simple tool instruction—its mission is to help one complete tasks *in proper context*. It typically includes a broad range of complex, interrelated tasks that may involve multiple applications or, alternatively, may not involve the use of software at all.

What Tools and Resources Constitute a Typical Performance Support System?

Performance support systems can be comprised of a variety of different types of tools and resources. Factors that determine the composition of such a system may include:

- Budget
- Size of the organization
- Intended purpose—augment formal instruction or replace it?
- Means of delivery
- State of technology within the organization
- Availability of relevant performance support technology

Although performance support can take many forms and serve many purposes, it usually consists of a mix of the following tools:

- Job aids and quick reference material
- Deeper reference material
    - Help system
    - Paper references
    - FAQ's
    - Podcasts
    - Webcasts
- Tutorials
    - Written
    - Simulations

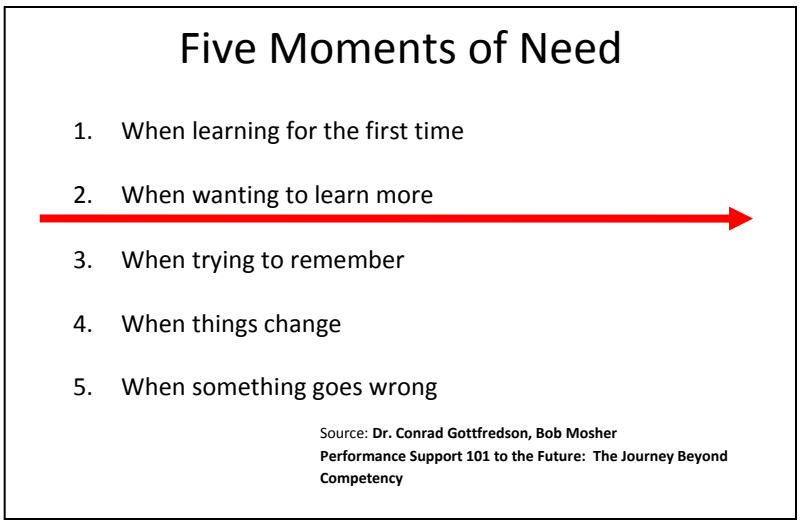
    - Other
- Live guidance tools
- Help on top interfaces
- Communities of practice
    - Blogs
    - Wikis
    - Email
    - Synchronous Web
    - Mentors
    - User groups
    - Focus groups
    - Best practices
- Content management and search tools[6]

3.0 When Learning is Needed Most—The Case for Performance Support

> "When the time to perform arrives, the time to prepare has passed."
> Anonymous

The need for learning in the workplace is never ending. Dan Peay, Vice President of Sales and Marketing at Transcensus, recently described what he calls ***2^3 (two cubed) Learning*****.** "There is never a 'right time' for learning." says Peay. "Inevitably, it is **too** early, **too** late, or **too** ineffective to meet 'readiness' needs. Too often processes and procedures are learned, but quickly forgotten when the moment to get the job done has arrived."

During a recent presentation entitled, "Performance Support 101 to the Future: The Journey Beyond Competency," Dr. Conrad Gottfredson, director of the George Washington Center for Freedom and Understanding, and Bob Mosher, Global Learning and Strategy Evangelist for Learning Guide Solutions, shed further light on this challenge by defining five primary moments when learning is most needed, as illustrated in the figure on page 7:[7]



Gottfredson and Mosher contend that most organizations expend most of their energy and budget toward addressing the first two moments of need, shown above the line in the figure above, using a mix of traditional instructor-led training and e-learning courses. However, relatively little has been done to address the learning moments below the line, which is typically where most of the learning actually occurs—by some estimates as much as 80% to 90%. Many refer to this type of on-the-job learning as "informal learning."

