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# Being a paperless medic

*Updated from a paper presented at the 36th UKSG Annual Conference, Bournemouth, April 2013*

Am I the student of the future? After presenting at the 36th UKSG Annual Conference on 'The Student-Information Relationship', Joshua Harding gives an updated, honest opinion of his relationship with consuming information as a digital student. Throughout this article, he discusses personal viewpoints based on subjective experience. Joshua hopes that through his blue sky thinking and outsider's perspective, he is able to provoke debate and inspiration amongst readers, to stimulate or challenge the current system and boundaries in which they may work. Joshua's workflows, however, are more grounded and based on years of trial and error, analysis of apps, and reassessment. Through his experiences, he hopes to give an insight into how students of the future will use technology like the iPad; what they will expect, what problems they are likely to encounter and, finally, to suggest ways in which stakeholders can prepare and support this new wave of digital students.

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## Introduction

In the past three years, the emerging popularity of tablets has captured the imagination of educators and students around the world. The tablet computer is not a new idea, but one that had failed until the release of the iPad. The iPad with its head start over the competition has gone on to carve a niche into education as a portable and always connected learning device. It is no surprise they have gained so much traction so quickly, and I feel it is reasonable to suggest we will see a more widespread adoption of tablets by the beginning of 2015.

A number of initiatives in universities and schools have adopted the iPad, placing it at the focal point for teaching and learning, moving from the rigid textbook and paper of analogue classrooms to a digital, portable, personalized learning environment. As the adoption of tablets increases, students' expectations will rise and they will require instant access to their most used resources, whether they are currently digital or analogue.

So the obvious question would be: as an institution, library, or publisher, are you ready to meet this inevitable demand?

## Discussion

As a student at Newcastle, where I did my undergraduate degree, my primary sources of information were printed lectures, handouts, textbooks and paper notes. This is representative, I expect, of the majority of educations past and present. In my experience a varied and bountiful number of notes are produced every year by students, carefully filed, used for revision and then promptly forgotten about. This is not because they have become obsolete or outdated, but primarily, at least in my case, because of the barriers to accessing them. Lying dormant in huge lever-arch files, it is difficult to locate specific morsels of information even for the most meticulous and organized student. I can recall many a time



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"As the adoption of tablets increases, students' expectations will rise ..."

234 reaching the library, arms trembling under the weight of my notes and textbooks, to later realize that the vital bit of information was in the folder I had left at home! Many of these hurdles were heightened when I started my medical training, and new ones added. In the first 18 months of my course, I had easily covered the same amount of content, if not more, than I had in my entire undergraduate degree. I found myself in a state of information overload, complicated by a new need to attend clinical placements and be increasingly mobile.

It was clear from the start of the course that the high pace meant I would need to consult a large amount of information covering numerous topics quickly and efficiently. Textbooks obviously have all the answers one may require, but the practicalities of carrying your books between seminars, lectures and group works are less than desirable. Not to mention impossible to take on the wards. Furthermore, even if you do arm yourself with a mountain of the most relevant and concise textbooks with pre-planned bookmarks, the pace and complexities of discussing just one patient in a group work render the paper textbook as useful as the proverbial chocolate teapot.

I needed to find a comfortable way of carrying all of my notes with me, as well as being able to access concise textbook quality information quickly, efficiently and on the move. My solution: digital consumption of information! I bought the first iPad and found it had the potential to be the solution to all my problems. Three years on, and I am now a completely paperless student. My primary source of information for medicine is now my iPad, providing me with a tool to access everything I require to study the academic portion of my course all on one device the size and weight of a paper notebook. This tool becomes even more powerful when you consider it in the context of clinical placements and experiential learning. Medical students, along with many other students, encounter a vast array of learning experiences, each spanning multiple subject areas. A key reason for the adoption of iPads and other tablet devices amongst medical students is the inordinate amount of time we spend in disparate healthcare settings, along with the opportunistic manner in which we come across learning opportunities. This experiential learning requires access to instant, accurate information as well as reference materials in order to improve understanding and get the most out of each situation. Whilst on a ward round, having the ability to access notes and textbooks on a specific condition allows you to then attach this high quality, accurate and up-to-date information to a real patient being discussed in front of you, an invaluable learning experience that aids retention and promotes confidence. Although my examples are very domain specific, it is not difficult to apply what I discuss in this article to other student cohorts.

There is a saying that states: we remember 20 percent of what we read, 30 percent of what we hear, 40 percent of what we see, 50 percent of what we say, 60 percent of what we do and, ultimately, we remember 90 percent of what we read, see, hear, say and do. The values given here should be taken with a large pinch of salt, the key message being that we all have different learning styles which focus on different aspects of learning, and that reinforcement through different learning inputs can result in improved retention. Most students have a visual learning style. Digital consumption of information lends itself to serve this learning style far better than analogue, as well as providing additional forms of media supporting different learning styles from the same resource. A paper textbook cannot play you videos, it cannot play you audio to help explain diagrams or pictures, and it cannot provide you with a way to manipulate its content. All these things may mean the difference between a student understanding a concept, and not. Using a tablet device is the first step to broadening your learning inputs. For me, the iPad brings together a variety of learning styles in a more engaging manner, putting them literally at your fingertips, enabling the student to get the most out of every learning situation as well as improving efficacy and retention.

