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THE EVOLUTION OF INFORMATION TECHNOLOGY AT BUCKMAN LABORATORIES

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Buckman Laboratories is well known for its commitment to continuous learning and knowledge nurture. Much less has been said about the technology applied to support its people-focused efforts. In this article, Tim Meek explains how the Knowledge Transfer Task Force guided the IT infrastructure from the heady days of Compuserve to the latest customer-centric extranet.

THE EVOLUTION OF INFORMATION TECHNOLOGY AT BUCKMAN

How an IT infrastructure can support knowledge management

By Tim Meek

At Buckman Laboratories, we have often said that our knowledge transfer efforts are more like a journey than a destination. It's an evolution rather than a revolution. Of course this is just another way of saying that we didn't really know where we were going, only that we weren't there yet. However, upon the arrival at each peak we could see a little more clearly where the journey should take us. Pressure from the top of the organization to move ever more quickly meant that our evolution was more like a series of revolutions – changing from old mindsets to new ways of thinking, and punctuated by a sense of urgency that everything is at stake.

The earliest knowledge management tool at Buckman was called the "Idea Trap." It was a pocket-sized notebook with idea stimulating questions on the inside cover – Adapt? Combine? Magnify? Minify? Modify? Rearrange? Reverse? Substitute? The pages were blank except for the company motto at the bottom of each page "Creativity for our customers." The concept was to always have a way of capturing ideas no matter where you are – any time, any place. This encapsulates our approach: simple tools used in imaginative ways with a higher purpose in mind.

From notebook to thinkpad

This story begins in 1984 when the company began to expand the innovation toolset by installing the first e-mail system. It failed. And so the following year it was replaced. For the next few years there were attempts to expand access to the system in the central and remote offices. While some success was achieved, the technologies did not meet the organization's global needs.

In 1985, Buckman's first remote access venture was centered around giving people dial access to the mainframe system. The dial connection used the new "high speed" 2400 bps modems. Indeed, these were a significant improvement over the 1200 and 300 bps modems used before.

The idea of connecting everyone in the world with dial access presented a new set of problems: the cost of international calls, the required operator intervention, or problems getting a phone line, were all common issues to be dealt with. What was needed was a global network.

At this time, Buckman began to pilot the use of portable computers. In the late 80s and early 90s we primarily used Zenith notebook computers, then began to standardize on the IBM Thinkpad computers in 1992-93.

Becoming a virtual business

For many years the office was considered to be the place of business. Computer systems were optimized to operate in an office environment through heavy doses of cables and terminals to allow people to access applications remotely – that

KEYPOINTS

- While knowledge management at Buckman Laboratories is entirely focused on people, technology plays a critical role as an enabler of faster communication and distance learning.
- IT played a significant part in shifting the preconceived ideas of where work is done. In 1988, with the arrival of the laptop, Buckman became a virtual business.
- The application of technology is focused on knowledge transfer, accelerating learning and encouraging innovation.
- The IT infrastructure at Buckman has developed from simple means, and has thus defined a vision for a user-friendly future.

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is, from their particular spot in the building. High speed response time was the target.

This was a false view of where business really takes place at Buckman. The true place of business is where services and products are applied to solve problems and add value for customers. Everything else that goes on at the office (manufacturing, R&D, etc.) is simply to support these front line activities. Computer systems needed to be designed around this new concept of "the focus of business activity." The first real revolution at Buckman was cutting the "hard wired" cable that connected people to the mainframe.

The notebook computer changed the entire paradigm in the way knowledge could be shared throughout the organization. It put power where it was needed all along – the front line. Communication became more open and immediate, and the knowledge system became less static and more dynamic. Ultimately, a "virtual real time" environment emerged.

In 1988, Buckman outsourced its worldwide network to IBM Information Network. This provided much greater global reach for Buckman's far flung offices and remote access for mobile users. However, because the network was not fully integrated it required a different user ID in different parts of the world, so a traveling user would need different software configurations on their PC depending on where they were in the world. Still, it did provide a much more reliable and extensive network.

Creating a knowledge taxonomy

In 1989, Bob Buckman charged the new Knowledge Transfer Task Force to:

1. Identify knowledge base requirements needed to accomplish business goals;
2. Assess IT options for generating, editing, storing, retrieval, transmitting, and presenting knowledge bases to Buckman user community;
3. Translate the knowledge base requirements into cost-effective IT projects; and
4. Evaluate the global opportunities and implications of these projects.

