

Approaching apps for learning, teaching and research

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Introduction

This chapter looks at discovery techniques and strategies for approaching the use of apps in support of learning, teaching and research. Example scenarios are included to help illustrate situations where apps can solve a problem or augment existing teaching practice.

This chapter has a pragmatic tone and is based upon my own experience working with apps and smart devices in higher education for over five years. Your own path of discovery with your device will be granular and accumulative and it is my hope that the suggested strategies outlined herein will help you to make the most of the functionality afforded by apps and will give you the confidence to expand upon your current use of your smart device.

App discovery

Something that I have found through experience is that the respective App Stores themselves are not always the best places to discover apps. This is something that Apple's App Store has tried to address through the compilation of thematic

The Google for Education blog announced the introduction of the Google Play for Education store in January of 2015 (Sproat, 2015), however access to this specially tailored store is contingent on an institutional management contract for Chromebooks and/or Android tablets (Google, 2015b). This can be viewed alongside news on the MacRumors site from March of 2015 that Apple plans to make changes to their iPad in Education programme (Rossignol, 2015). Although both of these initiatives offer potential rewards in terms of Mobile Device Management and app selection, the lone educator who endeavours to learn more may not have access to these resources due the level of institutional buy-in required for access

Box 1. Google Play for Education

collections, for example their “Education Collections” which are grouped by subject relevance (Apple, 2014a). Google’s app store, Google Play, has also attempted to achieve similar goals through the use of Educational sub-categories such as “Apps for Students” and “Maths & Science Made Fun” (Google, 2014a). These collections and category groupings can be helpful when searching for apps, which are suitable for your students, but when using store search functions more broadly, unless you have a specific app in mind you can receive a vast and overwhelming array of results. For example a search for the word “writing” without using filters in the Apple’s App Store will bring back everything from: handwriting practise apps, word games, to note-taking apps and a only a smattering of apps which are appropriate for academic writing. When searching in the Apple App Store, if the “productivity” drop-down filter is selected the results are more useful. At this point the apps, which I use for writing started to be listed, but still, a large number of apps lacked relevance which has a tint of irony, when the default search option is “By Relevance”. To pinpoint the broader issues with app stores: there is a lack of helpful reviews, you cannot exclude children’s apps and games from search, and the non-linear relationships between functionality in apps make discovery difficult.

Apps may not fit comfortably functionality-wise within a ‘productivity’ definition in the same way as a piece of desktop software like Microsoft Word. If we take a moment to think about this it seems obvious, as a large part of how we perceive ‘productivity’ is flavoured by our prior experience using desktop applications like Microsoft Word; a veritable do-it-all word processor. An app might package a small selection of functions, similar to those that Microsoft Word offers us, such as writing tools, spell-check and formatting tools, but the app might also traverse other genres of functionality or may be deliberately minimalist in order to promote focus while writing. Examples of apps which fall into a more minimalist niche for writing are Index Card (Denvog, 2013) and OmmWriter for iPad (Herraiz Soto & Co., 2013).

My key recommendation is to use web search engines, such as Google, Bing, Yahoo and DuckDuckGo, in the first instance to search for the desired task or a function of a prospective app. The aforementioned task or function that you want to see is what will lead you to prospective apps, “apps” that you can subsequently identify in the relevant app store for your smart device. This need not be time-consuming, as an experiment and a way to get started use a built-in Clock app or get yourself a timer app like Timer+ and set 10 minutes aside (Minima Software, 2014). Think about the thing that you

would like an app to do or a way that you would like it to work, for example "make notes on my iPad, app" and see what comes up in your chosen search engine. In the search engine DuckDuckGo (duckduckgo.com), an app-specific category will be included on your search page due to the inclusion of the word "app". DuckDuckGo also enables the use of Quixey, the app-only search engine, which you can access by putting "!Quixey" at the end of your search. The exclamation mark in this context, is called a "!bang command", and uses DuckDuckGo's search tools to access Quixley (DuckDuckGo, n.d.).

Sharing opinions and practice

Searching for online opinions is only one way that you can tap into collective knowledge around apps. In-person discussions, whether in the corridor at work or with friends and family, can be great sources for app recommendations. Furthermore consider sitting down for a coffee with fellow smart device owners. Try to resist the temptation to discuss what these devices don't do as that can derail the dialogue, instead focus on what you do with your device and what you aspire to do with your device. You may be surprised to learn that others have discovered different apps for completing similar tasks. Several higher educational institutions in the UK now run events focused on the use of these devices and discussion of apps, which can support teaching and learning (Aiyegbayo, 2014). Consider attending events like this at your institution or establishing your own. These events can be very informal or have a thematic basis for focus on specific outcomes (MacNeill, Webber & Hewitt, 2014). For example you might have a session around an app which a few of you agree is useful for in-class teaching, such as Doceri Interactive Whiteboard (SP Controls, 2014) or Explain Everything (MorrisCooke, 2014) and then you can use the session to explore the app in more detail together and discuss the things that you like about it and questions which you have come across.

