



16

Real-Time, Real World Learning— Capitalising on Mobile Technology

Keith D. Parry, Jessica Richards,
and Cameron McAuliffe

Introduction

This chapter explores the adoption of Web 2.0 technologies to promote active learning by students and to both mediate and enhance classroom instruction. Web 2.0 refers to open source, web-enabled applications (apps) that are driven by user-manipulated and user-generated content (Kassens-Noor, 2012). These apps are often rich in user participation, have dynamic content, and harness the collective intelligence of users (Chen, Hwang, & Wang, 2012). As such, these processes create “active, context based, personalised learning experiences” (Kaldoudi, Konstantinidis, & Bamidis, 2010, p. 130) that prioritise learning ahead of teaching. By putting the learner at the centre of the education process

K. D. Parry (✉)

Bournemouth University, Bournemouth, UK
e-mail: kdparry@bournemouth.ac.uk

J. Richards • C. McAuliffe
Western Sydney University, Sydney, Australia

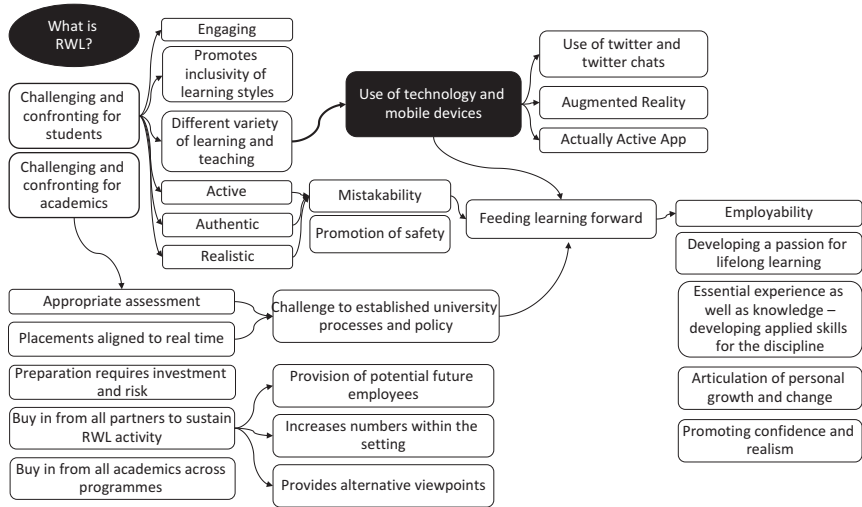


Fig. 16.1 Concept map from the authors

educators can provide environments that enhance employability prospects and spark a passion for learning that, hopefully, lasts a lifetime.

As such, we critique an active learning approach that makes use of technology such as mobile applications (apps), Twitter, and augmented reality to enhance students’ real world learning. Dunlap and Lowenthal (2009) argue that social media can facilitate active learning as they recreate informal, free-flowing communications that allow students and academics to connect on a more emotional level. Furthermore, their use upskills students in the technical complexities of the digital world and also the specialised discourses that are associated with online participation, suitable for real world learning and working (Fig. 16.1).

Three case studies explore the benefits of Web 2.0 processes. The first details the use of Twitter chats to connect students, academics, and industry professionals via online synchronous discussions that offer a number of benefits such as encouraging concise writing from students and maintaining on-going relationships between staff, students, and industry contacts. The second details a location-based mobile app that delivers content to students when they enter a defined geographical boundary linked to an area of a sports precinct. Finally, we explore the use of augmented reality apps to enhance teaching in Human Geography and Urban Studies.

Engaging Students

Academic engagement, which can be defined as active involvement in learning, is linked to high achievement. According to Park et al. (2012) it has been identified by educational researchers as a primary predictor of high levels of achievement in high school in particular. Students who are highly engaged at school are more likely to learn more, earn higher grades, and pursue higher education (Sciarra & Seirup, 2008). Yet, too often, students are apathetic, lack interest, and only engage superficially with learning; leading Newmann (1992, p. 2) to argue that “the most immediate and persisting issue for students and teachers is not low achievement, but student disengagement”.

Newmann (1992) contrasts engagement with the above conditions that have become (too) common in many education settings. Herrmann (2013) identifies that the higher education sector is now aware that undergraduates are often passive in teaching sessions and suggests that a solution to this is active learning, which is capable of motivating students to engage meaningfully in their courses and in their classes. Such an approach engages students in high-level thinking strategies and develops improved cognitive skills (Stolk & Harari, 2014). Stevens (2015) claims that when students process information in meaningful ways they are transformed from ‘consumers of content’ to ‘producers of knowledge’. Building on Biggs and Tang’s (2011) discussion of constructivism, we argue that students should indeed become producers of knowledge rather than consumers of content (Stevens, 2015).

As far back as the late 1990s researchers were beginning to advocate for active learning techniques to replace passive classroom activities and it has now been highlighted as a good practice in undergraduate teaching (Kassens-Noor, 2012). According to Moore (2013) even seemingly ‘traditional’ institutions have developed activity-based learning courses. It can include “lively debates between instructors and students, peer-to-peer discussions, reflective writing and team work” (Kassens-Noor, 2012, p. 9), but increasingly more innovative active learning practices are being employed.