One of the outcomes of the task force was a redesign of the menus for applications on the mainframe. The resulting "Fastpath" menu system created a taxonomy of knowledge areas based upon business functions across all of the different systems and repositories with a common interface. It even allowed users to create their own personalized menu for information. In many ways it was an early prototype of today's portals.

Other changes were taking place in R&D. One of the problems of storing the results and findings of scientists in traditional lab notebooks was finding and reusing those results in later research. Often, it was more economical to do the experiments again rather than spend time searching for archived results. In 1990, Buckman's R&D group began implementation of an electronic notebook system that could store results of lab experiments so that they could be searched later, even by selecting a graphical chemical compound.

The dawn of the Compuserve era

It was in 1992, however, that the most significant change occured. The global network, e-mail system, and central computer application access were all changed in one go. Bob Buckman had been using Compuserve for some time, and was struck by its ease of use and mobile capabilities. Further investigation revealed that it had quite an extensive global network, and that one user ID was all that was needed. We began working with Compuserve technical staff in 1991 to integrate two packages, one for e-mail and forum access and the other for mainframe access. After about 18 months, the Buckman Information Manager (BIM) package was ready to be implemented.

The Compuserve era brought about major shifts in our IT strategy. Firstly, a major application was being outsourced, secondly, everyone had to dial in to access e-mail, whether in the office or on the road, and thirdly a new standard had been set for "ease of use" with a system designed for home (not business) users.

An entirely new level of knowledge transfer

began with the introduction of the discussion forums. A forum "sysop" position was established to facilitate discussion, promote usage, and assist users. The name came from the legacy of the Compuserve system, which was essentially an enhanced version of the "bulletin board" systems.

Organizational shifts

In the midst of these technological changes, organizational transformation was occurring as well. The Knowledge Transfer Task Force had proved that there were important knowledge assets within the organization, but no processes in place to make them available to everyone. In order to speed up enterprise-wide knowledge access, Bob Buckman combined Information Services (MIS), Telecommunications, and the Technical Information Center (which includes a fully-fledged library) to form the Knowledge Transfer Department (KTD). This was symbolic action by a visionary leader to bring organizational focus on this journey to more effectively leverage knowledge across the company.

Bob Buckman has championed the knowledge initiative from its inception. He requested reports showing which individuals around the world were not using the discussion forums. Personal e-mail messages would be sent by him to anyone who had not accessed the system within an acceptable time period, asking if they were experiencing technical problems or needed training. He also spoke of the importance of active participation on the system. People got the message.

In 1994, Bob asked the forum sysop to provide the names of the top users. The top 150 were then invited to come to the annual planning meeting to provide input on the direction of the organization in what was called the "Fourth Wave Conference." At this meeting they were each upgraded to the latest IBM Thinkpad and given a top grain leather computer bag as a personal gift. The point was again made of the importance of participating, communicating, and sharing knowledge throughout the organization.

The ideal system of knowledge transfer

Emerging technologies and further crystallization of the knowledge transfer vision fed the engine of change. The Internet was gaining momentum and Buckman quickly saw its potential. In 1995 Bob Buckman articulated seven characteristics of the ideal system of knowledge transfer. They were:

1. It should reduce the number of transmissions of knowledge between individuals to one, to achieve the least distortion of that knowledge;
2. It should give everyone access to the knowledge base of the company;
3. It should allow each individual to enter knowledge into the system;
4. The knowledge base should be available 24 hours a day, seven days a week;
5. It should be easy to use for those who aren't computer experts and be searchable by every word in the knowledge base;
6. It should communicate in the user's language;
7. Questions should be updated automatically – the accumulation of technical knowledge would generate the knowledge base for the future.

Implied in these system characteristics is another "revolutionary" idea: the user *is* the database. As Bob Buckman put it, "We recognized early on that indeed the greatest knowledge base in our company did not reside in a computer database somewhere, but was in the heads of our individual associates worldwide."

Bringing customers in

In 1994, some efforts had been made to bring customers into the collaborative environment now called "K'Netix™ – The Buckman Knowledge Network." The first aimed to bridge the e-mail gap. At the time most companies only had internal e-mail, but Compuserve's e-mail hub enabled Buckman to connect with customer e-mail systems. Success was achieved, but it was largely dependant on customer effort or their willingness to connect their system to Compuserve.

Another attempt at customer interaction was to set up discussion forums for customers and Buckman sales and technical support people. This endeavor failed for two reasons. First, it required that customers have a Compuserve account, and second it required that they be willing to use this method of electronic discussion. These barriers prevented successful deployment.