Support of your teaching and research

A key aspect of personalising your device and thus confirming its value is to make use of apps for support of teaching and research. The most effective way to integrate this personalisation into your existing workflow is to consider the search for apps as not dissimilar to the search for literature. In your academic sphere you are likely to have keystone literature, a cadre of works, which you have found to be integral to your research and/or

teaching practice. A cadre of apps can also take on these properties over time, however just like your keystone texts it is worth interrogating their usefulness from time-to-time. Do they remain relevant, do they continue to serve the desired task or purpose, has something new emerged which does a better job, is there a free option which your students could use that would do something similar? These questions may seem familiar when applied to literature and over time as with research sources, favourite apps will emerge.

WebDAV is an acronym for "Web Distributed Authoring and Versioning" as an extension of HTTP; "Hyper Text Transfer Protocol". Was defined by a Working Group of the Internet Engineering Task Force (IETF) as a "set of methods" which can be used as a means for "management of resource collections" (Internet Engineering Task Force Trust, 2007).

Box 2. *Webdav*

You will find that unlike desktop software, which in some cases has a historical legacy reaching back 20 years or more, such as the likes Microsoft Office or Adobe products, your 'favourite' app may be superseded by something that does the job better in the near future. This may sound like a stress inducing notion and can present challenges in terms of moving your content from one app to another. These challenges are lessening due to improvements in cloud-based storage services

associated with smart device operating systems, for example iCloud drive and Google drive, and also through the emergence of what I like to term as third-party connective apps (Apple, 2014b; Google, 2014c). The criteria for "third-party connective apps" is that they must be listed as sharing/saving/transfer mechanisms from a wide variety of apps, typically they also have a web-based service element. Examples include Dropbox, Box, OneDrive, Evernote, Instapaper and Feedly (Box, 2014; DevHD, 2014; Dropbox, 2014; Evernote, 2014a; Instapaper Holdings, 2014; Microsoft, 2014a). Some of these services are content specific, for instance web content bookmarking in the cases of Feedly and Instapaper and others allow a variety of content in the cases of Dropbox, CloudOn, OneDrive and Box. In addition to third-party solutions, increasingly WebDAV (see Box 2.) connections are offered within apps allowing access to institutional repositories for storage, backup and retrieval. For example Microsoft Sharepoint can be used through a WebDAV connection in productivity apps such as, Apple's Pages, Numbers and Keynote, and also iAnnotatePDF, Notability and GoodReader (Branchfire, 2014; Ginger Labs,

2014; iTunes, 2014a, 2014b, 2014c; Microsoft, 2014b; Selukoff, 2014). We are not quite there yet in the case of all apps, particularly those which produce media artefacts such as audio or video files, but increasingly your data will be independent of the apps themselves therefore allowing you the flexibility to try out alternative apps.

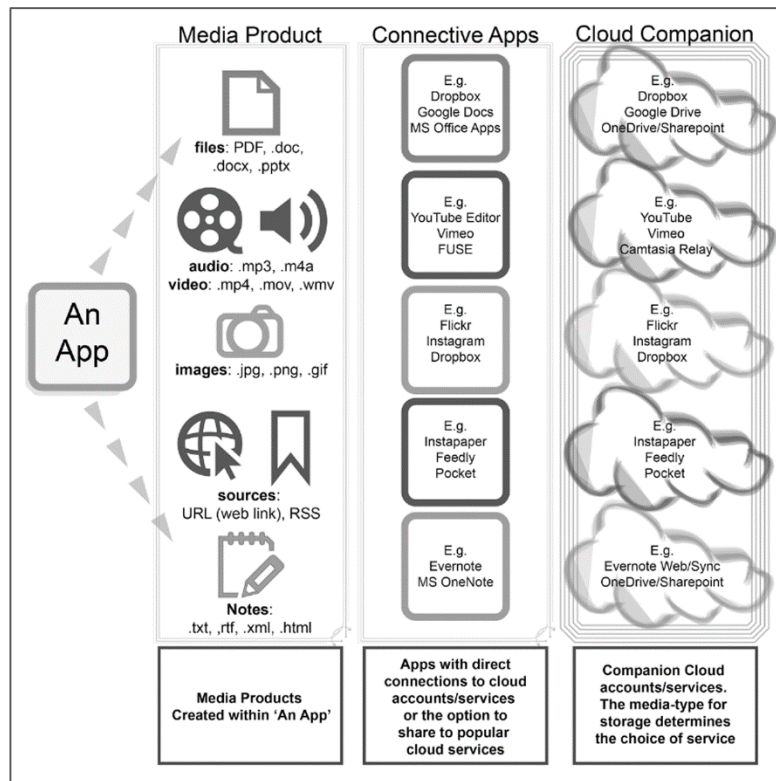


Figure 1. Third-party connective apps. This figure illustrates the relationship between media products created within an app and intermediary apps which liaise directly with cloud-based accounts and services