In many Western societies, students are now bringing a variety of mobile electronic devices into the classroom and it can be challenging to maintain their interest and engagement when they can be connected to the world outside the classroom via these devices (Kuznekoff, Munz, & Titsworth, 2015). In a review of the use of mobile electronic devices in classrooms, Kuznekoff, Munz, and Titsworth (2015) concluded that when such devices were used for non-relevant activities, they were a distraction for not only the user but also those students seated in close proximity. As a result, the typical practice for educators is to ask students to switch off phones or to at least to put them away during teaching sessions. The fear that mobile devices, and the access that they provide to external content (and people), will disrupt the flow and control of information may explain the reluctance of many educators to embrace them. Indeed, it can be both daunting and challenging to step away from traditional practices based on face-to-face instructions where the teacher conveys and arranges the learning and knowledge flow (Nincarean, Alia, Halim, & Rahman, 2013). Furthermore, in a survey of higher education faculty members, it was found that while over 90% of academics are using social media in the courses they teach or their professional careers the vast majority believed that social networks take more time than they are worth (Moran, Seaman, & Tinti-Kane, 2011).

Nevertheless, it is now recognised that social media sites offer value for teaching practices in higher education, affording particular benefits for collaborative learning (Moran, Seaman, & Tinti-Kane, 2011), which resultantly allows students to construct knowledge. Web 2.0 technologies and practices are now being introduced into teaching and learning activities around the world (Dohn, 2009). Dohn (2009) notes that Web 2.0 technologies and educational practices must be reshaped to fit each other and so the time and effort needed to successfully and effectively combine the two should not be underestimated. Yet, when the two are integrated effectively it is possible to create innovative teaching and learning environments that engage students. Moreover, the introduction of technology “provides an exciting opportunities [sic] to design learning environment that are realistic, authentic, engaging and extremely fun” (Nincarean et al., 2013, p. 658). It is the realistic aspect of these innovative learning environments that is of particular interest to this chapter.

In the early twenty-first century, the integration of learning technologies has been at the forefront of innovation in learning experiences. In particular, the ability to co-create content via Web 2.0 technologies positions them as ideal tools to facilitate an active learning approach where students create both content and knowledge. Whereas traditional forms of media have used one-directional communication models, web-mediated communication practices such as social media applications permit two-way communication between the site and users that allows them to create their own content and the interact with other users. One way to produce active and productive learners is through the use of Web 2.0 technologies and more specifically Web 2.0 practices (such as blogging and using social media platforms) that create collaborative and participatory learning environments (Tambouris et al., 2012). Web 2.0 has even been specifically described as “a collaborative medium” by the inventor of the World Wide Web, Tim Berners-Lee (1997) and it offers solutions to a number of the problems that beset higher education.

For example, with large-group teaching sessions there are a number of challenges, amongst which is the ability of teachers to assess the degree to which the information being presented is retained by learners (Fisher, Exley, & Ciobanu, 2014). Furthermore, these large-group sessions can be daunting as it can be difficult to identify what the audience is thinking. The use of electronic audience response systems can transform a passive audience into active learners (Boscardin & Penuel, 2012, Raux, 2012, Keogh & Wang, 2010). Early clicker-based systems have been replaced with web-based audience response system such as GoSoapBox and PollEverywhere. One simple benefit to these systems is that they can provide immediate and anonymous feedback. They allow the teacher to analyse student comprehension and learning during sessions (Konstantinidis, Bamidis, & Kaldoudi, 2009). Regardless of whether it is because of their collaborative nature or not, student interest and satisfaction has been shown to increase when Web 2.0 tools are implemented in the curriculum (Rogers-Estable, 2014). However, many of these integrated practices are still based on traditional campus-based models of instruction with technological support.

There is an increased expectation that learning should be available on demand, reflective of entertainment habits in a modern consumer

society. The “anytime, anyplace” nature of such connected devices allow learners to study at times and locations that are convenient to them and, crucially, when driven to do so by curiosity or in response to an external stimulus. In addition, they facilitate informal learning, building on the “previous experiences that net generation learners have with social networking” (Williams & Chinn, 2009, p. 165). Young people are using Web 2.0 technologies voluntarily in their own time so the integration of these into teaching and learning practices in HE settings can help to motivate and reassure students (Dohn, 2009). As technology becomes increasingly interconnected and ubiquitous in everyday life there may even be an expectation from students that their learning experiences will reflect their real world practices and feature Web 2.0 technologies. Such technologies also provide a more learner-controlled environment as users can obtain information quickly and efficiently via mobile devices and mobile Web 2.0 apps. A form of “highly active and participatory experiences” that today’s students are searching for (Brill & Park, 2008, p. 71) is thus created.

In addition, incorporating social media into learning process has the added benefit of upskilling students for future jobs that will increasingly require competence in the use of Web 2.0. It is naïve to assume that all digital natives are technologically sophisticated and comfortable with using technology. However, for successful engagement in education and the wider world it is essential that students develop the skills and knowledge that enable them to engage in “the new literacies of the internet” (Nicholson & Galguera, 2013, p. 7). Therefore, the integration of Web 2.0 into HE practices can further enhance the employability prospects of students. In addition to preparing students to be work ready in the twenty-first century, technology-rich learning environments have the potential to create lifelong learners and citizen-scholars possessing “global awareness, creativity, collaborative problem-solving, self-directed learning” (Groff, 2013, p. 1). These twenty-first century skills improve “learning and innovation skills, life and career skills, information and media skills” (Papanastasiou et al., 2018, p. 2). Therefore, As Dohn (2009) puts it, effective use of Web 2.0 can provide a “lifelong, life-wide” set of skills and weaken boundaries between formal and informal learning.

