Keynote Address by John Seely Brown at Pardee RAND Commencement 2018

Pardee RAND Graduate School awarded John Seely Brown an honorary degree at the 2018 Commencement ceremony. In return, he honored Pardee RAND graduates and the Commencement audience with the following wise words:

Commencement address for

John Seely Brown

June 16,2018

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Good morning. You are graduating at an amazing time. Here at RAND and the Pardee RAND school you have been exposed to some of the most important thinking of our time. You have had the opportunity to intersect with the kind of edge thinking that drives innovation in public policy. You have worked with powerful tools in this domain – some of

which were invented here at RAND –tools that help us better understand extremely complicated situations to help make a safer, healthier and more educated world. Said simply, the world needs the skills you have honed, here. Now, more than ever!

But it also needs you to have the passion of an explorer – to probe, to learn, to reframe, and to communicate effectively so that we can collectively meet the new challenges confronting us in this increasingly complex world, a world that is being driven by constant technological disruptions of a kind unlike others we have seen before us. But it is a world where diverse social systems are shifting and reforming. They are changing in kind and in operation in dynamic and uncertain ways both *through* these technologies and *because of* these technologies.

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We've all heard about and experienced this 'pace of change' narrative. I want to step back a bit to consider some aspects of this world to try to open up a space of possibilities that's a bit little different.

David Weinberger, Co-Director of the Harvard Library Innovation Lab, in his book *Too Big to Know* characterizes it this way:

"We used to know how to know. We got our answers from books or experts. We'd nail down the facts and move on. We even had canons . . . But in the Internet age, knowledge has moved onto networks. There's more knowledge than ever, but it's different. Topics have no boundaries, and nobody agrees on anything."

The complete title of his delightful book is *Too Big to Know*: *Rethinking Knowledge now that the Facts are not the Facts, Experts are Everywhere, and the Smartest Person in the Room is the Room.*
And yes, this was published in 2011.

Another of my favorites is from Joshua Cooper Ramo –
vice chairman and co-chief executive of Kissinger Associates and author of *The Seventh Sense.*
"The seventh sense is the ability to look at any object and see (or imagine) the way in which it is changed by connection. Whether you are commanding an army, running a Fortune 500 company, planning a great work of art, or thinking about your child's education."

Both of these books talk about *quantitatively and qualitatively* different kinds of connections to everything: to information, to each other, to the way we make things, to the way in we do things –
research, practice, create, innovate, love, hate, trust and fear.

The world's biggest problems are, basically, hyper-connected,

making them complex, volatile, uncertain, contingent and highly ambiguous. A small change half way around the world can propagate nearly instantly across our networks and affect us in surprising ways. Situational awareness and analysis is a lot more difficult in these circumstances.

By now, all of us here realize that complex problems are more than just complicated problems. They are a completely different class or species of problems. Often characterized as 'wicked' problems, one finds that as soon as you touch them they tend to morph. They cannot be 'solved' in any traditional sense because they resist solutions that one designs and implements based on good analysis and decision making at a moment in time. The "Catch 22" of wicked problems is that one cannot learn about the problem without probing it or trying solutions, but every solution you try can have lasting unintended consequences that are likely to spawn new complex problems.

Now add the accelerating pace of change of nearly everything around us and we have, what my colleague and co-conspirator Ann Pendleton-Jullian astutely refers to as a **white water world** – a world that is rapidly changing, hyper connected and radically contingent.

Operating in this white water world requires the **virtuosity** of a whitewater kayaker. Indeed for those of us who have done white water kayaking, we quickly learn the importance of reading context:

- **reading the currents and disturbances around you,**
- **interpreting the flows for what they reveal about what lies beneath the surface,**
- **and leveraging the currents, disturbances and flows for amplified action.**

Needless to say it is not hard to see how this applies, more generally, to the kinds of policy issues we now find ourselves immersed in.

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But what other meta-skills and dispositions might now be more important than ever in this white water world? I would say that one is a deep willingness to learn – to learn new ways to read the world and new ways to work with it. I think of this as becoming an entrepreneurial learner – which is not the same as being an entrepreneur but rather being someone who has evolved a <u>disposition</u> that:

Is always questing, connecting, probing.

Is deeply curious and listening to others.

