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Experiencing Knowledge

by Donald Norris, Jon Mason, and Paul Lefrere

To succeed in the Knowledge Age, people who have passed through today's formal education system—meaning most adults in Western economies—will need an order-of-magnitude leap in their capacity to acquire, assimilate, and share knowledge. Between now and the year 2010 (a target date for landmark changes in education worldwide, such as the establishment of a European Learning Space covering all college-level education in Europe), best practice in knowledge sharing will be substantially reinvented in all settings—education, business, government, associations, and other not-for-profits. We recently completed a fifteen-month collaboration, supported by an international advisory group, that explored current indications of this coming revolution from all over the world. Our findings are captured in *Transforming e-Knowledge: A Revolution in the Sharing of Knowledge* (Norris, Mason, and Lefrere 2003).

One of our most compelling conclusions is that not only will we be expected to handle more knowledge faster and to greater effect, but the very nature of the knowledge experience will change. What does it mean to "experience knowledge?" Today, we experience knowledge through diverse and iterative cognitive processes of reflection, definition, search, interpretation, understanding, learning, and assimilation as well as in skills application. In the process we select from a wide and diverse set of tools, sources, and interactive media, largely through conscious and often slow decisions. Many of our access channels today are separated by boundaries dividing workplace, leisure, and learning. These boundaries are rapidly changing as support for more fluid forms of learning, and more dynamic ways of engaging with knowledge, become embedded in our social systems and pervasive in our environment.

The experience of engaging with the knowledge and views of others is arguably as important as the actual knowledge with which one engages. Engagement is shaped by social and organizational norms, past experiences, personal preferences, and other factors. Today, we each select a particular mixture of knowledge-engaging experiences (such as reading, participating in seminars, and browsing the Web) based on the effectiveness and satisfaction they provide. But the mixture we select, while personally comfortable, may well be inappropriate, less effective, or worse, by 2010. Can we change? In this article, we assess current obstacles to transforming the knowledge experience, discuss necessary preconditions for such transformation, and highlight significant developments that herald a whole new environment for educators and professionals in the future.

Knowledge Management Limited by People and Tools

The efficiency of today's knowledge management experiences has been limited by the personal ability of individuals to process knowledge. Through years of less-than-optimal knowledge-seeking, many older adults have developed ingrained habits of mind that can be difficult to re-pattern in response to a rapidly changing world. Those who were born well before the advent of contemporary information technology tools often face difficult adjustments in the workplace; significant resources must be devoted to retraining and staff development. Meanwhile, the youth of today have fewer of those habits and expect—even demand—better as we continue to benefit from the improvement in Web technologies such as Google. Such generational differences with respect to these tools will no doubt become less pronounced over time, but it is clear that we remain in an era of transition.

At the same time, the experience of knowledge has been constrained by limitations of the technical interfaces and support systems that enable individuals to access knowledge, sort and sift through alternative sources, and select and assimilate the knowledge suited to their needs or preferences. Such constraints have also

limited each individual's capacity to share knowledge. The first generation of e-knowledge exchange—for example, various "World Wide Web Virtual Libraries" and the early versions of Encarta—provided an environment in which "one-stop-shop" portals, news services, and digital libraries were designed to attract and keep the user's experience *contained*, rather than *networked*. However, many of today's state-of-the-art knowledge repositories, search engines, intelligent agents, and community-of-practice support tools provide prototypes of the knowledge networks and marketplaces of tomorrow. The power of Google is but one example of a growing array of specialized search services; see, for example, the Distributed Search Manager in Australia or the Resource Discovery Network in the UK. Weblog and Wiki tools have helped develop Wikipedia—the free online encyclopedia—in an astonishingly short period of time, while products such as the Hyperwave eKnowledge Infrastructure and Autonomy are an indication of the integrated suites of tools that we can now deploy. Such resources do not yet constitute a quantum leap to a new level of knowledge experience, but they are in many respects characteristic of what the youth of today encounter routinely in other areas of their lives: multitasking, blogs, emergent behavior in groups, continuous short-burst communication.

Making Our Knowledge Lives Simpler

What moves us to new levels of engagement and efficiency? In short, it is often the compelling nature of simplicity. In an age of over-supply and information abundance, we need to make life simpler for knowledge users, learners, teachers, and mentors. For example, in the design of technological tools we can help users make far more sense of the world by drawing upon everyday, taken-for-granted forms of knowledge. In childhood, one soon learns to make intuitive judgments using feedback from one's eyes and ears, largely through activities such as building a model from a kit of parts. Likewise, these skills are elicited by a range of other useful tools such as mind-mapping software (for example, FreeMind or MindManager) and customized content syndication (enabled by Moveable Type and other Weblog software now available), which reduce complexity and increase our understanding of what we do.