Social Media

Social media has been defined as “a group of internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan & Haenlein, 2010, p. 61). Social media has recently been adopted by a number of academics to promote active learning by students and to both mediate and enhance classroom instruction (Tess, 2013). Dunlap and Lowenthal (2009) argue that Twitter can facilitate this form of learning as it recreates the

informal, free-flowing, just-in-time banter and chit-chat that we [academics] have with students in our on-campus courses—the banter that helps us get to know each other, experience our personalities, and connect on a more emotional level.

Informal learning, as facilitated by both Twitter and active learning, is an essential component of education that enhances academic performance (Kassens-Noor, 2012). To facilitate this process, it is important that students are provided with out-of-class opportunities to interact with each other, with academic staff, and, potentially, industry professionals. Junco, Heiberger, and Loken (2011) found that the use of Twitter increased engagement in the learning process by both staff and students and increased communication, through the creation of non-traditional classroom activities. In a controlled experimental study of first year students a class Twitter account was used to continue in-class discussions, to provide a “low-stress way to ask questions”, to provide information on class and campus activities, as an optional assessment task, and as part of compulsory assessments (Junco, Heiberger, & Loken, 2011, p. 122). Twitter also provides individual students (particularly less vocal ones) with a voice in large classrooms settings (Kuznekoff, Munz, & Titsworth, 2015) and may increase student contact with staff outside of class (DeGroot, Young, & VanSlette, 2015), both of which may reduce feelings of isolation and foster a sense of community. Twitter has also been shown to increase the informal communications between staff and students that have been found to “positively influence student perceptions

of trust and feelings of instructor immediacy, as well as student motivation” (DeGroot, Young, & VanSlette, 2015, p. 2).

Yet contrary to the findings of Jacquemin, Smelser, and Bernot (2014), students are not necessarily au fait with the use of all social media platforms and Twitter may be less commonly adopted by students than other platforms. Lin, Hoffman, and Borengasser (2013) found that students require education on how to use Twitter as many were not using it, while DeGroot et al. (2015) that even those who do use it may need educating on how to use it in a professional manner.

Bennett et al. (2012) evaluated six Web 2.0 implementations in Australian higher education and found that many students had little prior experience with the technologies involved and struggled to see the worth of Web 2.0 technologies in learning and teaching. In addition, some students, particularly those who are not currently using it, can be quite sceptical of Twitter and experience an “information overload” when they begin using it (DeGroot et al., 2015; Nicholson & Galguera, 2013). Nicholson and Galguera (2013) suggest that using Twitter requires students to learn the technical complexities of the digital world and also the specialised discourses that are associated with online participation.

Case Study 1

#Tweaching: Using Social Media to Increase Student Engagement (Jessica Richards, Lecturer, Western Sydney University)

This case study presents the use of Twitter with Sport Management students in the School of Business at Western Sydney University, Australia. The university is located in the Greater Western Sydney region, which has a large multicultural population of more than two million people from 170 nations. It is often referred to as working-class and has been identified as having average levels education, income and employment that are lower than the rest of Sydney (Lodewijks, 2013). The demographics of these students vary, with 50% of students at Western Sydney University being first in family to attend university and 23% of the students coming

from low SES backgrounds. The unit in this case study is a first-year unit with approximately 125 students across two campuses. The unit is titled “Sport Entertainment” and explores the relationship between sport organisations and social media engagement.

During the week prior to semester starting students are sent a hashtag (e.g. #WSUSport) allowing the lecturer to track tweets and respond to questions being posed by students within and outside of the class setting. The lecturer also encouraged students to use Twitter to begin following sporting organisations and media channels that would be tweeting stories of interest over the course of semester. However, whilst the use of Twitter as a tool to enhance student engagement has been discussed within academic circles (see Chawinga, 2017; Mollett et al., 2011) the use of live tweeting within the classroom remains under explored. Live tweeting refers to the lecturer and students using the platform to respond to course material in real time within the teaching setting.

The lecturer would show the cohort a type of stimulus material that related to the weekly module (this could be an online video, new story, or sport report). For example, a short video advertisement by Australia’s national sport governing body Sport Australia titled “*make your move*”, which was accessed via YouTube. The students watched the advertisement and then were asked to reflect on the message it was promoting and to assess its effectiveness. Immediately after watching the video, students were encouraged to ask the cohort questions (via the unit hashtag) or to tweet their opinions on the material. This proved to be an effective activity which not only engaged different groups of students within the teaching session, but also e-connected students from different campuses to the weekly content. As the students were able to see what other students had asked and posted they were then able to respond, “like”, or further discuss the trigger material with peers who may be sitting one metre away or with those being taught in another suburb. Additionally, students were shown how to “mention” organisations as part of this discussion, resulting in an increase to the breadth of the tweet’s audience. This use of mentions creates a direct link between the organisation and the student that then will appear on the thread.