Informal Learning—A New Paradigm

Dr. Stanley Malcom, in his article "Less than a Penny for Learning," states: "For every dollar spent on training, only eight tenths of a penny actually affects business performance through increased staff competency."[8] Malcom also makes the following key points:

- 80% of a training department's budget is allocated to overhead costs.
- 80% of the learning that training departments deliver has no effect on performance.
- 80 % of critical job learning occurs on the job.[9]

These conclusions are supported by other learning thought leaders. Jay Cross, in his article "Informal Learning—the Other 80%," states that learning is social in the sense that we really learn more in the break room than in the classroom. Workers discover how to do their jobs in many ways, including trial and error, observation of others, asking others, calling the help desk and by simply working with knowledgeable people. Formal learning, which typically occurs in classes, workshops and online events, constitutes only 10% to 20% of what one learns in the workplace.[10]

Cross also cites a study conducted by the CapitalWorks Consulting Group, a consulting agency focused on performance and organizational strategy. A survey was conducted in

which hundreds of knowledge workers were asked how they learned to do their jobs. The results were very compelling:

- Workers reported that informal learning was three times more important in becoming proficient on the job than company-provided training.
- Workers learn as much during breaks and lunch as during on- and off-site meetings.
- Most workers report that they often need to work around formal procedures and processes to get their jobs done.
- Most workers developed many of their skills by modeling the behavior of co-workers.
- Approximately 70% of respondents want more interactions with co-workers when their work changes.[11]

The Center for Workforce Development in Newton, Massachusetts conducted a two-year performance study involving more than 1,000 people at seven companies, including Motorola, Boeing, Ford Electronics and Siemens. The study was funded by the U.S. Department of Labor, The Pew Charitable Trust and workforce development agencies from several states. Research from this comprehensive study concluded that for every hour of training, four additional hours of informal training were required.[12]

One could conclude from this research that informal learning, and not the classroom experience, is the primary way in which one both gains and maintains job-related knowledge. One could further conclude that the traditional classroom experience is simply not all that effective. Yet on average, more than 80% of training budgets are typically allocated toward support of the classroom and other course-centric learning experiences. This is, as Cross describes, the spending/outcomes paradox.[13] Companies are spending substantial resources on systems that do not have a dramatic effect on worker performance. Simply put, the money is being spent in the wrong place.

Improving Competence in the "Performance Zone"

Performance starts with competence. Gery's research cites a study from a national consulting firm that highlighted problems associated with employee incompetence. In this study, it was determined that in one strategic business unit of an organization, 60% of its employees were involved in work activities that did not bring direct value. These activities included:

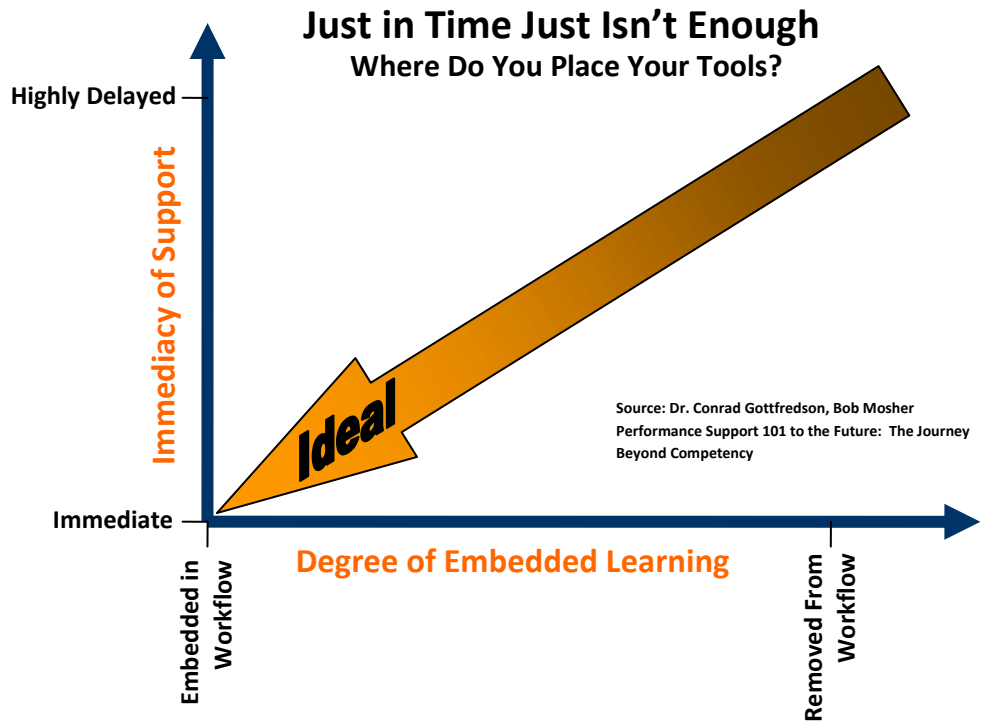
- Supervising people
- Controlling the work of others
- Reviewing the work of others
- Training others
- Answering questions at help desks or other expert support functions
- Coaching and correcting others

