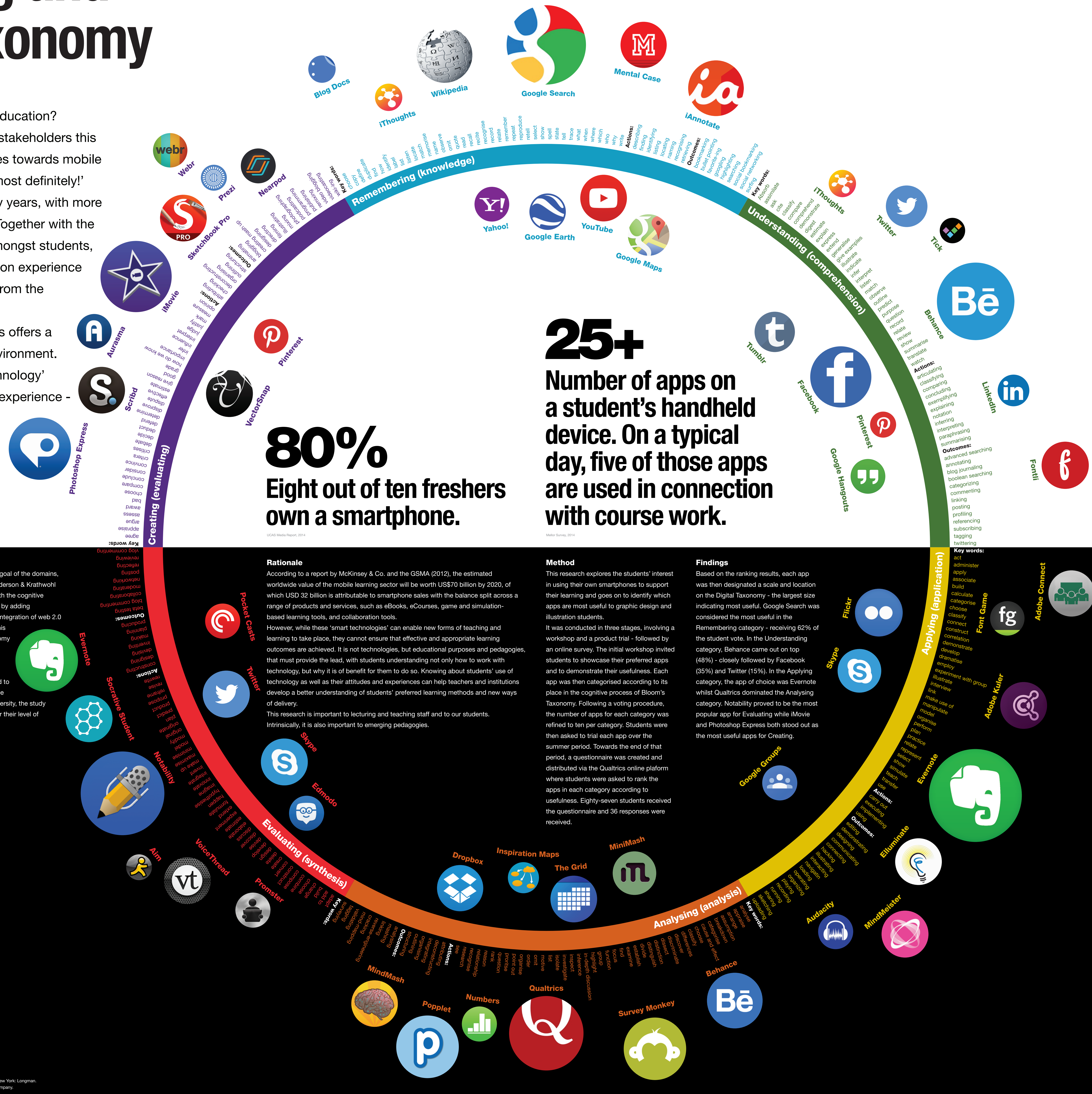


Smart learning and the mobile Taxonomy

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Are mobile devices fundamentally affecting Higher Education? In 2011, Educause asked academics and university stakeholders this same question - revealing many very positive attitudes towards mobile technology. The most common thread was that of 'most definitely!' Teaching practices have evolved over the last twenty years, with more and more emphasis on student-centred pedagogy. Together with the growing ownership of personal handheld devices amongst students, the potential for smartphones in education builds upon experience described in extensive literature on mobile learning from the previous decade which suggests that the ubiquity, multi-functionality and connectivity of mobile devices offers a new and potentially powerful networked learning environment. This report examines the potential of this 'smart technology' and how it can be applied to enhanced the learning experience - focussing on the specific use of smartphone apps.



97%
Most students would use their smartphones as part of their studies.