In a similar manner, Twitter Chats were used to further connect students with the real world. In place of some weekly sessions, staff and

students “met” online and made use of an agreed hashtag to discuss a series of questions. The questions were published online in advance and were numbered to allow all participants to follow the discussion. Unlike a face-to-face session, there was no requirement for students to attend class and while some were at various locations on campus others were at home or their place of work. Industry contacts, alumni, and academics were also invited to participate to provide real world insights and examples.

The School of Business at Western Sydney University have adopted the flipped delivery model, which refers to a blended learning pedagogy that transforms the traditional learning environment by delivering instructional content online and outside of the classroom (Simko et al., 2019). However, one of the challenges of delivering content in this way is the lecturer being able to gauge if the students have (1) understood the course material and (2) whether they were stimulated by what was chosen to reflect the topic of the module.

Using Twitter within class sessions provided the lecturer the capacity to create a poll to gauge how the content was being delivered and the level of interest from the students. The poll was utilised multiple times throughout the semester, particularly when the content was considered challenging. However, the most significant benefit to students utilising Twitter within the class setting was that it provided an opportunity for those more comfortable communicating digitally rather than verbally to engage with the lecturer and other members of the cohort. It was observed that this translated later in the semester to a more engaged and vibrant classroom, where students often referred back to tweets as a discussion point.

This approach also allowed students to engage with peers within the classroom and at other campuses, the lecturer, as well as sporting organisations. As a micro-blogging tool Twitter (now) has a limit of 280 characters, which means students must be considered about how they tweet, further promoting the importance of responding in a concise and engaging manner. Overall, the use of Twitter enhances the student experience by providing a fun and engaging tool to enhance interaction and promote discussion.

Augmented Reality Apps

Augmented reality, which merges or overlays digital information with real world settings, has been described as bringing “truly unlimited possibilities for teaching and learning process” (Sural, 2018, p. 566). Most significantly, mobile augmented reality (MAR) situates users in the real world, providing natural and authentic experiences and environments for learning. As described by Papanastasiou et al. (2018, p. 6) augmented reality (AR) “dramatically shifts the location and timing of education and training” and thus solves some of the space-time challenges that higher education institutions are currently facing. AR has been used in a variety of educational settings (e.g. increasing awareness of recycling, teaching the history of cities, and training in the use of electrical machines) and, in the last decade, a number of educational games have even been developed to enhance the learning experience of students in a fun manner (Huizenga et al., 2009; Nincarean et al., 2013). Embedding AR in teaching practices has been found to increase learner immersion and engagement, positively impact motivation, and even encourage experimentation (Sural, 2018). Papanastasiou et al. (2018, p. 1) provide a more extensive list of benefits: promoting self-learning, enabling multi-sensory learning, enhancing spatial ability, confidence and enjoyment, promoting student-centred technology...and decreasing cognitive load”. The widespread use of mobile internet-enabled devices has paved the way for a rise in MAR technology. As noted, the “unique” benefit of MAR comes with the ability to embed learning in authentic environments that promote and encourage learning outside formal education settings (Huizenga et al., 2009).

Recently, the rise of Pokémon GO, where players wander around the real world to unlock imaginary creatures via a location-based mobile app, using Geocaching (Tabacchi et al., 2017), highlighted that popularity of immersive, augmented reality games (Adlakha et al., 2017; Rauschnabel, Rossmann, & Dieck, 2017) and the effectiveness of gamification of health behaviours and social life (Kaczmarek et al., 2017). Players used their mobile phones to locate and then “collect” virtual characters that are overlaid onto prominent public locations,

known as “Poke-stops”, via augmented reality technology (Clark & Clark, 2016; Tabacchi et al., 2017). The game also included elements of social interaction, often chance encounters with other players at Poke-stops, and exchanges of knowledge between users. While virtual mobile games and games that require physical play/activity have been around since the 1990s, Pokémon GO connected users to urban (physical) spaces in ways that previous games had not (Adlakha et al., 2017).

Case Study 2

Mobile Augmented Reality Case Study: Pymont AR Field Trip (Cameron McAuliffe, Senior Lecturer, Western Sydney University)

Our cities are constantly changing to accommodate population growth, and to replace the old with the new. But while urban forms continue to change, sometimes the processes that drive these changes shift, with new processes emerging to influence the type of cities we live in. In Sydney, a “global city” of 5 million people, becoming enmeshed in a global economy has produced new patterns of urban development. Urban geographers and urban planners need to understand and be sensitive to these dynamic patterns, to disentangle the processes that drive change in our cities. As part of an introductory undergraduate unit in the Urban Planning degree at Western Sydney University (WSU), mobile augmented reality (MAR) has been successfully implemented to facilitate learning through the analysis of urban forms and processes in the field.

Urban geography, as a sub-discipline of human geography, is a field-based discipline. As an applied social science, field trips are a key tool in the pedagogical toolbox of human geographers. In this case, a MAR element was designed into an existing field trip to the inner city harbourside suburb of Pymont. The pedagogical principle of experiential learning (Kolb, 2014), along with a commitment to a pedagogical approach to technological integration (Brill & Park, 2008), influenced the development of the MAR component of the field trip. The redesign of the field experience around mobile augmented reality was intended to extend and

intensify the embodied experience of the field trip, helping to embed analytical connections between theory and the urban environment.