- Reworking other people's inadequate work
- Compensating for others
- Supporting others by joint work activities when incompetents could not perform independently
- Following up on others
- Actually doing the work of others who could or would not perform
- Conducting damage control activities
- Facilitating relationship problems that resulted from inadequate skills and work results
- Recruiting, hiring and orienting new people to replace those who left or were asked to leave because of incompetence
- And more[14]

Gery describes the place where competence occurs as the "performance zone." She concludes, "The performance zone is the metaphorical area in which things come together. It is the place where people *get it*, where the right things happen, where the employee's response *exactly* matches the requirements of the situation."[15]

P. Nick Blanchard and James W. Thacker, in their book *Effective Training: Systems, Strategies, and Practices*, claim that performance is the product of three factors: (a) motivation, (b) KSA (knowledge, skills, and attitudes), and (c) environment. They explain, "It is the combination of these factors that determines the person's performance. The likelihood of engaging in any activity, then, is limited by the weakest factor…If the environment does not support the activity or blocks it, then it doesn't matter how motivated or knowledgeable you are – you won't do it."[16]

Gottfredson and Mosher point out that traditional learning is typically not effective, because it is removed from the workflow. Support is also highly delayed because a worker must, in most cases, consult others to find information necessary to complete job-related tasks. However, a learning solution becomes much more effective as the degree of embedded learning and immediacy of support converge, as illustrated in the figure on page 10. This is the zone where real performance is achieved, and the realm in which a performance support system can play a dramatic role.



Gottfredson and Mosher also make the point that while many formal and informal learning initiatives are designed to help workers develop a greater level of competence, the real objective should be to move them beyond competence to the optimal place where innovation, organizational agility and exponential productivity occur, and where there is transcendence to proficiency and mastery.[17]

4.0 Benefits of a Performance Support System

> "He who has imagination without learning has wings but no feet."
> Anonymous

Successful companies and organizations have clear focus on both their core competencies and upon their target customer or constituency. Long term success requires consistently making the right trade-offs at the right time.

This logic, and the need for clear organizational focus, also applies to a company's learning initiatives. Employee competence and job performance, or lack thereof, can have a significant effect on a company's bottom line. If a company wishes to leverage its core competencies to the fullest extent possible, then learning that helps workers complete job tasks with the utmost efficiency is paramount to successful realization of that goal.

The Problem is finding the Right Information

Downtime due to an inability to find relevant, job task-specific information remains a huge obstacle to worker productivity. Consider these statistics from a recent IDC report:

- Knowledge workers spend an average of 15% to 20% of their time looking for information.
- Success rates are less than 50%.
- Unsuccessful searches in a company employing 1,000 knowledge workers could cost as much as $6,000,000 in time loss annually.[18]

Another survey of technology workers , in this case IT professionals and programmers, concluded that 100% of those surveyed reported having to stop working at one or more times per day to find answers and look for solutions to job-related problems. Of those surveyed, 20% reported having to stop 10 or more times per day. When totaled, this equates to at least 50 interruptions per week.[19]

The study concluded further that technology workers spend approximately seven hours per week looking for answers and researching solutions to problems. Over the course of a month, this represents more than 31 hours of technology worker downtime. When measured across an enterprise of 500 technology workers, the costs of worker downtime could equate to as much as $7.5 million per year—a staggering impact to profitability.[20]

