Using Augmented Reality to engage visitors and students at the Manchester Metropolitan University

Dee Vyas
Manchester Metropolitan University

Introduction

In 1990, Boeing researcher Tom Caudell first coined the term 'Augmented Reality' (AR) (Caudell and Mizell, 1992) to describe a digital display that blended virtual graphics with a physical reality. AR allows the virtual world to integrate with the real world, using interactive media aimed at engaging the viewer. Traditional passive material becomes immersive, enabling content to be viewed on a mobile device. The learner is now encouraged to participate and focus on the learning outcome rather than spending energy on learning how to use some form of technology. Vygotsky (1978) states that human consciousness is associated with the use of tools and artefacts. AR allows the combination of using a technology and the learner's creativity to develop this form of consciousness, to provide a seamless integration with the real world.

Large companies, such as Mercedes, Argos and IKEA, currently use AR as a method of engagement with the public for retailing purposes. This engagement forms the principal aspect of the study and thereby determines its feasibility for further development. The use of AR within Higher Education is currently under development. Two examples of AR in this context include the Kendall College prospectus and the deployment of AR to enhance teaching and learning for students in the School of Health Sciences, University College London, by supporting simulated practice, in which students are exposed to a variety of nursing activities in a clinical skills learning laboratory.

A variety of apps and platforms to develop an AR experience are available, differing in terms of functionality and cost. Aurasma is gaining popularity in education as it offers an online, web-based interface that makes it simple to create an AR experience; we used this technology to develop AR at MMU.

MMU Recruitment & Admissions had previously used printed material, primarily as publicity for the Open Day, to advertise the programme for the event. AR then provided an innovative, interactive and immersive experience, accessible using most mobile devices, to engage prospective students. This, the first time AR was deployed at the university on such a large scale, proved successful and illustrated how it might be applied more widely there for the benefit of the University's current students.

This novel application of AR at MMU aimed to develop a partnership with graduate students, using AR to create a postcard (Figure 3) which would provide rich opportunities for reflection on learning and achievement, whilst also improving their digital literacies. Using the postcard as an early example of student engagement, a student CV was developed which can be enhanced visually, by means of Aurasma, to highlight the skills of a student. Gaunlett (2011) states that making things for ourselves provides both self-esteem and social capital by connecting and collaborating.

The aims of this research were (1) to enhance engagement with potential students using innovative methods to demystify the process of applying for financial support and budgeting whilst studying at the university and (2) to encourage students to engage in creating their own interactive, media-rich CV, mixing real life with media-rich content to augment reality.

Method

Use of AR at the Open Day event

To use Aurasma for creating augmented content requires creating (1) a user account with Aurasma, (2) an account name (channel) for content storage, (3) triggers for users to view the immersive content and (4) a video file (overlay) to create an augmented reality experience (Aura). Therefore,

Trigger + Overlay = Augmented Reality experience

Aurasma was chosen as the AR platform after research into and the testing of a number of platforms. It was important to determine such factors as the usability of the application, the cost of creating and hosting content and the limitations of the application. This would involve testing the quality of image required, the size of video to be used and accessibility for the end-user. Several Auras for testing the technology parameters were created to determine whether Aurasma would be a suitable choice.

To view an Aura using Aurasma requires the download of the Aurasma app to the mobile device, after which it is necessary to follow the account name (channel) where the content is stored. (There is unfortunately one limitation: no Aurasma app for Windows mobile devices is available.) A dedicated AR channel (mmuAR) for the University was created to enable users to view all content. Instructions on how to download Aurasma and join the channel were printed on the back of the postcard to facilitate viewing (Figure 1). Recruitment & Admissions (R&A) carried out the design for the postcard (Figure 2) and the overlay, which was created using the Videoscribe application.

Figure 1. Aurasma and mmuAR channel joining instructions.

Interactive content for the postcard to be used with augmented reality was developed, using University-based experts. Prior to the final mass printing of the postcard, it was essential that the augmented reality aspect of the postcard was tested and working.