The Pyrmont AR Field Trip is structured as a small group self-guided field exercise for students enrolled in the unit, *Cities: Introduction to Urban Studies*. Students enrolled in this unit are typically beginning their degree pathway as an urban planner or geographer or progressing a geography teaching specialisation in their education degree. On the day, the students attend a briefing lecture onsite that provides information about the urban processes that students will be looking to identify, including urban consolidation, gentrification, and urban regeneration, along with evidence of de-industrialisation and the presence of a new post-industrial economy. Following the briefing lecture students head out into the urban landscape of Pyrmont in allocated small groups on one of eight preset self-guided field trips. During the field trip they observe historical change in the landscape at five different locations through an open-access commercial AR app. The AR app allows students to overlay archival images of the former waterfront industrial and trading urban landscape over the contemporary urban environment.

Mirroring processes happening in cities in developed economies elsewhere, Sydney's working harbour has been reborn as a place of tourism and leisure. The dirty, working-class industrial suburb of Pyrmont has been replaced by newly gentrified residential communities, living in new high-density residential towers and the repurposed warehouses of the former industrial waterfront. Mobile augmented reality allows the students to see these changes as a function of new processes through direct observation of the shift from the historical maritime core of the nineteenth and twentieth century city to newer post-industrial functions.

During the field trip students observe urban change using the AR app on their mobile devices at a selection of the more than 20 sites that have been setup for the field trip. They also observe and collect their own evidence of urban processes from the landscape, in the form of visual data (photographs and videos), which are then used for analysis and reflection in a debriefing lecture on the day and associated post-field trip assessments on the impact of global processes on Sydney's urban landscape. Using MAR in this field trip, urban geography and planning students can peel back the history of these places, to observe and experience *in situ*

how new urban processes have led to a new type of urban landscape in their city. Additionally, those students training to become geography teachers in secondary education gain insights into the use of immersive technologies in the field as a tool for experiential learning.

Feedback from students has consistently indicated that they have found the field trip “fun” and “engaging”. Beyond this, students report that the field trip has helped “implement learning” and “put into practice key concepts”, as they use MAR to “see the changes in the landscape over time”. Importantly, the immersive technologies used in the field trip have been reported to complement and support learning, rather being merely tokenistic. As one student commented at length in general feedback on the unit:

The field trip to Pymont was a perfect example of why this unit was so good. It married concepts in the unit with the real world and I really enjoyed that. It was a unit which had plenty of theory but was applied in a way that I have not experienced before in tertiary study. The use of technology was pretty advanced which is great because it did not feel tokenistic or forced. The use of [the AR app] HP Reveal was genuinely interesting and a fantastic way to drive home how much Sydney has changed (or hasn't) over the years. For someone who has not done a geography or planning subject it was a real revelation.

The use of mobile augmented reality in the Pymont AR Field Trip has been influential in teaching and learning at WSU and beyond, informing best practice in the pedagogical use of technologies in flexible learning and teaching. The Pymont AR Field Trip has been recognised as a best practice case in the geography discipline in research on the development of national Teaching and Learning Outcomes for Australian first year tertiary students (Luzia et al., 2015). In 2020, the AR field trip is moving into the next stage of its development to integrate advances in AR and VR technologies, along with better integration of geolocation to improve the efficacy of the student experience.

In line with the principles of experiential learning, students have been able to use MAR to reflect on the complex ways theoretically informed classroom discussions might play out in “real-life”. The field trip

consistently receives positive feedback, with students recognising how this technology helps them see the world through a critical social scientific lens, providing the basis for the critical interpretation of urban landscapes and the processes that underpin urban change that is central to their professional development as urban geographers and planners.

Actually Active Learning

Pokémon GO has proved to be successful, in the first week of its release it broke the Apple App Store's record for the most downloads in a week and generated approximately US\$600m (£470m) in global revenue in its first three months (Adlakha et al., 2017). Yet, more significantly, the application has been found to increase levels of physical activity, particularly in groups that traditionally have lower levels of activity, such as teens, preteens, and younger men (Clark & Clark, 2016; Gabbiadini, Sagioglou, & Greitemeyer, 2018; Ma et al., 2018; Marquet, Alberico, & Hipp, 2018). Users were encouraged to walk up to 10 kilometres in some instances and daily step levels increased by an average of 25% per day in the first stages of adoption (Gabbiadini, Sagioglou, & Greitemeyer, 2018).

Case Study 3

The Development of an “Actually Active Learning” Mobile Application (Keith D. Parry, Senior Lecturer, Bournemouth University and Western Sydney University)

This recent case study also features the Sport Management programme in the School of Business at Western Sydney University. Within one particular unit, students study sports fans to gain an understanding of their behaviours and the different types of fans that may be observed. Academic studies of sports fans and teaching in this area traditionally rely on theoretical discussions of fans, highlighting their behaviours or possibly using a video or two if the academic is adventurous. However, sports fans are not dry academic constructs, they are living, breathing people and the

subject is a dynamic and rich area that is of interest to many students. There is a disjuncture between the active, engaging environment of sport fandom and traditional teaching in this area. It was identified that a real world setting, where learning could take place just in time when students were observing sports fans in a real-life setting would provide a more engaging learning environment.