Addressing the Problem

So how is this problem being addressed? The answer is, simply, not very well. Despite significant research that confirms that most worker learning takes place outside of the classroom, organizations continue to rely largely on costly instructor-led training as a primary solution. A recent Training Magazine industry report provided some interesting statistics pertaining to how training budgets are being allocated. In calendar year 2005:

- $51.1 billion was budgeted for formal training.
- 70% of that budget was allocated to classroom instruction with live instructors.
- $13.5 billion was spent on training products and services, up $.2 billion from the previous year.
- 26% said that training budgets were up from the previous year.[21]

Costs for continuous employee development are enormous. However, in spite of continued trends toward allocation of training budgets to formalized classroom instruction, the tide is now beginning to turn. There is significant discussion and debate in learning circles about the effectiveness of formal learning, and greater emphasis is being placed on more informal, process-embedded approaches to learning among industry thought leaders.

Performance support systems have, whether deserved or not, had the reputation of being rather costly to design and implement, which is one of the primary reasons for their only

recent emergence as credible alternatives to established training paradigms. Furthermore, the rapid emergence of performance support is being fueled by recent advances in technology. This is allowing organizations to deliver highly effective, process-embedded resources in ways that were simply not possible just a year ago.

How will Process-Embedded Learning Benefit Your Organization?

Perhaps some of the most interesting statistics on the benefits of process-embedded learning can be found in a 2006 report of IT learning technology trends produced by Ambient Insight, LLC, which arrives at the following conclusions:

- Rapid e-learning is too slow. Process-embedded learning is, by comparison, very fast.
- Process-embedded Learning products reduce content creation and maintenance costs by as much as 60-80%.
- Average cost of a help desk call in the U.S. is $125 per incident. Process-embedded learning can reduce help desk calls by 60% to 75%.
- Process-embedded learning eliminates lost opportunity costs associated with taking a user out of production to attend a training class or complete an e-learning course. [22]

Following are additional benefits that one can expect from a process-embedded, performance-centric approach to worker instruction:

- Reduced learning time
- Higher levels of worker productivity
- Less reliance on others when completing job-related tasks
- Reduction in implementation costs
- Increased worker autonomy
- Better knowledge retention
- Better customer experiences

5.0 Where is the Industry Headed?

The training industry is currently in a state of significant transition. According to the Ambient Insight report, a number of factors are driving the rather dramatic changes that are occurring in the US, including:

- Steady decline of training budgets and training benefits
- Rapid decline of internal HR and Training departments in the US
- Steady reduction of internal IT staffs and IT population in US
- Migration of staffs and budgets out of legacy buyer organizations and into outsourcer firms[23]

Ambient concludes that the old training industry—pre 9/11, dot.com meltdown, stock market crash, IT spending slowdown, downsizing and outsourcing—is gone forever. Organizations are adapting to a new reality in which greater emphasis will be placed on emerging practices and learning technologies, including location-based learning, process-embedded learning, cognitive and affective learning products and personal learning products.[24]

By 2011, the most significant gains are expected in adoption rates of process-embedded learning, virtual labs, virtual classes and live mentoring. In contrast, classroom instruction, while still the most dominant training method as of last year, is expected to decline significantly within five years. Self-paced e-learning products and services are expected to experience declines as well.[25]

Source: Ambient Research 2006 Snapshot of Learning Technology Trends in the U.S. Training Industry Report

6.0 Introducing SHO Technology

At Transcensus, all of our combined learning experience has pointed us to the vital importance of connecting learning and readiness to the immediacy of performing the task. With the dramatic changes that are occurring in the IT training industry and the ever increasing need to embed learning within the process, performance support was clearly the right focus, but existing performance support technology solutions and methodologies were difficult to use, difficult to implement, and/or too expensive.

