Real-Time Learning: Business Process Guidance at the Point of Need

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INTRODUCTION

Management guru Peter Drucker coined the term "knowledge worker" in his 1969 book, *The Age of Discontinuity*.[1] Although knowledge workers were differentiated from manual workers at that time, Drucker concluded that new industries would primarily employ knowledge workers and that in the information-based economy the role of the knowledge worker would be at the heart of all organizations. When we accelerate and fast-forward to today, the terms "knowledge worker" and "manual worker" are no longer mutually exclusive.[2] People loading product onto rail cars certainly work with their hands, but they may also contribute knowledge to the business. Toffler[3] observed that typical knowledge workers in the age of knowledge economy must have some automated system at their disposal to create, process, and enhance their own knowledge. In some cases, he argued, they would also need to manage the knowledge of their co-workers; so although knowledge workers engage in "peer-to-peer" knowledge sharing across organizational and company boundaries, forming networks of expertise around their activities,[4] they are not currently enabled enough for their activities they execute. It is not only knowledge workers who would benefit from having more and better, readily available information about their work tasks. Employees working in business processes with complex applications need more than training to attain the needed competence level. Experience shows that formal training measures will only build the foundation of what users need to be able to use the new software to its full extent.

Just 48 h after being trained, learners will recall only 30% of the learned knowledge.[5] But could the knowledge workers and learners not just look up the needed knowledge when they need it? Employees usually receive training documents, business process models, and presentation slides, and have information in wikis and blogs at their disposal. However, to look up information the user has to interrupt work and concentrate on looking for a solution to the problem at hand. The same is true for other sources employees consult to fill their knowledge gap, whether it is searching the Internet or online forums or asking colleagues (see Figure 1). Current research provides evidence that knowledge workers spend at least 38% of their time searching for information.[6] Because of all of this, users can be overwhelmed by the

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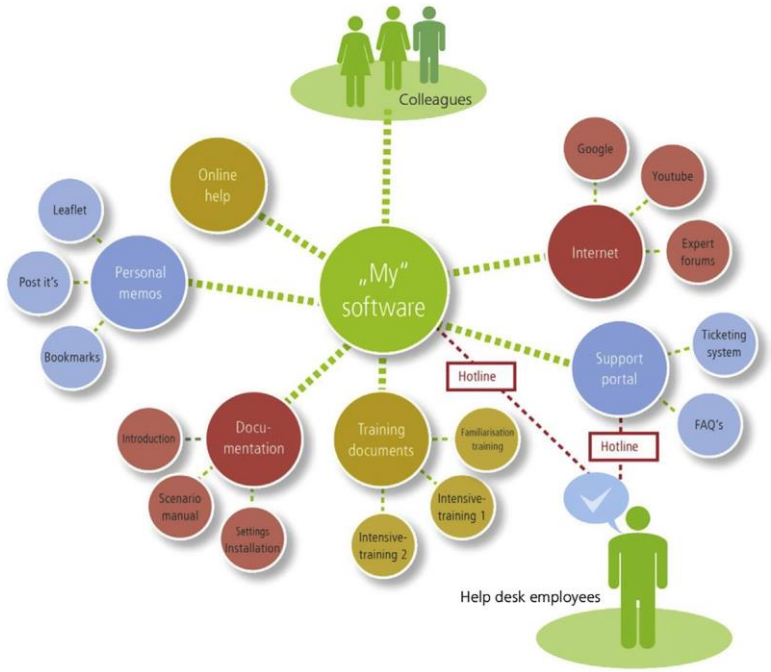

FIGURE 1

Knowledge workers have to find relevant information within a wealth of information sources.

amount of available information and lose much time until they find what is relevant for them. If users resort to trial and error, they may need even more time. As a result, productivity drops, usage errors sneak in, and acceptance of the newly introduced software system is at risk. As a consequence we see a whole new productivity, efficiency, performance management, and even effectiveness challenge for the modern organization. Thus, although there is a high level of standardization and integration enabled by automation, the potential for knowledge workers and other employees to call upon and use the embedded rules, guidelines, and knowledge is limited, hindering the organization's ability to innovate as well as harming its potential for growth.[7]

To give an example of the possible impact on an organization, such problems hit a large German clothing brand in 2006. When they replaced their outdated collection of enterprise resource planning (ERP) systems serving 2400 employees at five company sites with one new system, management expected more flexible, effective, and modern planning of clothing production. Because there are only a few delivery dates per year to dealers, production and logistics have to run reliably. However, the opposite happened. Employees were not able to use the new system correctly and made errors entering data. The wrong type and amount of

fabric was delivered to the factories, which led to interruptions in the production of clothes. Insufficient supply to dealers was one reason the company later became insolvent.