A very quick way to check the status of an app is to review the features list when an update is released through your respective App Store. What functions have the developers introduced? You may be surprised by new and helpful additions to the functionality that can make your favourite apps even more useful. Also if there is a piece of functionality which you would like to see in your favourite app, try writing to the developers to suggest it prior to switching to a new app. One of the excellent things about customer-

to-developer relationships, when it comes to apps specifically, is that it is a far more direct relationship than some traditional desktop software. Many apps have integrated feedback functions where you can provide the developers with direct suggestions so that they can actively improve the app and introduce new functionality. I have found developers to be very responsive and a quick message is all it takes. Also if you like an app and you are finding it helpful, consider leaving a review, recommending it via social media or writing a blog post about the pros and cons. To return to my prior point about app stores, if we share our reviews as educators, it will help to make searching for apps more fruitful in the future.

Example scenario 1

You plan to create a slide in your PowerPoint presentation displaying data from the United Nations related to a specific country, but before you create the slide you decide to search for "United Nations, app". Many International organisations and governmental bodies now have apps, including the United Nations (UN) which have several apps for different purposes (United Nations Digital, 2014). In this case you find an app from the UN, which will not only allow you to show data but comparative data between countries. Instead of a static slide you could use the app as a tool to question your students, for example students could ask a question like "what is the comparative level of education between country x and country y?" and the live answer to that question as well as a visualisation of that data will be live at your fingertips (United Nations, 2014).

The British Government are not actively pursuing app development, instead focusing on mobile accessibility for the re-designed gov.uk site (Loosemore, T., 2013). The data.gov.uk project overseen by the Transparency Board aims to create "a network of re-usable government data" this includes 3rd party apps which use "non-personal, non-sensitive data" (data.gov.uk, n.d., para. 1) for example: crime statistics, council information, etc.

Box 3. British Government's use of apps

Personalisation for teaching

Another way to approach the use of apps in a live teaching situation is to consider the personalisation of your device as an advantage and think about

how that might aid you. For example in your teaching spaces a desktop computer may be provided, connected to the projection system. This desktop is designed to serve the needs of the masses and as a consequence it will likely have a restricted ecosystem of software applications. Depending upon the situation and your familiarity with the classroom computer it may not be possible to confidently use anything beyond Microsoft PowerPoint. Provided you have a reliable Wi-Fi connection and a video adapter for connection to the projection system your device can be your personalised teaching tool. This point is largely restricted to iOS devices and Windows touch screen devices, as Android devices have varying levels of compatibility with projection systems unless the room is specifically setup for that purpose; for example a Chromecast box could be made available for presentation from Android devices. At schools, colleges and universities where the choice has been made to install Apple TVs, AirPlay compatible software or Chromecast boxes in teaching spaces, wireless display has the potential to not only be beneficial for students in terms of sharing in-class activities, but also presents advantages such as ease of use and freedom of movement in the room for teaching staff. These benefits are supported by JISC Regional Support Centres' report on the experience of staff using Apple TVs in conjunction with iPads at West Suffolk College (Jisc Regional Support Centres, 2013).

Example scenario 2

As a means of teaching anatomy you plan to use the website Zygote Body to display aspects of the human skeleton. However, the site is only compatible with Google Chrome and you are unsure of whether Chrome is installed on the classroom computer. As an alternative you install 3D for Medical's free app Essential Skeleton and display this in-class using the app's built-in annotation tools. If this were a frequent need you may choose to install the paid apps, Essential Anatomy or Zygote Body 3D Anatomy Atlas (3D4Medical.com, 2014; Zygote Media Group, 2014b). Apps like Essential Anatomy can also be used to provide quick annotated diagrams that can be saved as images for addition to the Virtual Learning Environment (VLE) for out of class study.