Is always learning with and from others.

Is reading context as much as reading content.

Is continuously learning from interacting with the world,

almost as if *in conversation* with the world

And finally, is willing to reflect on performance, alone and with the help of others – that is becoming a reflective practitioner.

This last one is critical. Indeed, you need to continue to evolve your own skills, but you also need to develop skills to connect – significantly - with others both inside and outside of your own silos, work groups, tribes and organizations. And perhaps, now more than ever, you will find that it is essential to develop what Ann Pendleton-Jullian calls a polymathic curiosity as you heard her talk about yesterday.
A polymath is a person whose expertise spans a significant number of different subject areas — not shallowly but at depth.
Polymathic curiosity is about having the intense curiosity of an 'insider' in fields that are not your own by training. It is one that helps you listen deeply within and across your own areas of expertise. This will be the new coin of the realm for anyone who is confronted with complex problems. But to be good at this one must have developed not just the skill but also the disposition of being not only a generous listener, but also, a generative listener, listening across multiple kinds of disciplinary and cultural boundaries and capable of working with the constructs you hear. I will argue that cultivating such a disposition will prepare you to productively encounter radically novel and unknown situations.
And to view these encounters as adventures - ones that amplify your own sense of agency.

Of course, most of the above is not something one learns primarily in classrooms, but rather in the world, itself. You have already

experienced some of this through your OJT (on job training). But that, is apt to be just the tip of the spear. Might there be new ways to learn – what might almost be called 'cognition in the wild' – a kind of situated learning-in-action, expanding your muscles of imagination in order to engage with contexts in a way that gets to a deeper understanding of what affects and influences them. That is, to interrogate contexts in the manner of Sherlock Holmes– with deep analysis of facts at hand and good deductive and inductive reasoning around those facts.

But where Holmes breaks new ground is insisting that the facts are never really *all* there and so, one must engage in abductive reasoning as well. One must ask not only what do I see but what am I not seeing and why?

Abduction requires imagination! Not the 'creative arts' kind but the kind associated with empathy. What questions would one ask if they imagined themselves in the shoes, or situation of another. And if you are not hooked on Sherlock Holmes, consider what great historians do, or perhaps, Rand's famous Herman Kahn in "Thinking the Unthinkable".

But, by now, you must be wondering: how can I keep developing better ways of sensemaking or interrogating context, or, simply picking up new skills given that the half life of skills seem to be shrinking to 5 years or less, and new tools are emerging, almost daily.

One approach is to develop a broad and diverse network of colleagues that provide access, insights and learning opportunities, starting with the connections you have already made here.

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But in addition to these new disposition and meta-skills, we are also on the verge of a new era in terms of learning and working with a new class of tools - tools that can assist us with learning in action, while increasing our own performance. I am sure we all here are aware of the new forms of artificial intelligence based on deep learning algorithms, the kinds that are capturing so much attention these days. But what is getting less coverage is how these systems might be turned from AI into IA – intelligence augmentation – systems that extend our own human capacities. And if we can get this right - this could lead to a kind of man/machine virtuosity that actually enhances our humanness rather than the more dystopian view of robots replacing most of us.

In March 2016 I, personally, had a major awakening, with the AI program, AlphaGo, beating Lee Sedol, the greatest Go player in the world, 4 games out of 5. Developed by DeepMind, the success of AlphaGo was an unsettling phenomenon, unequaled, perhaps, in the

history of computation and, for those who play Go, its gameplay was both counterintuitive and surprising – even deemed to be 'creative' by some Go champions. Millions of us found this achievement almost beyond belief. For me, personally, this actually marked the beginning of the 21st Century. Yes, 2016, not 2000, as seen thru, at least my own, technological lens. AlphaGo's stunning victory altered my very sense of what now might be possible. In fact, it raised, for me, an existential question around what human and machine might be able to do together – each learning with and from each the other. Was there any upper bound on what might be possible, here?

I could get carried away describing how this amazing machine learning system works because it fascinates me. But that is not what I want to talk about here. What is interesting here, I think, is what we find when we look at a much more textured portrait of what transpired during the playing out of the 5 games between Lee Sedol and the AlphaGo machine. This story is skillfully rendered in a stunning documentary called (not so surprisingly) AlphaGo where a small team followed, at close range, the AlphGo development team over six months from the first games it played and lost with the 2015 European Go champion to the final match with the Korean world Go champion, Lee Sedol, who has rock star status among Go players around the world.