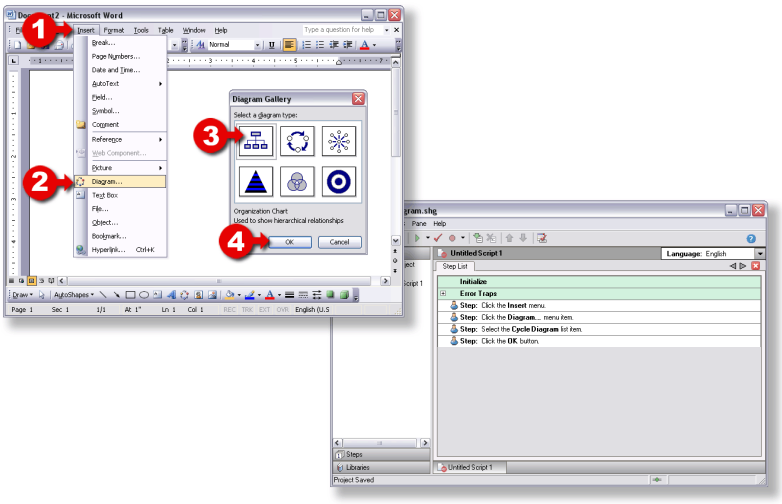
Software applications are challenged with these same issues. It often seems humanly impossible to do what we desire to do, even with advertised features of the software. Transcensus focused on both problems. We desired to put the "human interface" into software and provide moment of need performance support for the masses. Our focused effort resulted in the development of what we call SHO Technology.

Our patent-pending Scripted Human Operator™ (SHO) technology is an exciting innovation in software performance support and user assistance. It allows content developers to create truly interactive software instructional, assistance and support content that interfaces directly with windows software applications. No programming knowledge is required.

SHO content can be embedded directly within the workflow. While completing job related tasks, workers interact directly with the live software application they are attempting to use, instead of a browser, simulation window or other external training interface. In other words, the actual software application *is* the training interface. SHO technology can be thought of as a virtual instructor or tutor looking over the user's shoulder and offering step-by-step guidance inside the actual software application the user is attempting to use.

How does it work?

Using a revolutionary, award winning* performance support authoring technology called SHO Guide™, a content author starts by recording the procedure in a software application, as shown in the figure below.



Since performance support workflows can involve procedures that span several software applications, SHO Guide records the entire procedure, even across multiple applications. The SHO script can automatically launch the applications at the appropriate time. Upon completion of the recording process, SHO Guide automatically produces step-by-step instructions in up to eleven languages, including:

- Chinese (Simplified)
- Chinese (Traditional)
- English
- French
- German
- Italian
- Japanese
- Korean
- Portuguese
- Russian
- Spanish

*2007 “Extraordinary PCD Tool” Award Winner (http://www.epsscentral.com/news/2007PCDAwards)

Once recorded, content can be enhanced by doing the following:

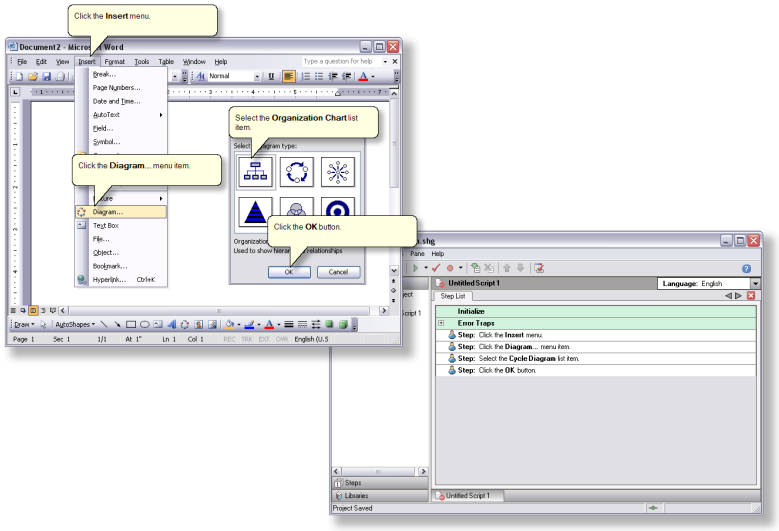
- Adding question and menu events
- Adding video, sound and graphics
- Adding arrows to draw attention to interface components
- Automating certain steps for the user
- Including state checking capabilities to ensure successful and predictable outcomes
- Linking to other SHO scripts
- Linking to documents and websites

Upon completion of the performance support resource development, content can be published to a format that can be accessed, but not edited by the software user. SHO Guide provides a simple and easy-to-use interface for publishing the finished content.