All of this shows how important it is not only to train employees before a software rollout, but also to support them directly after going live and beyond. Learning and development (L&D) teams in the human resource departments become increasingly aware of this need and are looking for solutions. A benchmark by Towards Maturity published in 2013 highlighted that L&D teams are looking to technology to help them roll out new systems and processes faster.[8] Although 81% of these teams want technology to help them implement new information technology systems, only 28% of organizations already use such technology. What is troubling is that many organizations' value creation suffers because of lack of collaboration and reuse of existing knowledge[9] by not having the ability to provide the right information when the user needs it.

Because of this complexity and these challenges, today's workers and users want knowledge and skill elements that are concise and fit their need. Most expect the information to be available in a timely manner and easy to access, i.e., the time to consume should be as short as possible, requiring the content to be in small units with specific narrow and relevant topics, i.e., pragmatic and simple usage. These are often referred to as knowledge nuggets.

What seems to be most relevant in terms of these requirements is information that is discrete, concomitant, and directly relevant to the situation. It can be provided by knowledge situated or integrated into the activities, therefore being captured and managed within a process. Because this is a whole new way of continuous improvement of the learning organization, the following sections will explain how such technology support for learning new processes and applications can be made available to process workers.

REAL-TIME LEARNING TO CLOSE THE KNOWLEDGE GAP

Bite-Sized Learning Units

Real-time learning means providing the right information exactly when the user needs it. Information is presented in small, self-contained units to support building up knowledge quickly. This concept is called microlearning and enables learning with small learning units in the work context, adapted to the user. Users can obtain learning content in the midst of the work process, fitting to their context and the problem at hand. Later, if a user is confronted with the same problem again, the content can easily be obtained and consumed again, until it has been learned well.

Microlearning content is designed to enable multiple classes of workers in such a way that it can be easily understood and learned in a short time. Because it helps to solve a current problem, it enables operational excellence, improves efficiency,

and helps to keep cost low. Furthermore, it enables self-learning, gives a feeling of success, and strengthens motivation for further work and learning. In a sense, it empowers and therefore is a new perspective on learning processes in mediated environments. Microlearning is especially common in the area of e-learning, where it caters to different learning styles and media preferences. Examples are short text explanations or video sequences, test questions, pictures, screen shots, and Web-based trainings. Also, apps, quizzes, and learning games that are commonly used on mobile devices (such as smartphones and tablets) can be regarded as a kind of microlearning content. As Theo Hug pointed out in *Micro Learning and Narration*,[10] no matter whether learning refers to the process of building up and organizing knowledge, to the change of behavior, attitudes, values, mental abilities, cognitive structures, emotional reactions, action patterns, or societal dimensions, in all cases we have the possibility of considering micro aspects of the various views on more or less persisting changes and sustainable alterations of performance.

ELECTRONIC PERFORMANCE SUPPORT: DELIVERING KNOWLEDGE AT THE POINT OF NEED

An *electronic performance support system* (EPSS) is technology for implementing the idea of real-time learning. It supplies users with small context-related learning units directly at the workplace and increases users' productivity and effectiveness. Usually an EPSS is defined as "a computer-based system that improves worker productivity by providing on the job access to integrated information, advice and learning experiences."[11] It helps reduce work process complexity and processing time, providing exactly the information a user really needs and user decision support for solving specific problems.[12]

BUSINESS PROCESS GUIDANCE

Business process guidance (BPG) takes performance support to the next level. Instead of just supporting users working with a single software application, BPG shows them an overview of all steps (in the business process in which they work) and guides them step by step through the process across several applications. Both software-based and manual work steps can be supported. BPG leaves a degree of freedom to the user regarding how to execute the process. This is in contrast to *workflow management systems* that strictly enforce each step of a process. Another difference is that BPG works well even if the applications cannot be controlled from a central system, whereas workflow management systems need tight technical integration with the applications to be able to start each application and data entry screen automatically.