Beyond the classroom

Many apps have the potential to be powerful resource creation tools, helping to support your students beyond the classroom. For example instead of sending a written email in response to a student question you may choose to use an audio recording app to send them a quick verbal response as an email attachment, or to use an app like TechSmith Fuse to provide a quick video reply (TechSmith, 2014a). Apps like Explain Everything or Doceri can be used to explain concepts through video in real-time, providing similar qualities as an in-class demonstration on the board (MacNeill, 2013b). The app, Explain Everything is used to great effect by Dr. Keith Turvey in his “Narrative Ecology Explained” video, in which he uses to the app to visually explain his Narrative Ecology theoretical framework (Turvey, 2013). As a way of integrating these practices into your workflow, next time you receive an email question from a student, ask yourself the following questions: can this question be answered visually and would the other students benefit from the answer as well?

Example scenario 3

A student has sent you an email asking where to find certain materials in your course or module within the VLE. Instead of writing an email back you take a quick screenshot of your course module and then use an app such as Skitch (Evernote, 2014b) to annotate the screenshot with arrows and labels, showing the visual location of the materials in question. This screenshot would be complete in a matter of minutes, could be emailed directly to the student from within the app and then also quickly uploaded to your course or module as a class forum entry or as an attachment to a course/module announcement. In this example your time-saving is two-fold: on the one hand you saved yourself from writing a description of the location of the materials and on the other you answered a question which other students may have potentially asked or felt unsure about asking.

The creation of resources outside of the classroom and possibly outside of work-time brings me to the concept of division between work and home life. As the popularity of smart devices has grown, in my own experience as a learning technologist, instructors have frequently come to me with concerns that the use of these devices has blurred the lines between work and home life. This is a view which was investigated by Jennifer J. Deal

(Deal, 2014) in a recent article in the Wall Street Journal. The article posited that the technology can make users feel like they need to respond to emails outside of work-time; however, as the article also suggested, the technology can also minimise the need for this through consideration of how we configure and use these tools. This is not a new problem, any technology that introduces portability changes the rules of the game. For example there are likely to be times when you choose to turn off your mobile phone or mute it, so you are not disturbed by its ringing. Even though the aforementioned mobile phone is likely to be a smart device now, it offers similar yet more sophisticated functionality. You can quickly turn on a "do not disturb" function, or even schedule that function during periods when you plan to research or you are at home. Furthermore there is a lot that you can do with customisation in terms of the kind of notifications you receive, so if you have an important email thread which you are following you can choose to be notified of those crucial email replies with an onscreen badge instead of feeling the compulsion to keep checking your inbox. The key to all of this is to set the rules of engagement, let others know how you operate and stick to your rules as far as you are able.

As for use of your device at home, utilitarian non-work apps can present some truly rewarding discoveries resulting in benefits within your work as well. For example, I have used my smart devices to measure the width of my front door to see if I could fit a new sofa through it, LINEA (Critec, 2014); edit photos which I have taken, Aviary Photo Editor (Aviary, 2014); scan documents, TinyScan (Appxy Information Technology, 2014); and create short videos about trips I have taken, iMovie (iTunes, 2014d). All of these experiences have resulted in immensely fulfilling digital products and then subsequently I used these skills to create resources for teaching and also passed on app recommendations to others. The point is if you view this only as a work device then you may only realise your device's potential as a word processor.

Retreat

As a means of gaining familiarity with your device I recommend taking a retreat with it and decide if this is a work retreat or home life retreat. Load up any materials that you think you might need on the device, for example that word document you are working on, or those photos from a recent holiday you are planning to tweak. Search for and download some apps based on what you want to do, you may choose more than one; use this as

an excuse to see what works best. Then dissuade yourself from packing your laptop and you're away! As a result of these sorts of experiments in my own experience, I now use my device for all my writing projects, as I can maintain my focus more intently in an app rather than within desktop/laptop software where I find the windowed layout to be a distraction (I have planned and written this document on an iPad, with the exception of the references). My most surprising use of an app during a day when I had decided to be iPad-exclusive was during a student event when I used a free app to help some students to take high quality passport-style photos for their student cards. I never needed the ID PhotoPrint app again, but it solved an immediate problem perfectly (Tinkertanker, 2013).

Cloud services and when is Free is not free

In the *Support of your teaching research* section above, I mentioned the use of cloud services in conjunction with apps. I recommend exercising caution when considering your options for data storage in the 'cloud' and in this area I defer to the advice provided by your institution's IT department. At my own institution we have a provided cloud-based solution, which can be used in conjunction with a number of apps, but many device users choose to use 3rd party services like Dropbox for both personal and work related uses. The key question to ask yourself is, who does this data belong to? If the data belongs to your institution and is privileged to your position within the institution then that data needs to be stored on the solution provided by your institution. Also when working on research projects and materials consider the intellectual property rights for those materials and works. For example, if you plan to use online collaboration tools or cloud-based storage solutions to work on projects with colleagues, make sure that you have checked the Terms of Service (TOS) as well as the End User Licence Agreement (EULA) prior to selecting the tool to ensure that the service provider or developer does not assume any ownership rights over your work in the fine print. You may find that your institution advocates the use of certain tools over others due to these considerations. If you are unsure about your use of an app or service, seek guidance from IT support professionals at your institution.