"I found myself in a state of information overload ..."

"... the pace and complexities ... render the paper textbook as useful as the proverbial chocolate teapot."



Figure 1. Workflow of a digital student

Source: Harding, J J, slide from plenary presentation on The Student-Information Relationship, 36th UKSG Annual Conference, Bournemouth, April 2013

My common workflows on the iPad (Figure 1) incorporate three primary input sources: lectures, e-books and resource apps. All of these resources feed into my note taking app (Notability) and PDF library (Goodreader), which in turn upload or sync the content with Dropbox, a cloud storage app. Cloud storage is undeniably the fulcrum of being a digital student. It provides resources on demand via a network. Dropbox allows you to upload, download and sync your files to the 'cloud'. This means that, providing you have an internet connection, you are able to access all the content you have stored in the cloud on every device you own and even devices you don't. So, if you change a document on one device, it will change on all devices connected to the internet. Due to their file structure system, apps like Dropbox also provide a great way to organize and share your content so that, at the touch of a button, you can send a link to a friend by message or e-mail.

Not wishing to stereotype too much, but many of my older colleagues find this concept of storing data on the 'internet' to be a little scary and always seem to think cloud-stored data is more likely to get lost than paper. In my experience this is not the case. Paper notes are far more susceptible to being lost or damaged than the data you store in the cloud. Of course there are exceptions, but for the average student, cloud storage is a far simpler, far better system than any form of hard media commonly used.

"Cloud storage is undeniably the fulcrum of being a digital student."

Most of our sessions as students are timetabled and the topic predetermined. Therefore, as a digital student, I am able to queue up all the relevant apps, PDFs and texts prior to starting. This allows me to consult information instantly, promoting confidence in answering questions as well as enhancing the ability to reinforce a topic using other sources. When confronted with topics or scenarios that are unfamiliar, I have the ability to refresh my memory, bringing the content to the forefront of my mind and providing me with easy anchor points on which to hang new learning. Using a digital approach during a lecture, I am able to download the slides, export them to my note taking app and annotate during the lecture using text or handwriting whilst recording the speaker. I can switch between my note taking app and other resources, giving me access whilst in the lecture to the same textbook the majority of my classmates will consult that evening to fill in the gaps. I have no need to go back to the books once the lecture is over, as I am able to access all

236 the information I need to produce concise notes during the lecture. The result: more time to cover other topics or reinforce the content from that day.

## Textbooks

I view the current version of EPUBs (i.e. I am obviously not including v3 in this) as no more than a simple copy-and-paste from the manuscript. Although they afford you the ability to carry and access all your books with no associated hassle, as well as add search functions, they are still severely limited when considering the full potential digital platforms have to offer. This is where my grievance with the EPUB format stems from. I see it as a very short-sighted approach. Why produce an e-book designed for a digital platform that does not utilize the benefits the platform provides? Because this is the format or norm currently accepted by the industry? I obviously do not understand it, but fortunately the people over at Inkling do. They had the foresight to tap into the potential of e-books and have now produced hundreds of interactive textbooks using an 'EPUB 3-ish' format. These e-books embed interactive diagrams, animations, movies, music, audio, slideshows and 3D models into the e-book, replacing static diagrams and pictures. Not only does this start to utilize the potential of digital media but it could lead to quicker understanding of a new concept. Having a textbook that offers you the ability to be walked through a diagram one stage at a time, view a video on the topic, or have the ability to view something in three dimensions, potentially cuts out the need to consult other sources to clear up a concept. This goes back to the point I made about maximizing different types of learning inputs. By using various media types in an e-book you are more likely to engage a student in a manner which makes sense to them. Other benefits of Inkling textbooks include the ability to search through the entire book, highlight text, and make and share notes. Students are also able to purchase the content per chapter and will receive free content updates to the book. All these are features a digital student of the future will expect.

"... publishers are so far just scratching the surface ..."

Although I do strongly believe that these interactive textbooks are the foundation on which the future of textbooks should be built, I still think that publishers are so far just scratching the surface with regard to maximizing the full potential that digital content on tablets has to offer. Publishers need to add further to their interactive e-books. The addition of a universal selling point to their products may provide what is needed for students to truly see the benefits and adopt digital content. 'Smart' textbooks are something I would like to see in the future. These would incorporate everything seen in interactive e-books, but would also include additional benefits of adaptation based on learning analytics. Data-mining usage statistics, in theory, open the smart book up to become a personalized dynamic e-book. Imagine a book that whilst I study it, is studying me, observing which chapters I have read the least and most, when I first covered a topic and my scores on each quiz and test taken. Through this, comparisons between the user and peers could be drawn. The book would also be able to remind you that it has been a long time since you last looked at a topic, prompting you to revisit it and reinforce the content rather than forget it. This would all provide the student with a guide to structuring their future revision and an idea of how their learning is progressing, something I would certainly pay for.