COMPONENTS OF A BPG SYSTEM

A *BPG system* will be used by content authors and process workers (end users). Each user group needs a different user interface to interact with the system.

Authors create support information for each role and each step in a business process. Support information can be new written text but it also links to existing content such as user manuals, Web-based trainings, user guidelines, business process diagrams, and any other media available on the intranet or Internet. Other important media to support the use of software applications are screen shots and screen recordings. Authors connect support information to user interface elements of the supported application, such as application windows, menus, forms, and data entry fields. This will later allow the BPG system to display the relevant support information automatically when the user reaches a certain process step with the respective application window.

For each business process and role, content authors can create a sequence of user interaction steps. This will enable the BPG system to present the business process as a whole to the user and then guide the user along the process steps.

Process workers use software that detects the application, application window, and process step the user is in. Only information relevant to the current application context and business process step is shown. Such a BPG system is called *context sensitive*. In addition, users can manually search for a process, to be guided along its steps. This will help users to complete the work task. Users can then rate how helpful the content is to their need, ask questions, or suggest improvements to the content. This feedback will be forwarded to the content authors so they can answer questions and improve the support information.

BPG IN PRACTICAL USE

BPG can be applied to all kinds of business processes and application systems. Among the most common areas are support for data entry, multi-application processes, and simplifying communication with the support desk.[13]

SUPPORTING ENTRY OF CORRECT DATA

Large and medium-sized companies rely on ERP systems. They are needed to administer products, customers, orders, employees, and projects and to manage complex production, service delivery processes, and supply chains. Although many data entry forms seem self-explanatory, users can have difficulty figuring out what exactly needs to be entered in a certain input field. Consider the example of adding a new corporate customer into an application: To what industry sector does the organization belong? What is the industry sector code? In what format will the user have to enter a tax number? Do telephone numbers have to be entered with international prefix codes?

A BPG system stores organization specific knowledge and provides it to users while they work with the data entry application. The system detects which processing step the user is in and displays information that is relevant to this context.

SUPPORTING MULTIPLE APPLICATIONS

Process guidance needs to be supported across applications. This allows the business process and its parts to be described in a common platform, structure, and layout, which makes the support media much easier to understand. In any application in which they work, users can get the needed support and thus can work at full efficiency.

As an example, a salesperson creates a quote using several applications. He looks up some customer base data in, for example, the Customer Relationship Management (CRM) system. In Excel he calculates a price offer. He transfers the offer to a Word template, sends the document with Outlook to the customer, and changes the offer status in the CRM system. Classic help systems are installed together with their application and can only support this one application. Therefore, these help systems do not provide real process support. A real BPG system can provide support across applications, available at every work step. It brings business process descriptions for all applications of an organization in a common format to the employees' workplace.

ENHANCING COMMUNICATION WITH THE SUPPORT DESK

When a new application is deployed, users frequently contact the support desk, which can create a high workload on the side of the support desk. User requests can be triggered by software errors, but in most cases they are caused by user errors caused by employees' inexperience with the application or missing training on certain parts of it. Users often find it hard to explain their problem to the support desk with the required level of detail. Many cycles of the support desk asking questions to the user about the problem can occur, which is annoying to both sides and increases the time needed to solve the problem. A BPG system should allow users to send their automatically determined work context (process and process step worked on, application and screen used, and screen shot with data) together with a short problem statement to the support desk. This should be available to users while working with the application: for example, with special keys or buttons added by the BGP system to the user interface. This saves them the effort of switching to an external ticketing system and manually describing the context in detail. In a similar vein, users can comment on the support information provided by the BPG system (with their context being transmitted automatically) to ask for additional information or suggest improvements to the existing information. Both users and the support desk may benefit from such a BPG system, because users find it much easier to ask for support and send improvement requests. On the other hand, the support desk saves many clarification requests and can continuously improve

the support information stored in the BPG system based on user suggestions. This, in turn, will give future users the answers they need so they will not need to ask the support desk.

INTRODUCING BPG IN AN ORGANIZATION

Creating a Repository of Microlearning Content

A BPG system offers bespoke microlearning and is therefore not pre-filled for any one application. The learning material must be sourced and entered into the BPG system before it is made available to users. Documentation, handbooks, project groups, specialist departmental knowledge, compliance-relevant information, work instructions, and organization-specific business process know-how from process repositories and databases are all relevant content sources (see Figure 2).

