Spotlight on John Seely Brown

In this issue of *Spotlight* John Seely Brown speaks to editor Sarah Powell about nurturing invention and managing innovation.

Dr John Seely Brown, a prominent speaker, author and teacher, and a visiting scholar at the Annenberg Center at University of Southern California (USC), was, until April 2002, Chief Scientist of Xerox Corporation and until June 2000, Director of the Xerox Palo Alto Research Center (PARC) – a position he held for twelve years. At USC John Seely Brown is pursuing his personal research interests which include digital culture, ubiquitous computing, social software and organizational and individual learning.

A member of the National Academy of Education and a fellow of the American Association of Artificial Intelligence and the American Association for the Advancement of Science (AAAS), Dr Seely Brown serves on the boards of directors of Amazon, Corning, Varian Medical Systems and Polycom, and on various advisory boards. He has published over a hundred papers and has received several awards. His most recent book, *The Social Life of Information*, co-authored with Paul Duguid (Harvard Business School Press, 2000), has been translated into nine languages.

Spotlight: You have written that 'you can't manage invention, just nurture it. . . but you can manage innovation. . .' How can an organization best nurture invention?

John Seely Brown: The catch in nurturing invention is how you authentically create a space for risk-taking. It's easy for management to say: go ahead and take risks, but risk-taking behaviour is a property of culture and must be an emergent property of the ways things are done around you. So the question is: how do you nurture a culture of risk-taking?

This is primarily a question of organizational culture, but there are regional and national differences. To me the essence of Silicon Valley, as opposed to virtually any other kind of innovation ecology, stems from a deep risk-taking culture which stems from a broader notion of risk-taking, emerging technologies and wishful adolescence. But there's a huge difference between being in Silicon Valley and Los Angeles, or being on the West Coast versus Boston, or even Boston versus New York. Different places will have quite distinctive personalities in terms of risk-taking. Then when you compare countries or regions – the USA with Europe, for example – the differences can become astronomical – just consider the differences in the bankruptcy laws for a clue.

Invention can take place in organizational life only when cultures really understand and foster deep risk-taking at the technological level. Very few organizations have done that successfully, and fewer still do so nowadays when margin squeeze in companies leads them to pull back from organic strategic explorations. In corporations with tremendous market share such as AT&T, IBM or Xerox in their heyday, there was a deep sense of the need to reinvest some of their substantial profits in thinking out of the box as well as a drive to invent in creating the next generation of technologies that could destabilize their own franchises.

Few companies, today, try to reinvent their future from within.. Probably the corporation that is best at doing this is Corning, This 150-year old company reinvented itself numerous times, each time practically creating entire industries – such as the optic fiber industry. Corning has created a culture of technological

innovation as its comparative strategic advantage. Within its powerful centralized labs, researchers go to the root of problems, but they only tackle problems that are so challenging that, if cracked, offer a serious potential of opening up or creating substantial new markets or whole new industries – not just developing new, derivative products. Indeed, in my opinion, they have managed to create a true innovation ecology where cross pollination between their core competencies is their coin of success.

Spotlight: What does *managing* innovation involve?

John Seely Brown: The *implementation* of major technological breakthrough is often more challenging than the technological breakthrough itself. In the real marketplace the goal is to find the 'sweet spot' and discover why and how this new technological invention can serve market needs at this particular moment in time. A company needs to be grounded, focused and open minded to do this.

While researchers should be an active part of this process, it is the role of entrepreneurs to understand the timing, the rhythm, and the means of getting something new to catch on. Entrepreneurs have the knack and courage to do this. They possess a willingness to recognize that they can be wrong while strongly believing that they can make it happen. Entrepreneurs need a combination of passion and faith in something, an incredibly good ear for making sense of the talkback from the marketplace, and a great sense of timing. They must be willing to march ahead and once they hit that magic sweet spot to scale up boldly.

Large corporations can't innovate very effectively because they need to keep an eye primarily on their quarterly returns – any shortfall means they get slaughtered by Wall Street. In today's context, they are driven by their ability to predict and to meet financial targets to the penny. But not only can one not schedule invention, one can't schedule innovation. You must be willing to move at lightning speed to scale up when you hit that sweet spot and that moment can't be predicted precisely and hence scale up must be subservient to the yearly financial planning process. That is one of the reasons why venture capitalists are so important in terms of innovation – they are not hamstrung by the same quarterly or even yearly pressures. Ten years, yes; one year, no.

Spotlight: As Director of Xerox Corporation's Palo Alto Research Center you were deeply involved in 'the management of radical innovation'. Without being too technical, how radical was radical?

John Seely Brown: The word 'radical' has two meanings, deriving from its Latin etymology. The first means 'root', which gives us the meaning in innovation of something that goes to the root of the challenge; the second is 'cool' in the sense of breaking a conceptual framework. In radical invention or innovation something radical goes to the root of a real problem or a real need. Frequently, if you do something radical it's like launching a whole industry surrounding a product. The 'rad' or 'cool' meaning of radical indicates going beyond the way people usually see the world. What is wonderful is the notion of combining these two ideas. How often do you follow a problem to its root, being willing to reframe the problem depending on what you discover or what it tells you about the world?