"We will buy just about anything that suggests we will get a better grade ..."

I see this as the tipping point for students. We will buy just about anything that suggests we will get a better grade, and smart textbooks which incorporate learning analytics, if done properly, would certainly provide this.

## Barriers, challenges and pitfalls

I feel that the challenge for me as a student is to learn the information. The challenge for publishers, librarians and other stakeholders in the scholarly information chain is to improve the pathways by which this information is delivered to me.

237 Two key points usually arise from discussions I have with my colleagues about using tablets in medicine: awareness and cost.

### Awareness

Most students are simply not aware of the benefits of using a tablet and consuming digital information. I have spoken to a number of librarians, many of whom have mentioned to me that they struggle to know what their student bodies want. I put it to you that the reason you don't know what your students want is because they don't know themselves. There are a number of ways this could be changed, improving digital literacy being one. This may help librarians to engage more with their student populations, providing them with advice and improving digital awareness. I also feel that looking to the student body may well be a viable option. I am sure there will be a number of students who have adopted tablets and digital content consumption, spanning a number of subject areas and numerous devices/operating systems. These students will be able to provide advice on which workflows to use for their specific subjects. Publishers can also play a role in promoting digital consumption by providing free (offline) e-books with the purchase of paper copies. A DRM-free PDF would be smashing!

"...the reason you don't know what your students want is because they don't know themselves."

### Cost

Cost is the other major issue surrounding the use of digital consumption amongst students. It is expensive to be a student, especially with the recent increase in tuition fees. To add to this, the cost of being a completely paperless student like me is significant. The upfront cost will not change, and there is no way around it: it will make a hole in your pocket. The cash sinkhole for digital students, however, is not these upfront costs or the costs of the essential apps you will use on a day-to-day basis, but the purchasing of textbooks and subscription-based apps. These are two things I feel should be paid for by my university. I can get free access to all the popular textbooks I want in paper format from my library, so why not digital? I have to rely solely on private consumption of information if I wish to remain paperless and not settle for lesser resources. I do not feel that having to pay for all the content myself is right. In theory, my university fees should be paying for the resources I find most useful, and these are increasingly digital. I have asked a number of librarians and those in charge of resources about this, the answer usually given being, "it's just too expensive". I can understand there being a hefty cost associated with things like this, but there must be payment models that scale or lend themselves well to trialling or adopting early digital content consumption.

### Variable content

Wide variation in the quality of digital content is also a major headache for the digital student. Variation in quality of e-books is tremendous, EPUBs being at the bottom of the pack in my opinion, as they provide you with the worst user experience due to their lack of utilization of the digital platform and poor formatting. At the other end of the spectrum, Interactive eBooks currently offer the best experience on the market. The problem is that I have to buy my e-books from multiple different sources, and then use multiple platforms to access the content. Having to use different apps to read different publishers' books is a real pain. PDFs have the greatest potential to move textbooks into the digital realm. Although they do not utilize the potential of a digital platform like Interactive eBooks, they do, without DRM protection, provide you with the ability to annotate in third-party apps. Presumably, DRM is used to ensure copyright protection, but in reality it is just a barrier for the end user. There are of course always solutions to problems, and so all DRM really does is limit the average end user whilst inconveniencing the more knowledgeable ones. I have my workflow and I'm happy with the apps in it, they are built for a specific purpose and they do it well. The relevance of this is that digital students of the future will have, like me, preferred apps. So, as a publisher, I

"... my university fees should be paying for the resources I find most useful, and these are increasingly digital."

238 would not be limiting my content to in-house systems or apps, as students will expect to be able to use the content you provide in the way they want to use it, not the way you deem they should use it. With this in mind, I would be looking into providing the popular third-party apps with the ability to open DRM-protected PDF e-books and using Inking Habitat and iBooks Author, retaining the DRM protection as well as satisfying the end user by affording versatility and choice.

## An ideal future

My ideal workflow will always include a note taking app that is handwriting centric. For it to be of use to students, a zoom function is a must to enable fast, legible writing that most closely resembles a paper notepad. PDF libraries are also essential and both of these apps must be able to sync to the cloud. Interactive eBooks should be adopted as an industry standard and it would be nice to be able to export content from these Interactive eBooks in different formats, making it possible to fit the content into your own notes.

From my perspective as a medical student, the e-book market seems to be fragmented, and something needs to be done to improve this. It would be preferable to have a future with interactive, smart, PDF and EPUB e-books all available from one store, able to then be viewed on one platform of your choice. I think, eventually, we will move closer to this ideal. Whether it is by amicable agreement and negotiation, or capitalist monopoly, it doesn't really matter to me.

"... students will expect to be able to use the content you provide in the way they want to use it ..."

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