Contacts with professional sports clubs allowed students access to elite level sports matches but the challenge of delivering timely content while they were able to view sports fans remained. With these consideration in mind, a location-based mobile app, inspired by the popularity and principles of Pokémon GO was developed that delivers learning materials related to sports fans when students are actually at sporting venues. The app consists of a map of the sports precincts, video content with short descriptions, and a user guide. It was made freely available for both iOS and Android devices with students allowed to download it during an earlier contact session using the University's Wi-Fi network.

Using the GPS functionality of a student's mobile device, content is released when the student enters a defined geo-fenced boundary linked to an area of a sports precinct, in this case Sydney Olympic Park. The app delivers content to explain what the students are seeing in and around the various stadiums. They are required to visit different areas of the precinct, walking between locations indicated on the in-built map on the app. As they move around the venue new content is released, gamifying the learning process.

The content consists of short lecturer-created videos that provide academic commentary and industry insights on topics related to the location and theoretical discussions on sports fans. To ensure that an active learning approach was followed, the videos were supplemented with short tasks (such as capturing a photograph or posting on social media) that allows students to immediately apply their learning and which further engages the students in the learning process. Attendance at these venues replaced traditional face-to-face sessions and allowed students to experience a match while studying sports fans and a variety of sport-related issues first-hand.

Feedback from students indicated that attendance at the stadium was both entertaining and educational. In some instances, it was their first

sports match and attending in person brought the content “to life”. There was an initial excitement at the use of a mobile app for educational purposes and the novelty of the app itself heightened this feeling. Students found the app easy to use and initial feedback indicates that the immediacy of the content delivery enhanced their understanding of the concepts. In addition, the app also allowed those who were not able to attend a specific game to attend an alternative event at a more convenient time.

Active learning refers, typically, to the active mental engagement of students with learning and generally does not require physical activity. This actually active learning approach not only motivates students to engage meaningfully in their learning but also encourages them to be physically active, increasing their physical activity levels. Early measures of the physical activity of users indicate that while students did not walk the 10 kilometres that Gabbiadini, Sagioglou, & Greitemeyer (2018) found Pokémon GO users to do, they averaged approximately 2.5 kilometres each match. As such, this form of learning improves educational potential and also the health of students.

Conclusion

The emergence of Web 2.0 tools on the internet have resulted in a growing number of interactive and socially constructed resources, which are often available for free, that teachers can use to support learning. The proliferation of internet enabled mobile devices and the increases in availability and quality of mobile data allowances means that mobile-based learning environments are becoming increasingly common. The ability of these Web 2.0 technologies to create active learning environments is further enhanced by their immediacy, allowing learning to be delivered in real time in addition to real world contexts.

The use of social media platforms to enhance student engagement and interest remains a growing area of academic inquiry in higher education research. With higher education institutions increasingly directing resources to developing online or blended/flipped teaching environments, the use of social media in the classroom has never been timelier. In large teaching workshops/lectures social networking platforms yield

great benefits as an additional way for students to engage and have a digital voice and platform to express themselves.

More generally, Web 2.0 tools provide a variety of benefits for students that traditional approaches to teaching and learning may not offer. They can enhance critical abilities, increase employability prospects, stimulate curiosity, and encourage learning outside of traditional settings. Furthermore, with a degree of innovation, they can also be used to create actually active learning environments.

Finally, the integration of such tools into educational practices can create lifelong learners and citizen-scholars that are ready and motivated to actively engage in global discussions. Educators should be encouraged to embrace mobile technologies within the classroom rather than seeing them as a threat to their control over the learning environment.

References

- Adlakha, D., Marquet, O., Hipp, J. A., & Tully, M. A. (2017). Pokémon GO or Pokémon Gone: How can cities respond to trends in technology linking people and space? *Cities & Health*, 1(1), 89–94. <https://doi.org/10.1080/023748834.2017.1358560>
- Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., & Kennedy, G. (2012). Implementing Web 2.0 technologies in higher education: A collective case study. *Computers & Education*, 59, 524–534. <https://doi.org/10.1016/j.compedu.2011.12.022>
- Berners-Lee, T. (1997). *Realising the full potential of the web*. Retrieved from <https://www.w3.org/1998/02/Potential.html>
- Biggs, J. B., & Tang, C. (2011). *Teaching for quality learning at university* (4th ed.). Berkshire: McGraw Hill, Open University Press. Retrieved from <http://UWSAU.eplib.com.au/patron/FullRecord.aspx?p=798265>
- Boscardin, C., & Penuel, W. (2012). Exploring benefits of audience-response systems on learning: A review of the literature. *Academic Psychiatry*, 36(5), 401–407. <https://doi.org/10.1176/appi.ap.10080110>
- Brill, J. M., & Park, Y. (2008). Facilitating engaged learning in the interaction age taking a pedagogically-disciplined approach to innovation with emergent technologies. *International Journal of Teaching and Learning in Higher Education*, 20(1), 70–78. <https://doi.org/10.12691/education-4-1-9>