What is most stunning in the documentary are the testimonials and interviews.

From Lee Sedol, himself, he says:

> I didn't' expect it to be like this. It was unbelievable! unbelievable!
>
> After losing three games in a row, I couldn't be happier.
>
> I've grown thru this experience.
>
> I will make something out of it with the lessons I've learned.
>
> I feel thankful and feel like I've found *the reason* I play Go.
>
> It's been an unforgettable experience.

In interviews, he talks about how playing against the machine rekindled his passion for Go. How it gave him new ideas.

In the words of Fan Hui, the European Grand champion that DeepMind hired to play an almost uncountable number of Go games to provide some of the learning for AlphaGo:

> When I play with AlphaGo, it shows me something.
>
> I feel beautiful.
>
> I see the world differently . . .
>
> What is the real thing inside of the Go game?
>
> Maybe it can show humans something we've not discovered.
>
> Maybe it's beautiful..

Cade Metz – the NYTimes editor who was co-present for all five matches – said that:

"Sedol's humanness was expanded after playing this inanimate creation and the hope is that machine and the technology behind it can have the same effect with all of us."

In the two months following the match Lee won every tournament game he played and he has not lost a match since.

Playing AlphaGo led to a new kind of virtuosity – human plus machine virtuosity. And for both Lee Sedol and Fan Hui, it created a different sense of the inner beauty of the game – probably the most complex game there is and one that has been played for over two thousand years.

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What was so stunning and eye-opening about this documentary was the way in which the champion Go players Hui and Sedol saw AlphaGo as beautiful – showing them something even more beautiful in the game they knew so well. This is a bit counter-intuitive and different from much of the fear that seems to pervade the public's relationship to the possibilities of artificial intelligence and how it will play out

through our futures. Which is not to say that we should not recognize these productive skepticisms.

In fact, in this month's Atlantic an article written by the past Secretary of State Henry Kissinger appeared. In this piece Kissinger says: "In certain fields—pattern recognition, big-data analysis, gaming—AI's capacities already may exceed those of humans. If its computational power continues to compound rapidly, AI may soon be able to optimize situations in ways that are at least marginally different, and probably significantly different, from how humans would optimize them. But at that point, will AI be able to explain, in a way that humans can understand, why its actions are optimal? Or, will AI's decision making surpass the explanatory powers of human language and reason?

Through all human history, civilizations have created ways to explain the world around them—
    in the Middle Ages, religion;
    in the Enlightenment, reason;
    in the 19th century, history;
    in the 20th century, ideology.
The most difficult yet important question about the world into which we are headed is this: What will become of human consciousness if its own explanatory power is surpassed by AI, and societies are no longer able to interpret the world they inhabit in terms that are meaningful to them?"

Kissinger's quote and questions about meaning beautifully dovetails with the concern and questions of Joshua Cooper Ramo who says:

"Many of the technical choices we are about to make will be strikingly political. Who has access to what data? Where is the line between human choice and machine intelligence?"
"Banal technical choices will reverberate through the future with the same influence that the Bill of Rights, the Magna Carta, the Analects. . . that persist long after they were first written down."

So beauty or beast . . . or . . . maybe . . . just maybe . . .
beauty *and* beast simultaneously.
We are in a world of uncharted territory – white water territory. One that requires virtuosity of us as individuals and maybe a new kind of human-machine virtuosity.

Virtuosity is an interesting word. It is about knowledge and skill but it is about *more than* knowledge and skill. It is about consummate knowledge plus consummate skill. These provide the grounding for imaginative leaps, leaps that find fresh ways to use the techniques for the improvisation, experimentation and innovation to address the above mentioned concerns about the implications of technology on society but also while riding the wave of expanding our own humanness. Perhaps, maybe we can even create the Age of

Imagination where we can fuse the arts, humanities & sciences, creating a new kind of alloy having properties that will differ significantly from those of their individual components.

Thank you and please remember we are counting on you to use your skills and imagination to help us unpack the complex public policy Issues that will always surround us or possibility even define us.