Piloting the *Dynamic Learning Experience* — IBM Focuses on Providing Timely Answers

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Management Summary

The *last mile* problem - so well known in telecommunications - can also be found in the delivery of training and other forms of ongoing knowledge transfer. Enterprise workers are often isolated in distributed workplaces, partnering by email and phone calls. Opportunities to gather for classroom training are few and far between. Workdays are crammed with tasks to be done. Time for a knowledge refresh can be found – ten minutes here, a half an hour there – but these opportunities cannot be predicted. There is a need for an environment for learning on the fly, either to back up and prolong the effects of formal training or as a quick just-in-time update when opportunities for formal training do not exist. The learning must fit the time at hand. Useful just-in-time learning experiences should be sharable. IBM's *Dynamic Learning Experience* (DLE) provides that capability. If a university is a full restaurant with a wide variety of offerings and a rich ambience, the DLE is like a salad bar, providing a bowl, a utensil, and a smorgasbord of ingredients with which to make a salad to your own specifications. The two are complementary. Over the course of a career, quick, appropriately composed, well-focused answers are what are most often needed.

This is an enterprise problem. Many studies have shown that employee productivity is hampered by time wasted looking for information. Employee effectiveness is also gated by an inability to lay ones' hands (or mind) on information at the critical moment. IBM, a company of over 300,000 employees, has spent a lot of time addressing this problem. What they have delivered offers an instructive example of a solution to a productivity bottleneck. At this point, DLE is a prototype, available to customers for testing. It will soon become a licensed service asset, and IBM has plans for including it in its learning software products in the future. Primarily, it is a very good idea.

DLE was created at IBM's Research labs, tested within the company, and then deployed to serve the learning needs of IT professionals. IBM's *Education Centers for IBM Software* program, familiarly known as *ECIS*, enables IBM business partners to deliver IBM developed and authorized education. The partner instructors are required to achieve certified instructor status in order to participate in the program. Traditional classroom training and self-study had been used for enablement of the partner instructors, but there was a need for an educational vehicle that would let learners quickly get the answers to specific questions. Navigating the outline of traditional manuals was not fast enough. Moreover, as Walter Muchow, an IBM WebSphere Education Development Manager noted, many technologists like to be in control of their own learning, and DLE enables them to have that control.

The deployment of Dynamic Learning Experience within IBM is an example of delivering information at the right time in the right way, when it can be used in context and therefore more easily absorbed. It is a business story of filling an unmet need that is common to most organizations. At a pedagogical level, it is a realignment of how learning is served – a way to make learning modular, user-defined, shareable, and easy to consume. Such a flexible, reusable process could change how organizations train and how employees keep current. For more details, read on.

The Beginnings of DLE

The story of the Dynamic Learning Experience begins at the IBM T. J. Watson Research Center in Hawthorne, New York. A group of researchers, led by Robert Farrell, undertook the challenge of designing a learning management system that would give learners fast access and more control over their learning. They were inspired by the stated goal of IBM's 2002 *Speed of Knowledge* initiative: to provide **quick access** to **small amounts** of **specific information** based on a **search and compose** paradigm.

IBM Research teamed with IBM Global Services Learning (IGSL), the organization that supports learning and professional development for many thousand IBM practitioners. "The early and continued collaboration between Research and Global Services was essential to our success," said Dr. Yael Ravin, who leads IBM's research in learning. Having a large willing population of learners to test the design in early pilot phases was a key to the feasibility of the project. Feedback could be constant and pragmatic. It allowed for the redesign and testing of several alternatives.

Another key was the leveraging of standards and common practices for the use of *Learning Objects[1],* a basic set of criteria called SCORM. (See Exhibit 1, at right.)

DLE responds to learners' needs by dynamically creating courses for them. The courses are composed of modular Learning Objects, extracted from a repository. The Learning Objects stored in the repository are classified by metadata tags. These tags are the means by which objects are aggregated into courses. Tags are essential to the management of the repository - allowing new content to be added, and old content to be expired. They also provide the ability to make an information space custom-structured for the way the organization thinks, works, and grows.