Going back to your question, the challenge of radical innovation is how to get others to buy into something that makes no sense within the perspective they currently hold. When you are engaged in radical innovation, you are breaking frameworks, you are doing something at odds with current held mental models and thus your ability to communicate becomes incredibly important. You must help people buy into it, reconstructing the context for it to make sense. Take the

example of our invention of laser printing at Xerox. Today laser printing seems obvious but the idea of turning a copier into a laser printer based on guiding a light beam rather than snapping an image seemed totally bizarre when we first launched it in the early 1970s. It was so different to the mechanical printers then. But with our other invention of bit map graphics – the graphic user interface (GUI), we needed to be able to print what was on the screen. There was a natural synergy between what you wanted a printer to do and what you saw on your screen, or perhaps what you saw the printer do and you wanted to see on your screen. So these two bizarre ideas went hand in hand that when coupled led to quite a new industry.

Another example that is only now coming to the market is the notion of erasable paper, a paper made of a different substance. This is a simple idea that emerged quite a few years ago. You can wave a wand over this paper and all the type disappears and new type comes up. It's no thicker than, and looks almost like, regular paper, and yet is erasable. The idea is based on a toner that can actually rotate itself when subjected to an electric field and thus turn itself on and off. One application is store signs that will reprint themselves automatically. One of the reasons for development of this paper was the desire to build an ecologically sound environment, hence one of our early mantras: today's news on yesterday's newspaper.

A third example could be what is now called pervasive or ubiquitous computing. We started work on this 15 years ago, acting on the premise that each person would eventually have at least one hundred computers because almost every possible device would have a computer in it – toasters, watches, radios, cell phones, cars, etc. At the time the Xerox Corporation people thought we were crazy, but we had good reasons for believing our intuition. This break with the usual way of seeing the world then threw up fundamentally different technological challenges such as managing vast networks and IP addresses in a seamless way. Today, fifteen years later people say: yes, of course, with IPv6 well on its way to becoming a standard along with all kinds of wireless devices.

Spotlight: You are said to see the fault of the early IT revolution as having been obsessed with the technology and insufficiently sensitive to the human users. How has this been addressed?

John Seely Brown: It hasn't been addressed very well. Most of us today could question whether we live in a world that is more peaceful, more reflective than the world we lived in before personal computers became the rage. This is not a question with an easy answer. A real issue is that most technologists don't understand even how graphic design works or how good architects/designers can build things such that as we start to interact with them they (the artifacts) subtlety inform us on how to continue that interaction – technically called an affordance.

If an architect designs a building for you it should offer cues as you approach it on where the main door is, etc, without having to post a big sign saying entrance this way. These are things that architects and graphic designers understand intuitively, but information technologists don't. Part of the reason is that in the information technology world we tend to make everything explicit. We don't understand how to design for the sub-conscious mind – we design for the conscious mind and we only pay attention to content. But humans pay attention to context as well as content, that's how we make sense out of the world. Indeed, as Paul Duguid and I discuss in our book 'The Social Life of Information', content without context is often meaningless or dangerously mis-interpretable. When you are having a conversation you are paying as much attention to the body language, intonation, pauses and rhythm of the talker (all part of the

context) as to the content. So what's the equivalent of reading body language? In the physical or social worlds there are all kinds of subtle cues we unwittingly use to keep ourselves orientated. We can process astronomical amounts of information this way without feeling particularly stressed. IT overlooks this.

Spotlight: So, how do you explore these areas as information technologists? Is it through co-creation with users?

John Seely Brown: The trouble with participatory design is that you often can't go much beyond what the user knows at that particular moment. So we can either take the role of anthropologists more seriously – they are participative observers and trained to observe. More generally, this requires a fundamentally interdisciplinary approach which is interdisciplinary in terms not just of the sciences, but also of the arts. This is a tremendously interesting field of exploration

Spotlight: Is there not an additional challenge in that people intellectually are moving on all the time because of the circumstances in which they find themselves and the changing influences on then?

John Seely Brown: That is an extremely important point because, in the old days, things didn't change quite so fast, and media or more accurately genres with a given medium had a chance to stabilize. Then we would subconsciously appropriate a genre and know how to read the content through the lenses of that genre. But today things are changing so rapidly that you don't have that much stability in many of the genres which actually makes reading content more complicated. People tend to forget the social resources we use that scaffold our ability to interpret things, to make sense out of the content. Just look at MTV… for many of us we remain clueless at how to 'read' that channel.

Spotlight: Your website dubs you 'Chief of Confusion', as one who helps people ask the right questions. . . Does this suggest that learning and innovation arise from the challenge of a confusion of ideas and approaches?

John Seely Brown: It definitely does that but it also warns against not believing that you know too much. In some ways, the more you become expert at something, the harder it can be to break free of that expertise in order to see something afresh. What is needed is a willingness to step back and re-examine things from a different point of view, an ability to immerse yourself in a different culture or to understand how others may interpret what you've just said.

Spotlight: How can risk in innovation be encouraged yet contained?

