

the Pathologist

In My View

In this opinion section, experts from across the world share a single strongly held view or key idea.

Submissions are welcome. Articles should be short, focused, personal and passionate, and may deal with any aspect of laboratory medicine. They can be up to 600 words in length and written in the first person.

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Digital is Inevitable. What Now?

Pathology is not immune to the powers of digital; let's look at parallels outside the medical industry...



By Patrick Myles, Chief Executive Officer of Huron Digital Pathology

It's amazing to think about how digital imaging technology has transformed just about every part of our lives. Want to watch an Oscar-winning film in 4K resolution? Just fire up Netflix and grab the popcorn. Need a 360-degree view of your car's surroundings so you can safely park at the grocery store? It's right there on your navigation screen. Have a desire to take magnificent photos that can be blown up and displayed on huge billboards in major cities around the world? Press a button on your iPhone (last year's model will do just fine).

This begs the question: are there really any areas of our lives that won't be disrupted by digital technology? I read with interest a recent cover feature in *The Pathologist* on building a business case for digital pathology, and specifically Luke Perkocha's thoughts on the issue (1).

If you read various opinion pieces on digital pathology, you may think that the practice of pathology is somehow structurally immune to the powers of digital. Is this true though, or is the march towards digital inevitable?

Perhaps the strongest argument about

pathology's digital future, both for and against, is the radiology analogy. It goes like this: if you think that pathology will go digital, you will argue that digital imaging is everywhere in radiology, so therefore it's inevitable for pathology. If you are in the opposite camp, you will agree that digital radiology replaces costly and messy film; however, pathology slides aren't going away, and their digitization step is complex. Plus, if you're against it, you'll argue that digital radiology images are small and manageable, whereas digital pathology images are large and unwieldy. Unfortunately, these lines of argument quickly lead to a dead end, with entrenched parties on both sides.

How about this: let's step out of our comfort zone for a moment and look at a non-medical industry that has a strong professional component and has gone through a digital imaging transformation. Perhaps there may be some insights there. To do so, I will focus on professional photography and where it was at a similar stage in its evolution. We will see if we can answer the question of whether pathology has special digital-fighting powers or whether we've been down this road before.

Twenty years ago, we were still largely in the film age. Around that time, I remember when Philips came out with the first 35mm full frame image sensor that had the resolution (6 megapixel at the time) and dynamic range to offer up a true alternative to film in a professional setting. In 1998, Phase One was the first company to incorporate Philips' sensor into their single shot digital camera back, which attached to the back of a Hasselblad studio camera in place of the traditional negative film holder (a close analogy to putting a digital camera on a microscope). With this new technology, professional photographers could now offer their customers digital files almost immediately, rather than

waiting until the next day for negatives to be developed in the lab and for film to be scanned into digital format. Once advertising agencies got hooked on this quick turnaround, they naturally gravitated towards photographers who had these new digital tools. With some enticing financing from the vendors to purchase the expensive equipment, professional photographers began trading in their film backs for camera backs in record numbers. The rest is history.

“In pathology, many vendors count the massive number of slides to be digitized and just see dollar signs.”

But surely, there must have been some photographers who resisted these new tools, right? To provide some context, I found a wonderful “for and against” article that was published by Computer Weekly magazine in 2000 titled “Will digital cameras supersede film photography?” (2). In the article, the “against” camp makes several arguments that haven’t held much water. For example, the one author argues that the cost of storage is a huge impediment to adoption of digital photography. He uses the example of a then state of the art digital camera that would quickly fill up an 8-megabyte memory card (that’s megabyte, not gigabyte). He also makes several interesting arguments about printing digital files – how it’s too expensive to print using digital and the files don’t have enough resolution. I guess not

everyone could have predicted that print would be so vastly replaced by the many screens in our lives.

For pathology in 2017 – to quote baseball great, Yogi Berra – “it’s like déjà vu all over again.”

First, let’s address storage. In 2000, 8 MB of compact flash memory was actually a big deal. It was relatively expensive, it had to be fast enough and it had to be reliable. But look what happened in three short years. In 2003, a 512 MB memory card was selling for \$150! Today we see the same dynamic. For some reason, we find ourselves caught up in a terabyte dilemma when, in fact, we’re entering the age of the Petabyte (get used to that word). Forbes contributor and technology guru, Kalev Leetaru, gets it right in his recent article “Why are we so afraid of petabytes?” (3). He asks why terabytes are feared in 2017, when Google and Facebook have been routinely working on multi-petabyte datasets for the past five years. Or look at retailing giant Walmart. The company is in the process of building the world’s largest private cloud to process 2.5 petabytes of data per hour (4). The lesson here is that medical imaging, and just about every other part of our lives, will benefit immensely from the amazing advancements that are happening in technology-leading industries.

The other lesson from digital photography is in the misplaced belief that with digital technology we will simply be doing the same things as we did before, just somehow faster and cheaper. This belief totally ignores the power of technical innovation and its ability to create unforeseen applications. In 2000, photography was seen primarily as a means to get high quality images onto the printed page. Whether it was a newspaper, magazine, or billboard, that’s where photographs went. Of course, what happened was the digital capture tools were combined with higher capacity storage, faster processors, broadband

internet and all manner of amazing online technology to create incredible new products, applications, and servers – only some of which could have been imagined. The implication for pathology is that digital technology will enable new ideas and innovations, and that we must look beyond what we are doing today – and beyond our own front door – to see where the opportunities are.

Okay, so digital is inevitable. What now?

It sounds like I have been a little hard on the practitioners, whether photographers or pathologists, but let me be equally tough on vendors. They are often responsible for inhibiting adoption as well. In pathology, many vendors count the massive number of slides to be digitized and just see dollar signs. They miss that critical first principal that “great products solve problems.” There’s a reason that whole slide scanning tools have been embraced by the research community – the researchers have real problems to solve. They need to get their slides into a digital form to complete their quantitative research. Very practical indeed. The very same thing needs to happen on the clinical side. Instead of trying to scan every slide right out of the gate, we should start with the low-hanging fruit where digital technology can solve pressing, real-world problems. Then we can work together to see where the digital future will take us.

References

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