In 1995 we set up www.buckman.com. Since then, the Internet has drastically helped standardize messaging technologies. It's as significant now as having common telephone systems or broadcasting standards, and it will enable the expansion of K'Netix™ to include customers and suppliers.

Focusing IT on learning

Buckman had been providing extensive training for many years, and reimburses employees for tuition fees for higher education (even extending this to employees' children). In 1995 we began to focus IT on individual learning by considering how to do it on-line. KTD could see that distance

learning would make learning available at any time and any place, and bringing the classroom to the student would provide continual education. Unfortunately, this brought a whole new source of ulcers for KTD.

Distance learning at this time was connected via expensive video conferencing and high speed communications circuits. The computer-based multimedia (multi-megabyte) tools didn't fit the 14.4 k bps connected world we lived in. We needed an on-line learning system and someone to help us implement it. At that time, Lotus was developing what would later become LearningSpace. We adopted this framework, but maintaining content and supporting instructional design soon became the focus, so, in 1996, the Bulab Learning Center was formed.

The intranet comes of age

Late 1996 brought the first real push toward development of an intranet portal and search capability. New resources were added slowly as KTD's attention was focused mainly on business systems and Y2K compliance. Another issue that became unavoidable in 1997 was Compuserve's inability to continue to support our needs. It was not doing well in the market and KTD began to look for a replacement for the system that had served the company so well for five years, and more importantly had set user's expectations higher than ever on reliability and ease of use.

Our approach to finding a new system was straightforward – we knew the Internet standards we should use for external collaboration and we could avoid risks by utilizing technologies we were already familiar with. Users tested three types of client software and Microsoft Outlook Express was chosen over other packages, primarily for ease of use. However, the e-mail system conversion also meant an upgrade to Windows 95 and Office 97.

A change such as this is always a challenge, but it also brought opportunity. The Office upgrade meant that the global cutover had to take place in a short space of time. We were about to change every computer in the company and conversion was to be completed by October 1, 1998. It was an extremely successful conversion with only a few stragglers missing the cut-off date.

Nineteen ninety-eight also saw the cutover to the new ERP system and removal of the mainframe system. UNIX had gradually taken over as the primary host system environment at Buckman along with some Windows NT server applications. These new systems run the "Fastpath" of today – our intranet system now simply referred to as K'Netix™.

The timeline

1984 Bulab's first computer access via telecommunications
1985 DISOSS/PSPC e-mail system
1986 Limited usage of IBM portable PC, International Access to DISOSS
1987 First "laptops" in field
1988 IBM Information Network (IIN) replaces home-grown network access
1989 Knowledge Transfer Task Force started
1990 Fastpath (today this would be called a "portal")
1991 R&D electronic notebook system
1992 KTD is formed; begin conversion to Compuserve e-mail & forums from DISOSS/PSPC/PS-CICS; Compuserve Network replaces IBM Information Network; customer forums – the first "extranet"
1993 Begin conversion to Windows
1994 The name K'Netix™ is born; 4th Wave Conference; begin conversion to Windows 3.1, Microsoft Office, WinBIM; begin to use UNIX; RHB describes the seven characteristics of the ideal KT system
1995 www.buckman.com goes on-line; intranet goes on-line; begin on-line learning systems design
1996 TCP/IP becomes network standard (KNA/KAM) with Netscape browser
1997 First search engine on intranet; begin ERP system implementations
1998 Conversion from Compuserve to Internet; e-mail; newsgroups, global upgrade to Office 97 and Windows 95; removal of mainframe system
1999 Intranet portal redesign; extranet development

The extranet and beyond

Much of Buckman's knowledge effort has been in connecting people. The goal has been to operate the company as a virtual team that comes together to address business issues 24 hours a day. As we continue into the future, customers and suppliers will be engaged as part of this virtual team.

Today, the Internet and e-mail are the accepted norm for business communication and customer interaction. Moreover, customized on-line systems are being designed to bring new value to customers. These extranet systems will increase the speed of problem-solving and drive rapid change.

In Buckman's business, "face time" with customers will never be eliminated, but the level of customer interaction will increase through on-line access. In this new world, establishing trust in an environment where not everyone meets face-to-face is hard. Perhaps video conferencing over the web will be part of the answer. Perhaps we'll have to settle for a phone call. At any rate, from the peak we have now reached, the future looks like an interesting place to be. The journey continues, and there's more at stake than ever before.