On the whole, educational institutions have taken surprisingly little account of this. By contrast, the world of industry as well as many individual practitioners are quick to adopt such tools since they can simplify tasks that were previously the province of experts but are now possible for less-skilled people. The rapid proliferation of RSS (Really Simple Syndication) channels is testimony to this (Harrsch 2003). Wide access to knowledge-leveraging tools is becoming more and more likely because of several trends: the greater affordability of such tools in the marketplace; new capabilities of the World Wide Web, including the Semantic Web; and the further development of distributed computing capacity through Grid Computing. Coupled with changes in our individual attitudes and behaviors, these advances will enable knowledge sharing to achieve the accelerated ease of use and critical mass necessary for true transformation to be achieved.

Slow to Achieve Amenity

However, the less-than-revolutionary performance of first-wave technologies is also a familiar pattern. History has shown that transformative deployment and application of technology takes time, especially where people have territory to defend; by investing too heavily in what we already know, we very often prevent ourselves from discarding outdated knowledge and moving on to unexplored and unfamiliar territory. There is no shortage of hype and expectation regarding the Knowledge Revolution, but in the near future we *can* expect faster, better, cheaper, and more engaging versions of knowledge-sharing technologies, infrastructures, and protocols to emerge. Even more importantly, the technology will become convenient, easy, and reliable. But it will be over time that knowledge-sharing environments will achieve *amenity*; for as Brown and Duguid assert, it is when technology achieves amenity that it becomes invisible. That is, it becomes part of the user's world, such that the user is easily and seamlessly absorbed into its world (1999, 50-55). It becomes so much a part of our "normal" experience that older people experience pressure to use it, just as with mobile phones today. The greater the take-up, the greater the pressure on others to change.

Arthur (2002) has likewise observed that the Knowledge Revolution is in the early stages of amenity-building. He points out that it took automobiles roughly half a century to reach amenity through the development of highway infrastructures, rules and protocols, safe and easy-to-use equipment, and a host of other factors. Other, earlier revolutions like steam power and railroads followed similar patterns. Arthur states that "A revolution doesn't really arrive until we structure our activities around the new technology—and the new technology adapts to us by becoming easy to use" (2002, p. 70). Unlike the automobile or steam-power revolutions, information technology and its accompanying tools and infrastructure have clearly shown a much higher rate of development and expansion over a proportionately shorter period of time. Yet the road to amenity will still require substantial transformation in how we use technology on an everyday basis.

Pervasive Computing Creates New Knowledge Experiences

What recent developments offer the greatest steps toward simplicity and amenity in our use of technology, and promise a whole new range of knowledge experiences?

Taken together, some of the most significant trends indicate the emergence of pervasive computing environments. By pervasive computing, we mean a combination of *mobile* information and communications technology (through laptops, notebooks, personal digital assistants, and fused-function devices) and *ubiquitous* computer technology (through the embedding of small, low-cost devices in clothing, appliances, cars, automobiles, work settings, and every other place). Pervasive, ambient computing environments are portrayed in Figure 1. These new technology-suffused settings will change the knowledge experience, disrupting many of our social, organizational, economic, and institutional structures. They will also stimulate new pathways to innovation.

Such environments already exist today at demonstration sites for pervasive computing that have been developed for workplaces like Xerox PARC, museums (Fleck et al. 2002), and elderly care facilities (Korhonen, Paavilainen, & Sarela 2003); such technology is also becoming increasingly accessible and cheaper for home installation. As individuals enter these environments, they are immediately recognized and authenticated, thereby triggering the availability of communication and knowledge resources. The individuals can engage with a variety of displays ranging in size from a few inches (pagers, phones, and small embedded devices) to a foot (screens of notebook computers, personal digital assistants of various kinds) to a yard (smart whiteboard-like devices). The engagement can be any combination ranging from peripheral to fully focused, using keyboard, speech, gesture, or other means.

These new environments will change every aspect of our knowledge experience. The physical locations where we acquire knowledge will be expanded, such that learning will become even less confined to customary contexts than it is at present. The channels through which we retrieve knowledge will be more varied, and the range of interfaces through which we share knowledge will be broadened. The intensity of our knowledge engagements will also be enhanced: Individuals will have much greater and more timely access to agents, experts, and mentors for advice, while also finding it much easier to multitask diverse knowledge streams. These varied impacts are enumerated in Table 1. Between now and 2010, such technologies will be deployed in many public and private settings. The nature of our knowledge experience, as individuals and as groups, will be revolutionized.

Conclusion

The transformation of learning through technology has many implications for the future of our educational institutions, our workplaces, and our culture at large, and not the least of these is a change in the fundamental way in which we experience knowledge. Currently we still face considerable challenges to innovation, with regard to both our habitual mindsets and our current tools and infrastructure. Yet through further advances that make technology easier to use, as well as more fully assimilated into everyday life, our engagement with knowledge will take on wholly new forms. Through the development of pervasive computing environments, knowledge will be experienced in a more multidimensional, timely, flexible, and efficient

fashion, such that it is no longer bound by the conventional barriers that have continued to determine how and where we learn. In many respects, the gaining and sharing of such knowledge will seem much more like an extension of our daily behavior, an element in which we live. As with other technological revolutions, the changes we may expect will not only be extrinsic, but will lead in turn to intrinsic modifications to our accustomed patterns of behavior. By anticipating these changes, we may be more prepared to realize their full potential in the next phase of the Knowledge Age.

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