Digital Taxonomy for Graphic Design and Illustration undergraduates
In 1956, Benjamin Bloom defined three domains of learning: Affective, Psychomotor, and Cognitive. The goal of the domains, termed Bloom's Taxonomy, was to create a more holistic approach to designing learning. Meanwhile, Anderson & Krathwohl revised Bloom's original in 2001 to make it more relevant to newer educational theories by combining both the cognitive process and knowledge dimensions. Churches' Digital Taxonomy took the revision a step further in 2008 by adding multimedia technology to the taxonomy and the associated learning opportunities that emerge from the integration of web 2.0 technologies into the learning environment. Alan Carrington developed the concept further in 2012 with his introduction of the Pedagogy Wheel. A graphical way for teachers to see the mapping of Bloom's Taxonomy whilst linking iPad and iPhone apps to each cognitive domain category. My own study takes all these previous revisions a step further by relating each cognitive category to the learning needs of Graphic Design and Illustration undergraduates. Whilst the list of key words associated with each of the cognitive categories remain unaltered, the list actions and outcomes have been modified to meet the needs of contemporary practices. Central to this enquiry is the relevance and use of smartphone apps as a way of enhancing the learning experience. By collaborating with students at Staffordshire University, the study takes on a further dimension as the results of a student survey ranks those selected smartphone apps for their level of take-up factor and usefulness.

The result is the following 'Smart Wheel'...

Rationale
According to a report by McKinsey & Co. and the GSMA (2012), the estimated worldwide value of the mobile learning sector will be worth US\$70 billion by 2020, of which USD 32 billion is attributable to smartphone sales with the balance split across a range of products and services, such as eBooks, eCourses, game and simulation-based learning tools, and collaboration tools. However, while these 'smart technologies' can enable new forms of teaching and learning to take place, they cannot ensure that effective and appropriate learning outcomes are achieved. It is not technologies, but educational purposes and pedagogies, that must provide the lead, with students understanding not only how to work with technology, but why it is of benefit for them to do so. Knowing about students' use of technology as well as their attitudes and experiences can help teachers and institutions develop a better understanding of students' preferred learning methods and new ways of delivery. This research is important to lecturing and teaching staff and to our students. Intrinsically, it is also important to emerging pedagogies.

Method
This research explores the students' interest in using their own smartphones to support their learning and goes on to identify which apps are most useful to graphic design and illustration students. It was conducted in three stages, involving a workshop and a product trial - followed by an online survey. The initial workshop invited students to showcase their preferred apps and to demonstrate their usefulness. Each app was then categorised according to its place in the cognitive process of Bloom's Taxonomy. Following a voting procedure, the number of apps for each category was refined to ten per category. Students were then asked to trial each app over the summer period. Towards the end of that period, a questionnaire was created and distributed via the Qualtrics online platform where students were asked to rank the apps in each category according to usefulness. Eighty-seven students received the questionnaire and 36 responses were received.

Findings
Based on the ranking results, each app was then designated a scale and location on the Digital Taxonomy - the largest size indicating most useful. Google Search was considered the most useful in the Remembering category - receiving 62% of the student vote. In the Understanding category, Behance came out on top (48%) - closely followed by Facebook (35%) and Twitter (15%). In the Applying category, the app of choice was Evernote whilst Qualtrics dominated the Analysing category. Notability proved to be the most popular app for Evaluating while iMovie and Photoshop Express both stood out as the most useful apps for Creating.

Discussion
Other aspects of the survey focused on device ownership, user habits, and general attitude towards technology within the learning environment. Interestingly, most participants claimed to own more than one device with the smartphone being the most common. Laptops and tablets were second and third respectively. Very few of the 36 students (4) owned a desktop computer. As Smartphones are not functionally equivalent and apps are often platform specific, the survey shows responses to the question 'What type of operating system does your mobile phone use?' Android and Apple were the two main contenders with 50% and 33% respectively. Students were asked 'How many apps do you download per month?' The majority of students (83%) download between 1 - 5 apps per month with the remaining (17%) downloading up to 15 apps. To compare app ownership against usage, two questions were asked. 'How many apps do you currently have on your handheld device?' and 'On a typical day, how many of those apps do you use?' Half the students (50%) claimed to own between 15 - 20 apps whilst 17% of the students own between 30 - 35 apps. This figure is reflected in a recent Ofcom Report (2014) stating that six in ten (61%) adults say they have between one and twenty apps installed, around one in five (18%) have between 21 and 40 and one in seven (14%) have 41 or more. It was also reported that the biggest users (59%) of smartphones are aged between 16 - 24. General attitude to technology within the learning environment was measured using a Likert-type fixed choice response format. This measured levels of agreement and disagreement to the following statements: 'I believe that I can improve my graphic design/illustration skills by using the benefits of the internet.' 'All thirty-six students strongly agreed with this statement. 'If encouraged to do so by my lecturer, I would use my smartphone more often as part of my studies.' Again, the majority of students (97%) either agreed or strongly agreed.

Conclusions
Students' relationship with technology is complex. They recognise its value but still need guidance when it comes to better using it for academics (Educause, 2013). Student feedback would suggest that once students begin using technology for learning they begin to appreciate the benefits and the further possibilities that exist within their current frame of reference. This is certainly the case with many of the apps in the survey. Amongst smartphone users, this is already evident in the way they seek to manage their lives as learners using apps to check Blackboard and timetables. However, it is not clear how smartphone learning can transition from the existing pedagogic paradigm to a Pedagogy 2.0 paradigm; how it can help to disrupt existing expectations to transform pedagogies. It is suggested that academics and educational developers continue to develop their understanding of personal technologies like smartphones and their applications. And, with that understanding, reflect on the differences between these emerging technologies and established learning environments. In doing so, educators need to also reflect on their assumptions about the design and delivery of the curriculum and the formal and informal engagement students can have with it. Meanwhile, the 'Smart Wheel' - as part of this research - has taken some of the first steps towards that transition.



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