Taking into account the way people learn, decisions must be made on the form of content most applicable to support a specific function or process; these could range from short texts, images and screenshots, videos, and documentation to interactive online learning modules.

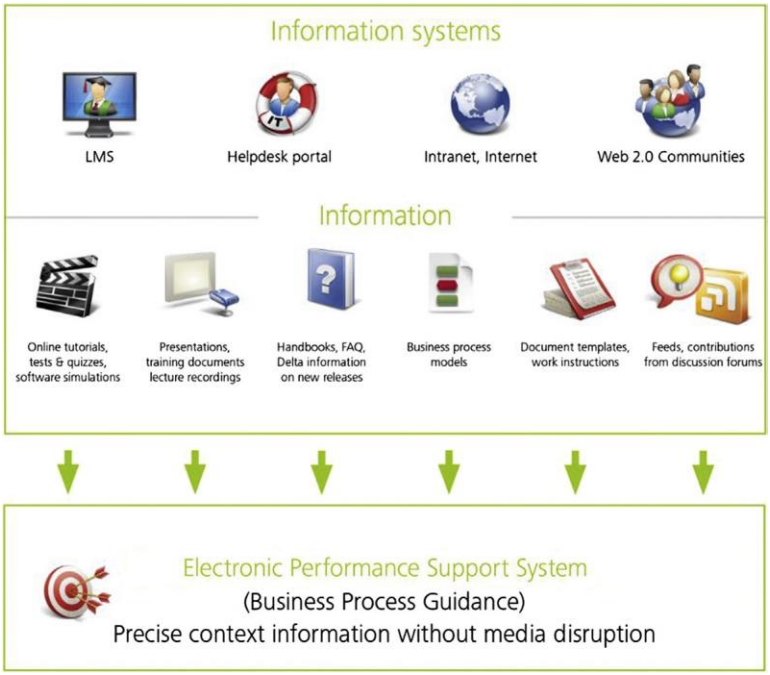

FIGURE 2

Learning content sources for Business Process Guidance.

MAJOR STEPS TO CREATE THE REPOSITORY

Based on these principles, a typical approach to create a relevant, helpful, and up-to-date repository of BPG learning content is to:

1. Define the business process, applications, and functionality to be supported by the BPG system
2. Identify the individual learning groups (according to department, function, etc.)
3. Select and gather learning content (which topics need to be covered and at what level of detail). Focus should be on the most value-adding processes and those where users have most problems in interacting with the applications
4. Upload the content to the BPG system
5. Regularly analyze requests to support desk and improvement suggestions from users and update the learning content accordingly

CONCLUSIONS AND OUTLOOK

As shown, risks of introducing applications to an organization do not stem primarily from the existing or newly introduced technology. They stem from the quality of the software-supported processes and the ability of employees to use the technology correctly.

The same BPG systems support the implementation of new applications and the update of business processes that go with it. They will reduce the effort required for training users up front and the support desk efforts needed in the introduction phase. Users will learn to use new software applications more rapidly and thus become more efficient in their process work. They will also gain a better overview of the overall process and what role different applications have in it. This is an important part in ensuring that business processes are performed as designed.

It is expected that real-time learning through BPG will grow in importance in the future:

- *More changes*: Processes and applications will change even more frequently in the future, triggering a need for training and support among the employees using them
- *More collections of applications*: Instead of one large system installed and configured on premise, we will often see a collection of applications provided as a service out of the cloud. This asks for process guidance that works across applications and that can be configured and equipped with content by the user organization
- *Social networks will be used more at work*: We will also see more knowledge sharing and peer support using social network technologies at the workplace. Social BPG will provide users with access to the social network communication channels and will help to filter and display only messages that are relevant based on the process and application context of the user
- *Users will influence provision of content*: Statistics from software usage and user feedback will become an important source for content authors to provide

additional content and improve the existing support content in the BPG system

- *BPG will extend beyond the office*: Mobile devices will bring process guidance to new areas such as repair and maintenance of machines. First prototypes are built in research projects where information and work instructions will be displayed with augmented reality techniques on top of live pictures taken through the built-in camera. Users can call experts who support them directly, seeing the machine in real time through the camera.

BPG already is a good concept to support the introduction of new processes and applications. Its potential will grow in the future as it enables the organization.

End Notes

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