Commentary on: The Rise of Technology in Plastic Surgery Education: Is the Textbook Dead on Arrival (DOA)?

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This truly is the information age. At any given moment, we can hold a super computer in the palm of our hands, allowing us to access a vast corpus of human knowledge and link with our peers and colleagues instantaneously. Social media in particular helps keep us up-to-date on new developments in our fields. Each week, new applications (apps) and programs attempt to distill the large amount of available knowledge into high-yield learning points that are applicable to our practices. Navigating this ever-changing abundance of knowledge has proven challenging. The study by Waltzman et al confirms what we have long suspected: smart phones and tablets are ubiquitous and their potential should be harnessed effectively. The authors of this study also ask, “Is the textbook dead on arrival?”

Although textbooks are not as pervasive a part of education as they were in prior generations, this medium should not be discounted as a teaching tool just yet. In fact, the printed page may have some benefits over tablets and smart phones that may help us optimize learning.

Smart phone and smart tablets have only really begun to revolutionize education in the last several years. Although a review published in 2009 found that residents used personal digital assistants for pharmacological prescribing apps and medical calculators, the release of the iPad and similar tablet devices brought medical app use to the forefront of patient care. The first version of the iPad was released in 2010, and the “Plastic and Reconstructive Surgery” app was released a little more than a year later. Yet, despite the passage of only 5 years, Waltzman et al’s article shows that the smart tablet has become an indispensable way of accessing virtual textbook libraries, the latest journal articles, and web-based videos that demonstrate surgical techniques, in addition to allowing us to video conference with peers at a moment’s notice. At our institution, we have specialized apps, for both tablets and smart phones, for following patients, further integrating this advanced technology into patient care.

However, with the wheat comes some chaff, and with this great abundance of data, we can become overwhelmed. This is not necessarily a bad problem to have. But it does challenge educators to design quality educational experiences that optimize teaching time and the transfer of knowledge to the aspiring plastic surgeon.

The Plastic Surgery Education Network (PSEN) and RADAR Resource have become the primary plastic surgery education sites, particularly PSEN, which covers core concepts. While both sites offer high-yield content, PSEN’s focus is more general, which makes the site more widely applicable. Therefore, PSEN should be utilized more by junior residents, and the more specialized site RADAR Resource should be utilized more by finishing plastic surgery trainees. More residents are aware of the latter site, which features more concept-based articles that give a comprehensive overview of aesthetic surgery. Therefore, RADAR Resource could easily become the most popular source of high-value aesthetic surgery knowledge.

Where does the paper textbook stand in this electronic environment? Its role may not yet be marginalized. As evidenced by Waltzman et al’s findings regarding format preferences, study respondents read e-books, hardcopy books, and portable document format (PDF) files equally. However, 43% of the study respondents preferred to access journal
articles in an electronic format, and 56% preferred to access articles via print copies of the journal or print-outs of the articles, despite over 90% of the respondents owning a tablet. Clearly, people are actively reading on paper media despite having access to electronic readers. The question is – Why?

A recent study by Mangen et al compared reading comprehension in individuals reading linear text on paper versus computer screens. The authors of this study cite multiple previous studies that suggest computer screens create a “higher cognitive workload” (stress and tiredness) for the reader. In addition, study participants were able to remember what they read on both platforms but understood the context of what they learned better with paper format (i.e., participants’ contextual memory was better when text was read on paper). According to Mangen’s previous studies, the “physical, tactile, spatiotemporally fixed cues” from reading text in print media all potentially allow the reader to develop a more robust image of the subject matter being read in their mind, creating a better mental map of the subject matter.

Reading on electronic devices may also impact the reader physically. The term “Computer Vision Syndrome” was coined to describe a repetitive strain disorder associated with more than 3 hours of computer use per day. Symptoms of this disorder include eye strain, headaches, blurred vision, dry eyes, and neck and shoulder pain. Some studies estimate that 90% of the 70 million US workers using computers for more than 3 hours per day experience this disorder in some form. Although it is not thought to cause any permanently harm, reading text on electronic screens no doubt contributes to the reading difficulties that some individuals experience when reading text on computers, tablets, or smart phones.

Computer-based learning may have another unintended consequence for students. In 2011, a study in Science examined “The Google Effect” on memory, finding that college students are less apt to remember facts when they knew they could easily access the Internet to find them. Additionally, neuroimaging of frequent Internet users shows twice as much activity in their short-term memories while performing online tasks compared with sporadic Internet users. Effectively, our brains have learned to disregard information found online. Our brains are taught to skim the vast, easily-accessible corpus of knowledge found on the Internet, rather than absorb and comprehend what we read therein. This process is enhanced the more we use the Internet. In a way, the Internet has become a bank of long-term memories that our brain accesses (via computers, tablets, and smart phones) multiple times a day. What’s more, this phenomenon may have even longer-term consequences. Short-term memories must be actively processed in order to become long-term memories. Long-term memory is associated with the development of critical thinking, which is essential for the practicing surgeon.

This commentary is not meant to champion the printed page nor is it intended to vilify electronic media. There is no doubt: the e-reader (whether a smart phone or a tablet) is here to stay. With the increased use of tablets and smartphones, there will be changes in the way we process and learn the vast amount of material available to us. Information overload may unintentionally and ironically hinder the process of knowledge absorption. A standardized “one stop shop” for general plastic surgery concepts may decrease new trainees’ uncertainty. Currently, PSEN seems to fill that role, although its modules can be improved with further understanding of how we learn. While tablets are great for “on the go” learning and review, textbooks can still serve a role in solidifying what knowledge is gained from electronic media for the long run. Whether the textbook ultimately becomes extinct remains to be seen. Nevertheless, the primary goal of optimizing knowledge transfer to our students should always remain in sight.

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REFERENCES