In short, most apps, whether they interface with a cloud service or not, have a Privacy Policy. For instance in the Apple App Store you will find this information below the app description. When considering your privacy, in non-work related use of apps, think about what the app's purpose is, and

whether it needs the data it is requesting. So for example, if you install an app, which is for accessing a social media platform, and it requests access to your contacts, ask yourself why does it need access to your contacts? It is likely that this app wants to use your contacts data to find matches between your contacts and your activity on the social media platform, but you have lots of people in your contacts who are not members of that social media platform, why does the app need that data? This particular request has caused me to uninstall apps more than once, or manually enter only the people who I wish to contact using the app.

On the other side of the scale a photo app will need access to the photos on your device in order to be useful. To help you make decisions with regards to your personal privacy on both iOS and Android devices you can review which data sources your apps have access to within the settings (Apple, 2014c, "Basics: Privacy"; Google, 2015a).

To summarise: as one does with the use of certain websites and software applications you have to make trust-based decisions and if there isn't enough information to go on, then reconsider whether you want to go ahead with installing the app.

Recommending apps to your students

Within the context of post-secondary education, many of the apps that you discover over the course of using your device could offer potential benefits for your students. Also encouraging the use of smart devices' web capabilities to access resources, for example through your VLE can be of great benefit. These approaches present tangible value in terms of inclusivity. Ofcom figures from the first quarter of 2014 showed that ownership of smartphones in DE (low-income) households now outnumbers ownership of laptops at 47% as compared to 44% (Ofcom, 2014a). This suggests that for students in this socio-economic group, smartphones may be their most readily available option for accessing the Internet. Data from Ofcom's 2014 Internet use and attitudes bulletin also supports this with 57% of UK adults saying that they access the Internet from their smartphone, 86% of that '57%' response group were identified as being of typical post-compulsory education age; 16-24 year olds (Ofcom, 2014b, p. 3). The use of apps and the devices' web access capabilities is particularly beneficial in the areas of: personal organisation, written work,

research, and revision. When recommending apps and device use to students it is worth considering the following issues:

1. **App costs:** a free app, low cost or free web-based app may be more enticing to students than apps you may personally choose to purchase.
2. **Access to data:** apps which do not require any disclosure of information for their use, for example no service-specific account needed and do not request an email to be entered are preferred; both for ease of use and data protection.
3. **Clearly define how the app is useful:** what is it about this app, which makes it really compelling? Why do you use it and in what context? In her book, *Best Practices for Teaching with Emerging Technologies*, M. Pacansky-Brock suggests listing all technology tools, including “supplemental mobile apps” that will be used during the course of study. Pacansky-Brock recommends creating a “list of tools that will be used and your reason(s) for using each” and making this list available to students prior to the start of the course as, “it empowers students to be able to register for classes that meet their own learning styles and overall preferences” (Pacansky-Brock, 2013, Chapter 1, Section A, para. 2).
4. **Inclusivity:** are there options available, possibly as web resources, for those students who do not have smart devices, but do have laptops/desktops? Conversely any software or web application, such as the VLE or an online reference tool should ideally be smart device accessible. To define a web application in this context, D. Nations, writing on about.com’s tech trends website explains the concept very succinctly as, “any application that uses a web browser as a client” (Nations, n.d., para. 1). The difference being that when we choose to use such applications on a smart device they must also be responsive, meaning that the layout and functionality actively adjusts to access from the device’s web browser as well as being accessible from a within conventional desktop/laptop web browsers such as Mozilla Firefox, Microsoft Internet Explorer, or Apple’s Safari.
5. **Signposting:** another idea that Pacansky-Brock introduces in *Best Practices for Teaching with Emerging Technologies* is the idea of visually or descriptively signposting mobile accessible assignments and activities to students. As she writes, “consider using a small icon to designate ‘mobile worthy’ activities, “your

students will appreciate your efforts to make their everyday tools part of their college learning experience..." (Pacansky-Brock, 2013, Chapter 6, Section 7: "Which Activities Are Appropriate for Mobile", para. 4).