John Seely Brown: Unfettered risk is unbelievably risky; in fact it's just stupid. There is a thin line between meaningless risk and meaningful risk and that is something that often distinguishes a person who is good at something from someone who is not. One of the things you need constantly to think about is not only how you encourage risk-taking, but how you create a safety net for that risk. Risk must be managed.

As soon as you accept the idea of managed risk you will need some very powerful tools. I happen to be a strong believer in the use of compound real options theory. This is a financial market concept but it can be applied to the management of both invention and innovation. The challenge is to recognize that you must find a way to combine 'learning by doing' with 'learning while waiting'. As you develop the technology for a new product concept you're learning what is easy to do and what is hard to do with that technology. You are learning how malleable and robust that technology really is. That's learning by doing.

Learning by waiting gives you the opportunity to see what new things are happening in the external market and what your competitors are doing. The best way to manage risk is to combine insights from the outside world with insights from inside. Real options, used correctly, lets you do both of these, together.

Spotlight: What is your view of the value and future of the open source movement?

John Seely Brown: I'm a strong believer in the power of open source. It leads us to understand a fundamental culture that is emerging amongst kids who grow up digital, which is what I'll call the remix culture, where kids take what is all around them and engage in a form of tinkering, bricolage or remixing as a very interesting way to exercise their creativity and communicate a sense of self to others. This is typically called 'mash-ups' in the music arena. Open source is a form of mash-up.

Professor Mimi Ito, an anthropologist at USC, has discerned what she calls the rise of the amateur class. The word 'amateur' is derived from the word for love. An amateur is a person who engages in a pursuit as a hobby, for the love of it, which is an intrinsic motivation. Being professional, meanwhile, means you do something for pay, a form of extrinsic motivation. So, amateurism is a reflection not so much on skills as on motivation.

Capitalism has run a course that suggests that almost everything we do in the pursuit of making money. I believe that we may be at the last gasp of that pure form of capitalism. We need to invent a new form that combines the creation of financial capital with that of social capital where the social capital is helps to empower community and a sense of self and self worth – a kind of relational capital, if you wish, that is aimed at creating meaning.

I see open source as an example of the value of the amateur and this could actually spill over into other forms of society. This is why blogs, for example, are becoming so important. We tend to forget that science itself emerged from the activity for amateurs – people were doing it for the love of it. They were vetting their ideas by writing letters to each other, much as today they blog. Open source is a step towards rebalancing an outdated form of capitalism, but I think it will have to be seen as part of a much bigger movement seeking to identify how to construct meaning and value from your life's work, and to enjoy it. Against that backdrop, open source becomes very interesting. Take examples such as Linux or Wikipaedia – a brand new open source encyclopedia, constructed by thousands of individuals around the world using the social software tool of wikis. This last example suggests to me that a much broader phenomenon is already happening.

Spotlight: What to you have been the most exciting technological inventions and the most valuable technological innovations?

John Seely Brown: First I'm struck by three incredibly powerful innovations of the past: the pencil, the book, and the newspaper. Each one of these fundamentally transformed society. More recently it would have to be the world wide web and mobile devices such as the TREO that let me have continuous access to the web (the little pocket-sized, mobile device which combines cellphone, email, websearch facility and photo camera all-in-one) and finally, digital cameras and digital photography.

The mobile Internet is very different from the Internet as accessed through our PCs. We are only just at the cutting edge of this medium but I sense that it is significant. The digital camera, meanwhile, is bringing back the issue of visual

literacy that helps to balance the world's focus on text as the fundamental form of literacy. For centuries all our tools have spoken to us in text, yet very few of us are fundamentally text-oriented. Many of us are much more visual or auditory in the way we come to understand the world. We're finally beginning to get tools that let us to think and write in richer media. These developments are part of the remix culture. When I take images and recombine them in new ways, visual literacy comes more to the fore and I can balance textual literacy with visual literacy.

Spotlight: Do you consider the IT revolution to be close to reaching its full potential?

John Seely Brown: The IT revolution has barely started. Only now are we beginning to evolve new ways to work, communicate and learn. Until very recently we had used the same model of execution for a hundred years or more. Take our education system or the way we run factories. It has been supply push as opposed to demand pull. When you can move to a demand pull framework you will see a major transformation. Look closely at Amazon, for example, and you will see how a service oriented IT architecture enables quite a different kind of organizational culture and business model.

For entertainment today you can access the Internet, surf the web and pull down what you want to learn about or explore what is happening around the world. You can also read or add to blogs. You can also read a story as it is being written, which makes you an active reader. All this is just scratching the surface of where we're going to go in the next ten to twenty years and it poses some intriguing questions such as how, when you have people writing news stories or shooting videos all over the world, this will change the very notion of what news is. We have only seen the beginning of this more demand pull, information media. We shouldn't forget that it took about thirty to forty years for electrification to take hold. The formative use of an infrastructural innovation, which electrification was, takes a very long time to permeate society. It takes time to socially appropriate infrastructural change and that is what is happening right now.

John Seely Brown has his own website at www.johnseelybrown.com