The content author can specify the languages to which to publish the content. If using video or sound in the presentation, SHO Guide also lets the author specify whether or not to embed those resources in the published file or maintain them separately so they can be referenced when needed. Published script resources can be stored in a central repository from which a user can access them over a network or the Internet, or they can be delivered with another software product or internal software deployment.

Unlike many forms of streaming content, published SHO scripts are extremely compact and efficient. The user simply performs a one-time installation of the Transcensus SHO Player, a very light weight and unobtrusive playback interface, and then launches the SHO script to begin playback of the integrated step-by-step instructions. Launch can occur from a software help system, a browser interface, a software knowledgebase, or directly from a user's desktop.

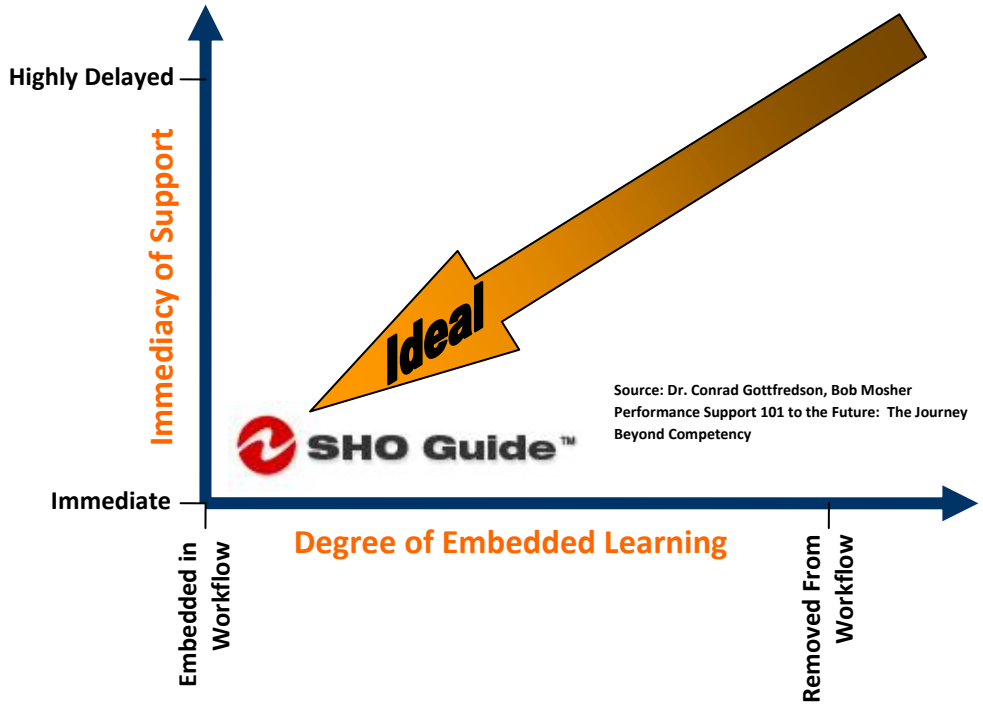
After publishing, workers are presented with instructions in the form of balloons that point at components of the interface of the *live* software application—not a simulation window—to guide them step-by-step through the procedure, as shown in the figure on page 17. Balloons can be accompanied with voice instructions if desired.



SHO technology introduces an entirely new paradigm for knowledge dissemination—fully integrated and fully interactive performance support. With SHO, an organization can:

- Reduce the need for instructor-led training
- Reduce the need for expensive e-learning and simulation
- Remove intimidation associated with software use
- Help software users make use of undiscovered features
- Reduce the need for support
- Significantly reduce software implementation and training costs
- Decrease task-completion time and increase accuracy
- Reduce new hire on-boarding time for software applications
- Reduce attrition rates
- Improve customer service
- Retain customers by improving application usability

By virtue of the immediacy of the support that it provides and the fully embedded nature of the content it produces, SHO Technology is the very embodiment of performance support technology that lives at that metaphorical place where performance happens and proficiency and mastery are achieved.



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