I was recently asked about whether it is appropriate for academic staff to recommend certain apps as they are commercial products which may or may not be supported by the institution's IT department. This is a legitimate concern and to play it safe you may wish to recommend only apps that are related to institutional services or are provided by approved vendors. Although apps can provide a cost and time effective solutions to academic challenges, I think that there is a case to be made for couching recommendations in terms of personal use and personal choice. You might choose to give a recommendation like this, 'I have personally used apps for editing short videos in slow motion, for example x app, it costs y amount and other similar apps might be available'. For students who do not have access to smart devices there may be web-based alternatives, for the slow-motion video example, YouTube's free web-based video editor could be an option (Google, 2014e). I like to follow a rule of three when providing technical solutions, so in addition I might also suggest that the students could book a video editing computer station at the institution's media centre where they could get technical help with the project. The point is any of the three approaches to the project will have similar results and it may not be possible for all the students to use the institutional editing facilities at the same time, so apps provide a greater level of flexibility for completing this project. The Swiss Army Knife-like power of apps to solve situations like this should not be underestimated and in this example recommending an app is not that dissimilar to recommending an article, book or selection of online resources, which might aid the completion of a given assignment. You also don't necessarily have to recommend a specific app, but could suggest more generally that students consider using their smart devices for the project. It is possible that your students' current scope of device-use is restricted to a small number of apps, they may not be aware of the potential of their device.

If you work with students who have specific educational needs, take a bit of time to investigate the accessibility options available within an app; are there any integrated options within the app for type-size or style adjustments, does the app respect the operating system accessibility options? For example, a popular app like Evernote, might be helpful to students with Dyslexia for collecting and storing notes but accessibility-

wise it does not offer in-app adjustment of background colour/contrast and typeface style of notes so it may not be as suitable as alternative note-taking apps (MacNeill, 2014). Furthermore device operating systems can offer some very helpful built-in accessibility tools. For example the Speak Selection and VoiceOver functions on Apple's iOS devices are incredibly helpful for text to speech and these tools have developed at a rapid pace with operating system updates (Apple, 2014c, "Accessibility: Speak Selection & VoiceOver"). The recent iOS8 update introduced Speak Screen, a two fingered top-to-bottom screen swipe to read out the contents of the page shown on screen (Apple, 2014c, "Accessibility: Speak Screen"). This function also brings up a collapsible on-screen controller allowing the user to control the speed of the voice and to skip ahead or rewind.

A further recommendation is that if you undertake any induction activities with your students, consider auditing your students' device ownership (Chen & Denoyelles, 2013). A good way of doing this is through use of an audience response tool, which allows students to use their smart devices to answer the 'device ownership' question interactively for example, using Poll Everywhere or Socrative (MasteryConnect, 2014; Poll Everywhere, 2014). With an accurate indication of device type ownership you can think about potential app sharing and class-based activities based on this information.

Steps for use of smart devices with your students

The next step after gaining familiarity with apps to support your teaching delivery and research practices is to implement the use of appropriate apps in the classroom with your students; where each student or group of students uses an app for an in-class activity or project. When considering apps for in-class use there is a simple list of rules, which you can follow, inspired by the "Mobile learning practitioner's checklist" developed in the Higher Education Academy's *Making mobile learning work* publication, the concepts are updated due to changes in mobile technologies since publication in 2011 (Traxler & Wishart, 2011).

Checklist for in-class use of smart devices

1. **Learning outcomes:** how is using smart devices going to achieve your learning outcomes and what is the added value? Particularly does the use of this app in the classroom introduce the students to

a skill or tool they could make use of elsewhere in their studies and more broadly? Sometimes the added value is something as simple as not having to book a computer room, which necessitates communication of a room change, in order to allow students to look up or access materials on the web briefly during a class session.

2. **Wi-Fi and mobile network coverage:** ensure that there is adequate Wi-Fi in the area where you plan to use the devices. In the case of location-based activities where you might be relying on 3G or 4G coverage, ensure that the area has coverage and discuss this with your students to ensure that they are happy to use their data plans for this purpose.
3. **Devices:** do you plan to ask the students to use their own devices or devices you provide?
 - **Devices are provided:** if you have a bank of devices, which the students can use you can pre-install a paid app for completion of a specific task; this can still work well if you only have a small number of devices. A ratio of one device per three students can be very effective. In contrast, one device to one student can be isolating in a classroom situation as it creates a situation where students can enter their own individual virtual zones. So to explain, if you would like the students to take a test where you wish to measure individual responses, then one to one is the correct ratio, but for most other activities a more collaborative or team approach can be successful.
 - **Student owned devices:** if asking students to install an app on a personal device, free apps are the ideal for take-up, but if only a paid app with do it must have added value beyond the classroom in the same way that buying a textbook offers study value. For example you may ask student teachers to mark-up a sample paper to indicate mistakes, using a PDF annotation app; a very worthy exercise which I must credit to Dr. Nadia Edmond (MacNeill, 2013a). In this case it may be useful to install a paid app for this as the students can go on to use that app in their teaching practice. Conversely in this situation you may wish to use a free app that offers a smaller toolset, providing the students with a taster of paper annotation

and then suggesting apps, which offer more advanced functions.