- Chawinga, W. (2017). Taking social media to a university classroom: Teaching and learning using Twitter and blogs. *International Journal of Educational Technology in Higher Education*, 14, 3. <https://doi.org/10.1186/s41239-017-0041-6>
- Chen, Y.-C., Hwang, R.-H., & Wang, C.-Y. (2012). Development and evaluation of a Web 2.0 annotation system as a learning tool in an e-learning environment. *Computers & Education*, 58(4), 1094–1105. <https://doi.org/10.1016/j.compedu.2011.12.017>
- Clark, A. M., & Clark, M. T. G. (2016). Pokémon GO and research: Qualitative, mixed methods research, and the supercomplexity of interventions. *International Journal of Qualitative Methods*, 15(1), 1609406916667765. <https://doi.org/10.1177/1609406916667765>
- DeGroot, J. M., Young, V. J., & VanSlette, S. H. (2015). Twitter use and its effects on student perception of instructor credibility. *Communication Education*, 65(4), 1–19. <https://doi.org/10.1080/03634523.2015.1014386>
- Dohn, N. (2009). Web 2.0: Inherent tensions and evident challenges for education. *International Journal of Computer-Supported Collaborative Learning*, 4, 343–363. <https://doi.org/10.1007/s11412-009-9066-8>
- Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education*, 20(2), 129–135. Retrieved from <http://search.proquest.com/docview/200135030?accountid=36155>
- Fisher, A., Exley, K., & Ciobanu, D. (2014). *Key guides for effective teaching in higher education: Using technology to support learning and teaching*. Florence, KY: Taylor and Francis.
- Gabbiadini, A., Sagioglou, C., & Greitemeyer, T. (2018). Does Pokémon GO lead to a more physically active life style? *Computers in Human Behavior*, 84, 258–263. <https://doi.org/10.1016/j.chb.2018.03.005>
- Groff, J. (2013). Technology-rich innovative learning environments. *OECD Working Paper*.
- Herrmann, K. J. (2013). The impact of cooperative learning on student engagement: Results from an intervention. *Active Learning in Higher Education*, 14(3), 175–187. <https://doi.org/10.1177/1469787413498035>
- Huizenga, J., Admiraal, W., Akkerman, S., & Dam, G. t. (2009). Mobile game-based learning in secondary education: Engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning*, 25(4), 332–344. <https://doi.org/10.1111/j.1365-2729.2009.00316.x>
- Jacquemin, S. J., Smelser, L. K., & Bernot, M. J. (2014). Twitter in the higher education classroom: A student and faculty assessment of use and perception.

- Journal of College Science Teaching*, 43(6), 22–27. Retrieved from <http://ezproxy.uws.edu.au/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ejh&AN=96434846&site=ehost-live&scope=site>
- Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, 27(2), 119–132. <https://doi.org/10.1111/j.1365-2729.2010.00387.x>
- Kaczmarek, L. D., Misiak, M., Behnke, M., Dziekan, M., & Guzik, P. (2017). The Pikachu effect: Social and health gaming motivations lead to greater benefits of Pokémon GO use. *Computers in Human Behavior*, 75, 356–363. <https://doi.org/10.1016/j.chb.2017.05.031>
- Kaldoudi, E., Konstantinidis, S., & Bamidis, P. (2010). Web 2.0 approaches for active, collaborative learning in medicine and health. In S. Mohammed & J. Fiaidhi (Eds.), *Ubiquitous health and medical informatics: The ubiquity 2.0 trend and beyond* (pp. 127–149). Hershey, PA: IGI Global.
- Kaplan, A., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, 53, 59–68. <https://doi.org/10.1016/j.bushor.2009.09.003>
- Kassens-Noor, E. (2012). Twitter as a teaching practice to enhance active and informal learning in higher education: The case of sustainable tweets. *Active Learning in Higher Education*, 13(1), 9–21. <https://doi.org/10.1177/1469787411429190>
- Keogh, P., & Wang, Z. (2010). Clickers in instruction: One campus, multiple perspectives. *Library Hi Tech*, 28(1), 8.
- Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Upper Saddle River, NJ: Pearson Education.
- Konstantinidis, S., Bamidis, P., & Kaldoudi, E. (2009). *Active blended learning in medical education—Combination of WEB 2.0 problem based learning and computer based audience response systems*. Paper presented at the 22nd IEEE International Symposium on Computer-Based Medical Systems, Albuquerque, NM.
- Kuznekoff, J. H., Munz, S., & Titsworth, S. (2015). Mobile phones in the classroom: Examining the effects of texting, twitter, and message content on student learning. *Communication Education*, 64(3), 344–365. <https://doi.org/10.1080/03634523.2015.1038727>
- Lin, M.-F., Hoffman, E., & Borengasser, C. (2013). Is social media too social for class? A case study of twitter use. *TechTrends*, 57(2), 39–45. <https://doi.org/10.1007/s11528-013-0644-2>
- Lodewijks, J. (2013). Political Economy in Greater Western Sydney. *The Journal of Australian Political Economy*, 72, 80–105.