At the beginning of the IBM DLE project, metadata tagging of educational materials was a quickly evolving practice. SCORM, for example specifies over 70 tags. Research focused on defining a minimal set – DLE uses 7 tags – and on automating the extraction of metadata from content. During the course of development, the metadata tagging process became more automated. Of

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[1] Think of *learning objects* as small chunks of information, characterized with standard and optional metadata attributes which indicate the subject, approach (introductory or in depth), related topics and source of the information. The amount of time they take to digest is predictable, and can be as short as a minute or two.

Exhibit 1 - Learning Objects and SCORM

Most information, *per se*, is not self-descriptive enough to be easily reused. *Learning objects* address this problem. Leaders in the development of learning objects include airlines (where an inherently distributed and increasingly lean structure begs a better way to train), government (where military units must be kept abreast of a variety of new information), as well as traditional education institutions. There is a variety of shareholders in the learning object concept: content creators and owners, content packagers, content repositories and distributors, content users (such as teachers) and content consumers (students and other end users) all have a vested interest, a point of view, and a different take on what needs to be done. The result, not surprisingly, is a massive variety of approaches and nomenclatures. The US government has weighed in with a set of requirements, defining 5 required tags and over 70 optional ones.

SCORM (Sharable Content Reference Model) is a collection of specifications and standards – a data profile - that seems to offer a common point of reference for many disparate approaches. SCORM focuses on Accessibility, Reusability, Durability, Maintainability, and Adaptability. The SCORM initiative is funded by the US Department of Defense, and is composed of industry members, IMS, ARIADNE, IEEE, and other organizations.

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the seven core tags, five can be extracted, and only two must be specified by humans. As an example, learning objectives require human input, but keywords do not.

DLE is effective at composing courses on the fly because it accesses modular Learning Objects from multiple sources. For the ECIS deployment, Learning Objects were created out of technical slide presentations, IBM Technical Manuals (known as "Red Books"), existing course material, and other reference documents.

The Prototype

By August of 2004, the time was ripe for a prototype[2] to be tested within IBM. A group of

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[2] It is important to keep in mind that this is a prototype, with all the limitations and promise that that stage involves. It does not address the security, access control, or digital rights of learning material, or the associated royalty payments. But

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Exhibit 2 - DLE in a Nutshell

DLE is a Web-based, password-protected application. It includes a course player for learners to request courses and go through them; an administrative interface for managing learning objects and repositories; and an assembly engine that creates courses based on users' requests. DLE works with content from a variety of sources - XML documents, slide presentations, Word documents, and PDF material – which it converts into Learning Objects, accessible by open standards.

Users input a query (e.g., *Web Services*) and their preferences (how much time they have; whether they'd like an overview or in-depth study, the level of difficulty, etc). DLE dynamically assembles courses out of the repository of learning objects, respecting the user preferences. The system arranges the objects in a logical order, in accordance with basic rhetorical and instructional principles, and delivers the custom course to the user. Learners can change the order if they wish. The arrangement is then saved as a "made-to-order" course, which can be invoked with a click.

In the "manually assembled" mode, users have more control to select the modules themselves and change the aggregated duration time. As users select modules, the system provides others to match the selection so far.

The user is then free to play, modify, save, discard, or share with others. Share is perhaps the most important feature, for it is how usable courses spread through the organization. The course is owned by its creator (or amender), who determines how long it should live.

WebSphere[3] instructors-in-training in South America had a clear need for the self-service, composable learning that DLE provides. Ten instructors, two IBMers and eight business partners, were gathered for the first step in IBM Instructor certification, which was face-to-face training. They took home[4] access to a specif-

ically-targeted DLE environment (see Exhibit 2, at the left), which they used, over a month, to prepare for the assessment of their competence at delivering a training module, and for their certification on individual products. Putting content into the system, testing, and conducting sessions to train users on the DLE, was all done in six weeks. IBM WebSphere's Kelly Lacy, Program Director, WebSphere Training, was surprised at the efficiency of the process. "It didn't take a superhuman effort," she said.