4. **Presentation and sharing:** how will the students share the work that they have created on the devices with the rest of the class? This can be as simple as passing the devices around, although students may be less inclined to do this with personally owned devices. Solutions that allow you to show collective responses on the classroom projection system, such as Poll Everywhere, Socrative and Nearpod (Kovalskys, 2015) can be helpful here. Technical solutions can also provide sharing functionality. Solutions include, as mentioned in the personalisation for teaching delivery section, Apple TV, Chromecast and software for Mac/PC that allow the computer to act as an AirPlay receiver; over Wi-Fi broadcast of Apple device screens to the enabled computer (Apple, n.d.).
5. **“Contingency” (Traxler & Wishart, 2011):** With the best will in the world sometimes things will happen which are beyond your control. For example if the Wi-Fi connection becomes unavailable, that can derail a session when using a mobile responsive website, a web application or an app with web contingent functionality. I recommend testing beforehand in the room you plan to use, with the equipment you plan to use such as an Apple TV. Also having the main classroom or presentation laptop on a wired connection is helpful so that you can circumvent the Wi-Fi for presentation purposes. If you are planning to use an online presentation tool, it is also worth having a basic version of the same material as a PowerPoint presentation or PDF file. For example a polling activity could still be completed using questions shown on the classroom projection system and a show of hands in the room.
6. **“Student Autonomy” (Traxler & Wishart, 2011):** This concept was explained effectively in the *Making mobile learning work* publication: “the need to work with students to enable them to choose the best ways of using their personal devices to support their learning” (Traxler & Wishart, 2011). Use of the students’ own devices speaks to this point, as you providing an educational experience which they can take with them and revisit, not something which remains on the loaner device which exists only within the confines of the classroom. You are empowering students to begin their own journey into the personalisation of learning.

Device neutrality and BYOD is the future

On an individual basis we may find ourselves predisposed to a certain corporation's hardware ecosystem due to a variety of factors, including but not limited to compatibility with existing hardware/devices, data and SMS plans and employer supported or purchased hardware. Your students will also have their own preferences and may prefer to use their own equipment due to familiarity and accessibility, to access centralised web-based services (Johnson & Adams, 2011, p.17). The emerging apps and web applications of the future are compatible with multiple operating systems and multiple device types and facilitate live sharing with a strong web-based component. Also the prevailing apps will allow created content to be accessible from a variety of platforms, as Fang explains in *EDUCAUSEreview Online* this "content must be produced to be accessible via various devices and platforms, using not what is "leading edge" or "bleeding edge" in the market but rather the more generic protocols or formats that most, if not all, devices accept" (Fang, 2014, para. 18).

The aforementioned points are becoming increasingly important considerations when choosing which apps you want to use for in-class collaboration or when recommending apps to your students. In my own work I try follow a device neutral rule as far as possible, seeking apps which are available for both Apple and Android operating systems, unfortunately Windows compatible apps are still a rarity. As the Horizon Report stated in the 2013 edition (Johnson *et al.*, 2013, p.16) and the Open University's Innovating Pedagogy report (Sharples, *et al.*, 2014) recently validated from a UK perspective, that Bring Your Own Device or BYOD is the overwhelming trend in education and will affect the nature of apps which succeed in the market. This results in both benefits and challenges in terms of adoption and support, but I for one am excited about the possibilities which will arise as smart device ownership becomes unanimous.

Practical examples

Learning: assignment and activity ideas

- **In-class activity:** place students in groups, with a smart device per group, and ask them to create a visual comic strip to explain a narrative idea. This is an idea which I must credit to Dr. Ruben R. Puentedura at his workshop as part of the 2011 New Media Consortium conference where he introduced the idea of using the

app, Strip Designer for this purpose (Egeblad, 2014; Puentedura, 2011). Potential apps: Comic Life (Plasq, 2014), Strip Designer.

- **In-class or group assignment:** use of video apps to demonstrate correct practice to other students, particularly relevant to clinical skills in health subjects as evidenced by A. Monaghan's use of video apps (University of Brighton, n.d.). Potential apps: Coach's Eye (TechSmith, 2014b), Ubersense Coach (UberSense, 2014).
- **Group or individual assignment:** ask students to create short videos from photographs with voice-overs to explain a historic event or narrative. Potential apps: generic camera app available in iOS, iMovie, YouTube Capture (Google, 2014d)
- **Group assignment activity:** ask students to create a location-based mobile activity, this may be created on a desktop/laptop for eventual use on a mobile device. Potential apps: Aurasma (Aurasma, 2014), Scramboo Playmaker (Scramboo, 2014)
- **Individual or Group activity:** ask students to annotate an image, for example an advertisement or art work for critical evaluation purposes. Potential apps: Skitch, Notability, BaiBoard (Lightplaces, 2014), Explain Everything, Doceri Interactive Whiteboard.
- **Online group activity:** collaborative lecture notes - ask your students to keep notes which mean something to them (minimalist or in-depth) and then request that they add the notes to a blog or group discussion board in the VLE. This is helpful for students who struggle to take notes and a source for potential online discussion. Potential apps: Blackboard Mobile Learn (Blackboard, 2014), web access to the VLE via smart device, Evernote, Notes Plus (Tran, 2015) and other note-taking apps currently available.