- Luzia, K., Cole, B., Allen, P., Clark, J., Jones, A., Lawrence, J., ... Wallace, J. (2015). *Geography—Good practice guide*. Sydney: Office for Learning and Teaching.
- Ma, B. D., Ng, S. L., Schwanen, T., Zacharias, J., Zhou, M., Kawachi, I., & Sun, G. (2018). Pokémon GO and physical activity in Asia: Multilevel study. *Journal of Medical Internet Research*, 20(6), e217. <https://doi.org/10.2196/jmir.9670>
- Marquet, O., Alberico, C., & Hipp, A. J. (2018). Pokémon GO and physical activity among college students. A study using ecological momentary assessment. *Computers in Human Behavior*, 81, 215–222. <https://doi.org/10.1016/j.chb.2017.12.028>
- Mollett, A., Moran, D., & Dunleavy, P. (2011). Using Twitter in university research, teaching and impact activities. In *Impact of social sciences: Maximizing the impact of academic research*. London, UK: LSE Public Policy Group, London School of Economics and Political Science.
- Moore, D. T. (2013). *Engaged learning in the academy challenges and possibilities*. New York: Palgrave Macmillan.
- Moran, M., Seaman, J., & Tinti-Kane, H. (2011). *Teaching, learning, and sharing: How today's higher education faculty use social media*. Retrieved from Boston <http://www.pearsonlearningsolutions.com/educators/pearson-social-media-survey-2011-bw.pdf>
- Newmann, F. M. (Ed.). (1992). *Student engagement and achievement in American secondary schools*. New York: Teachers College Press.
- Nicholson, J., & Galguera, T. (2013). Integrating new literacies in higher education: A self-study of the use of Twitter in an education course. *Teacher Education Quarterly*, 40(3), 7–26. <https://doi.org/10.1002/ncr.20069>
- Nincarean, D., Alia, M. B., Halim, N. D. A., & Rahman, M. H. A. (2013). Mobile augmented reality: The potential for education. *Procedia—Social and Behavioral Sciences*, 103, 657–664. <https://doi.org/10.1016/j.sbspro.2013.10.385>
- Papanastasiou, G., Drigas, A., Skianis, C., Lytras, M., & Papanastasiou, E. (2018). Virtual and augmented reality effects on K-12, higher and tertiary education students' twenty-first century skills. *Virtual Reality*, 23, 425–436. <https://doi.org/10.1007/s10055-018-0363-2>
- Park, S., Holloway, S., Arendtsz, A., Bempechat, J., & Li, J. (2012). What makes students engaged in learning? A time-use study of within- and between-individual predictors of emotional engagement in low-performing high schools. *Journal of Youth & Adolescence*, 41(3), 390–401. <https://doi.org/10.1007/s10964-011-9738-3>

- Rauschnabel, P. A., Rossmann, A., & tom Dieck, M. C. (2017). An adoption framework for mobile augmented reality games: The case of Pokémon Go. *Computers in Human Behavior*, 76, 276–286. <https://doi.org/10.1016/j.chb.2017.07.030>
- Raux, D. J. (2012). An effective active approach for teaching accounting in the 21st century: Using active learning, an on-line course management system, and a student response system. (Report). *Review of Business Research*, 12(4), 86.
- Rogers-Estable, M. (2014). Web 2.0 use in higher education. *European Journal of Open, Distance and E-Learning*, 17, 130–142. <https://doi.org/10.2478/eurodl-2014-0024>
- Sciarra, D. T., & Seirup, H. J. (2008). The multidimensionality of school engagement and math achievement among racial groups. *Professional School Counseling*, 11, 218–228. <https://doi.org/10.5330/PSC.n.2010-11.218>
- Simko, T., Pinar, I., Pearson, A., Huang, J., Mutch, G., Patwary, A. S., ... Ryan, K. (2019). Flipped learning—A case study of enhanced student success. *Australasian Journal of Engineering Education*, 24(1), 35–47.
- Stevens, R. (2015). Role-play and student engagement: Reflections from the classroom. *Teaching in Higher Education*, 20(5), 481–491. <https://doi.org/10.1080/13562517.2015.1020778>
- Stolk, J., & Harari, J. (2014). Student motivations as predictors of high-level cognitions in project-based classrooms. *Active Learning in Higher Education*, 15(3), 231–247. <https://doi.org/10.1177/1469787414554873>
- Sural, I. (2018). Augmented reality experience: Initial perceptions of higher education students. *International Journal of Instruction*, 11, 565–576. <https://doi.org/10.12973/iji.2018.11435a>
- Tabacchi, M. E., Caci, B., Cardaci, M., & Perticone, V. (2017). Early usage of Pokémon GO and its personality correlates. *Computers in Human Behavior*, 72, 163–169. <https://doi.org/10.1016/j.chb.2017.02.047>
- Tambouris, E., Dalakiouridou, E., Tarabanis, K., Ryberg, T., Buus, L., Peristeras, V., ... Porwol, L. (2012). Enabling problem based learning through Web 2.0 technologies: PBL 2.0. *Educational Technology & Society*, 15, 238–251.
- Tess, P. A. (2013). The role of social media in higher education classes (real and virtual)—A literature review. *Computers in Human Behavior*, 29, A60–A68. <https://doi.org/10.1016/j.chb.2012.12.032>
- Williams, J., & Chinn, S. (2009). Using Web 2.0 to support the active learning experience. *Journal of Information Systems Education*, 20, 165–174.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