The instructors-in-training were presented with pre-composed courses, ranging from 20 to 45 minutes, which were prepared for them by Walter's team. Many of them used the courses, personalized them through further editing, and added content. A few composed courses themselves. All of them wished that more content had been available. Some wanted to add their notes.

The instructors queried DLE for topics like portal installation, configuration, and administration. How to deploy portlets within portals was a particularly hot topic. DLE let them explore what they needed to know in a flexible way. Walter wrapped it up thus: "Within the WebSphere organization, in the software group as a whole, there are lots of people who need to keep up with current information. DLE doesn't just increase their skills, it also keeps them current."

Since then, Kelly's team has deployed DLE with substantially more content to 900 IBM consultants and practitioners for just-in-time knowledge acquisition. They are now expanding the program to selected IBM business partners worldwide.

Looking Forward

Mining the Pilot Program Experience

These early experiences have revealed several use scenarios.

1. **As a preparatory tool** for meeting an expert, or attending a meeting.

   - As a way to keep experts from being overwhelmed. When an expert is asked a question by a novice knowing what information is available, the expert could create a "care package of resources" for the novice to read as a prerequisite for a follow up discussion, which would then be more fruitful.

   - As a resource for a consultant who needs instant knowledge.

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it does demonstrate clearly the business value of the process it enables.

[3] WebSphere is a software platform for building and delivering web-based applications, including portals.

[4] DLE is a web-based application. The instructors in South America used a browser, and the server was in the Software Group classroom facility in Middletown, Rhode Island. Bandwidth was not a problem.

2. **As a way for providing links between related content** that may not be supported by traditional, top-down organization. The use of search as an organizing principle allows this multi-dimensional flexibility of association.[5]

3. **As a tool in traditional learning environments.**

   • DLE would be helpful in traditional learning situations to study for exams, and to brush up on topics. It is not a replacement, but an extension of what happens in class.

In the case of the South American pilot program, it was a little of all of the above. The instructors-in-training still went through face-to-face training, practice teaching, and product certification, but DLE made the process easier and more effective and let them more easily stay current.

Extending DLE Further

The transformation of technical content into modular Learning Objects is time consuming. The process involves segmenting long manuals or whole books into smaller chunks and assigning metadata tags to the chunks. IBM Research is working on further automating this process and improving the content transformation tools.

There is great interest in adding voice and video to the DLE environment, as well as interactive modules, such as applets. The only limit on what can be deemed a learning object comes from the use of search (versus an external hierarchy) as the organizing method. Search needs hooks that it understands in order to *find*. While applets could be classified, their open-ended nature would confound the need to define a length of time for adequate comprehension. It might be better to position applets, RSS feeds and other information sources as adjuncts to a DLE, rather than as part of it.

Broader Use of DLE

In knowledge management and collaboration, DLE could give content developers a tool to assemble more rapidly new content out of smaller modules, instead of creating content mono-lithically.

Metadata could also be used to set up expiration dates for courses involving ephemeral content (like garbage collecting) and to track usage (like digital rights management). This approach would also be used if security and privacy protections were needed.

Go to Market Plans

The DLE is under consideration for future releases of IBM *Workplace*. Due to its Web-based nature, DLE could be delivered as a stand-alone asset, or could be embedded in third party products. It could be accessorized as services, or it could be a simple delivery vehicle for flexible courses from a pre-populated repository.

IBM is looking for customers with areas of learning need, and a well-defined, focused group of users, to pilot DLE with and evaluate its potential for full deployment.

Conclusion

This pilot illustrated how DLE can be used on a small scale to provide effective and flexible knowledge transfer in an on-demand fashion. As the need to re-educate workers increases in frequency and proliferates in scope, the need for composable, just-in-time learning environments, like DLE, will grow. It is a great business tool. Now is the time to think of how you can incorporate this just-in-time learning tool in your organization today – and tomorrow.

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[5] For more on enterprise search, see **The Clipper Group Explorer** dated July 28, 2005, entitled *Enterprise Search Adds a User Dimension to Business Information Organization*, and available at http://www.clipper.com/research/TCG2004048.pdf.

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