Teaching: presenting, marking and formative feedback ideas

- **In-class presentation:** using a conventional presentation format (slides and verbal delivery), apps that feature remote control options can be helpful. Such as Keynote, where an iPhone/iPad can be used to remotely control the presentation on a Mac or iPad connected to the projection system. Or apps such as BaiBoard or SlideShark (Brainshark, 2014), which allow you to broadcast a presentation or a virtual whiteboard (which can in-turn be shared on the desktop computer hooked up to the projection system).
- **Interactive audience response options:** for flexible presentations including audience response tools Nearpod is a multi-platform

tool and companion app which can be controlled in-class through the app. Two additional apps for audience response are Socrative, Poll Everywhere and there are others.

- **eMarking options:** these are largely VLE platform and eSubmission dependent, two contemporary examples are Bb Grader (Blackboard, 2015) and Turnitin for iPad (iParadigms, 2014).
- **Formative feedback:** there is vast array of apps, which can be used to provide formative feedback, here are just a few ideas.
 - **Audio feedback:** generic iOS Voice Memos app, SoundNote (Estes, 2014), Recordium (Divband, 2014), iAnnotatePDF, Notability, Turnitin for iPad;
 - **PDF annotation:** iAnnotatePDF, Notability, Adobe Reader (Adobe Systems, 2014), Notes Plus;
 - **Video feedback:** TechSmith Fuse, iMovie, generic video app.
- **Note-taking during meetings with students:** Evernote, Notes Plus, Notability and others.

Research: research and personal organisation ideas

- **Source discovery and filtration:** use apps like Feedly, Instapaper, Newsify (Alexander, 2014), Flipboard (Flipboard, 2014) to discover and subscribe to blogs and news sources (using RSS feeds – see Box 4). Each of these apps allows you to customise and categorise your sources for easy reading and organisation of your research and personal interests. If you use this category of app in tandem with social media it will help to highlight topic and research related news which you can share amongst your network
- **Bookmarking:** Feedly, Flipboard and Instapaper have companion plugins for desktop web browsers, which can be used to bookmark pages for later consumption within the mobile apps. Furthermore the multi-platform app Pocket runs the gamut from bookmarklet tool to RSS curator and has, according to the Pocket website, compatibility with “500+” apps in order save a variety of sources

RSS is an Internet protocol and is an acronym for Really Simple Syndication (RSS 2.0 Specification, n.d.). It is a method by which users of web-based content, including written blog posts, online articles and audio/visual materials such as audio or video podcasts can be acquiring via subscription.

Box 4. Using RSS feeds

for later review (Read It Later, 2015). Alternative mobile web browsers, rather than browsers provided through the operating system, such as Mercury (iLegendSoft, 2014) and iCabMobile (Clauss, 2014) allow for customisation of sharing and saving to a variety of online bookmarking services.

- **Social networking:** the mobile app iterations of social media networks are often far more efficient and pleasurable to use than in their desktop forms. Twitter (2015), LinkedIn (2015), Pinterest (2014), Learnist (2015), Facebook (2015) and Google+ (Google, 2014f) all have companion apps. From a work perspective I have found Twitter, LinkedIn and Pinterest to be most useful in support of research, for seeking teaching resources and professional networking.
- **Compilation of materials for research:** there are a number of apps that allow for the import and management of multiple file types, in the case of Notes Plus different files can be compiled in a virtual notebook. Recommended apps: iAnnotatePDF, Notes Plus, Notability.
- **Simple apps for focused reasons:** for getting initial thoughts on paper there are apps which can be helpful to aid focus. Recommended apps: Index Card, Paper (FiftyThree, 2014), Ommwriter, Evernote.
- **Reference management apps:** EndNote for iPad (Thomson Reuters, 2015), Mendeley (2014), PaperShip for Mendeley and Zotero (Shazino, 2014); each interacts with companion online services. There are also apps such as RefME and Thomson Reuters RefScan which use barcode recognition technology with images taken using the smart device camera to produce formatted reference information (ReferenceME, 2015; Thomson Reuters, 2013).

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