

Oblivious to just those tools that enable breakthrough innovation**The Magic Eyes® of innovation: The role of mediation****3D glasses illustrate how instruments of all types mediate between the innovator and the world around them**

Mediation carries with it the general meaning of coming between two parties, an intervention, in order to resolve differences.

Broadly speaking, then, microscopes mediate between biologists and cells, binoculars mediate between ornithologists and birds, and telescopes mediate between astronomers and the heavens. Similarly, eyeglasses mediate between the visually impairedⁱ and the world around them, sunglasses mediate between those with sensitivity to brightness and the world around them, and canes and seeing-eye dogs mediate between the blind and the world around them. In each case, the viewer is at some disadvantage without the mediating tool or instrument.ⁱⁱ

Although perhaps more frivolous, but a mediating tool none-the-less, 3D glasses of the type depicted in the photo at the top of this page mediate between individual audience members and the projected image of a 3D movie. Only with these special glasses can the viewer benefit from all of the depth perception that a 3D movie has to offer.

In this essay, I slightly modify the Magic Eye® metaphor from viewing RDS images by relaxing your gaze to viewing 3D movies by using 3D glasses. I do so because I believe that it more clearly and vividly illustrates the concept of preparation that was discussed in examples 1 and 2 in essay 4, "The Magic Eyes® of innovation: Working within the metaphor." In that earlier essay, the viewer's eyes themselves mediated between the viewer and the world around them. In the present essay, I begin with the 3D glasses serving this function, although with more subtlety and, as such, with the additional nuance that can be accessed as a result of it. Same concept, slightly modified metaphor.

3D glasses: the core design consideration

While I have intentionally avoided much of the technical detail behind the viewing of Magic Eye® images as we explore this metaphor, for the purposes of the present essay, it is necessary to provide a brief overview of how 3D glasses and movies are designed in order to facilitate discussion of how the metaphor illustrates the role of mediation in breakthrough innovation.

The glasses used to watch 3D movies employ two entirely complementary light filters, one for each eye, either of differing color (for example, red and green) or of differing polarization. The image projected on the theater screen, or displayed on a 3D television, is constructed such that the portion of the image accessed by one of the two filters is offset from the portion of the image accessed by the other, resulting in the viewer gaining depth perception. Again, only with the mediation provided by exactly these two types of complementary filters, one for each eye, along with the precisely constructed projected image, is depth perception possible.

All else being the same, if both filters are identical to each other,ⁱⁱⁱ depth perception is lost. All else being the same, if one filter is of the correct type and the other is not,^{iv} depth perception is lost. And, finally, all else being the same, not surprisingly if one or both filters are missing, depth perception is lost.

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Thus, light filter selection is at the critical core of the design of 3D glasses. In order to mediate between the viewer and the screen in such a way that the individual audience members experience depth perception, each of the two filters must meet specific requirements.

Application to innovation

Now here's the payoff for investing yourself to this point in the present essay. Serial Innovators (SIs) interact with the world around them with a number of mediating tools, although we rarely think of them as such. Let's explore this in some detail.

At a high conceptual level, SIs interact with the world mediated by expertise in at least one technical discipline complemented by business insight. Since SIs view ➤

breakthrough innovation holistically, their technical expertise and their business expertise work together, not independently. As they engage in the practice of innovation, however, they exercise little focus on their technical and business expertise itself. Instead, they use these tools of mediation in a way that **the tools become a part of, extensions of, the SIs themselves.**

If you take some time to reflect on this in light of the metaphor, you will come to realize just how powerful the connection is. The SIs' technical expertise and business expertise are represented by the two complementary light filters. Both their expertise and the filters are tools of mediation. Those who only possess expertise in a technical discipline are like audience members wearing 3D glasses with only one filter; the technologists lack the expertise to practice breakthrough innovation and the audience members do not experience depth perception. Finally, of those who do possess both technical and business expertise, after considerable study and practice, these SIs no longer focus on their expertise; similarly, the audience members in a 3D movie theater quickly immerse themselves in the film itself, losing awareness of the fact that these odd 3D glasses have enabled their new-found depth perception.

Yet, the metaphor doesn't stop here. Technical expertise and business expertise are not the only mediating tools employed by SIs. For example, they typically carry expertise in at least one additional technical discipline. Also, they develop significant interpersonal skill. And when they are operating at the peak level of performance, their awareness is focused on the problem at hand, not the **multiplicity of mediating tools.**

Interestingly, mediating tools also build on other mediating tools. Take a technical discipline such as solid-state physics. Solid-state physicists carry with them mastery of quantum mechanics. In order to master quantum mechanics, they would have had to have mastered differential equations and matrix mathematics. In order to master differential equations, they would have had to have mastered calculus. In order to master calculus, they would have had to have mastered algebra and, typically,

trigonometry. Their immersion in each one of these tools enables them to master it and, in turn, immerse themselves in and master the next level tool. In the end, a solid-state physicist navigates complex problems dealing with the physics of materials with little or no awareness of the **hierarchy of mediating tools** upon which their expertise is built.

In the end, **it is both the multiplicity and the hierarchy of these mediating tools** that enable SIs to contribute to breakthrough innovation in ways not observed in others. Taking a few minutes to reflect on this metaphor of how 3D glasses illustrate both the multiplicity (two different color filters) and the hierarchy (the filters are required in addition to the viewer's eyes) should help you begin to realize just how many mediating tools you use on a daily basis to navigate the world around you – and to realize just what tools may help you or those who work for you become even more capable innovators. ■

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ⁱ Keep in mind that different types of eyeglasses mediate on behalf of the nearsighted and the farsighted, with bifocals mediating on behalf of those suffering from both types of visual impairment. Note, too, that each eye is corrected, and thus mediated, separately.

ⁱⁱ We can use the concept of tool or instrument interchangeably in this essay. For simplicity, I will remain with "tool" throughout.

ⁱⁱⁱ Both red or both green for a 3D movie constructed based on red and green color.

^{iv} For example, one red and one blue (the third primary color for this application) for a 3D movie constructed based on red and green color.

"On the Epistemology of Innovation: How Breakthrough Innovators Connect the Dots" is a series of brief, occasional essays addressed to executives, managers, and technologists responsible for innovation in industry. Its purpose is to challenge readers to reflect broadly and deeply on the practice of innovation – in particular on how innovators come to know what to do today – in order to succeed commercially in the future. Essays are available without charge at the University of Illinois' digital archive at <https://www.ideals.illinois.edu/handle/2142/27667>. The discussion group at <http://epistemology-of-innovation.com> is a place to provide feedback and dialog with the author and others regarding these essays, as well as to register to receive notice of new essays as they are issued.