Figure 2. Student fees and financial support postcard.

Use of AR with University students

When used creatively, video can become a powerful expressive tool. Creating the postcard for the student work involved initially filming six students at their Graduate Art Show. The videos were made without any rehearsal and the six students filmed were asked to talk about their field of specialism and their exhibition. Using images of their work on display, a postcard similar to that for R&A was created. The postcard in Figure 3 is an example of a student's work.

Aurasma was used in a similar format for creating the Auras used for the Open Day event. The students filmed were asked to choose a trigger image for their postcard and to view the final interactive process to ensure the augmented reality was a true representation of their work. Instructions on how to download the Aurasma were once again printed on the back of the postcard. At the end of the interaction (viewing), an email generated by the application could be sent to the student, requesting further information about their work.

Figure 3. Graduate Degree student postcard.

Development of the Augmented Reality CV (ARCV) (Figure 4) included one of the students who had been involved in the creation of their student postcard. For the implementation, a number of images would trigger links to media-based content, highlighting the student's professional career and specialism. The overlays incorporated her graduate show, current areas of development and an interview with her. At the end of each interaction, the viewer was redirected to a Twitter, Facebook or Flickr account to access further aspects of their work.

Figure 4. ARCV.

Results and Discussion

Use of AR at the Open Day Event

For the Open Day event, 1000 postcards were printed and distributed to visitors. Each visitor received an explanation of what AR was and how to view it using a personal mobile device. Though this was time-consuming, as the viewer had to download the Aurasma app and join the channel before being able to view the aura, it was a new method of highlighting the financial aspects of studying at university and visitors were overawed by a method so interactive.

Having not been informed (by the published material provided before the visit) of this interactive media, visitors were unaware of what to expect upon arrival. As the event was very busy, there was occasionally insufficient time to explain to them how to use the postcard.

Evaluation was carried out in two ways, respectively during and after the Open Day event. During the event, those attending were shown how this interactive medium worked. The reactions obtained included:

'Amazing'   *'Wow!'*   *'I haven't seen this before'*   *'That's great'*

The second method involved a survey of those attending during the Open Day; the response obtained from this sample (size n=73) is shown below:
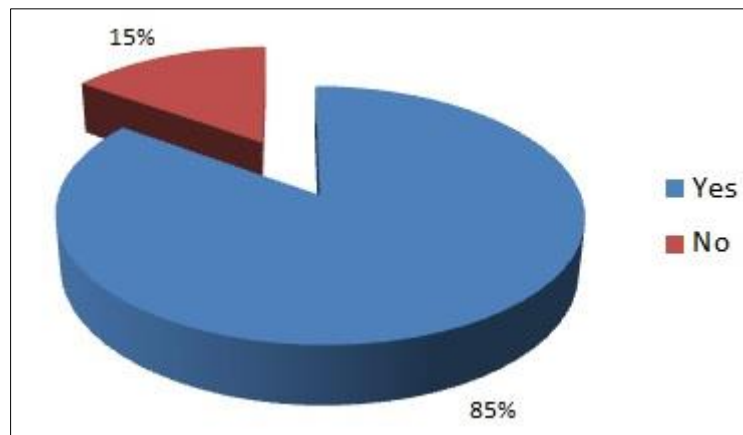
Figure 5. Was this the first time you had viewed Augmented Reality video?

The analysis highlighted the fact that this was the first time the majority of visitors had used AR. Having a larger sample size to provide feedback would provide detailed evidence of the effective use of AR; however, to obtain a detailed analytical breakdown of the number of times the Aura was viewed required a commercial licence with Aurasma and, for the initial implementation of this technology, the cost could not be justified.

The ease of setting up the interactivity was a major advantage of using Aurasma. Other AR platforms such as Metaio and Layar are available, but do not currently offer a free service to education. There have been content development improvements to many of these platforms, but the choice was heavily influenced by the fact that Aurasma had free access.

Like many new technologies, AR provides challenges as well as possibilities and one such challenge is the inflexibility of the content in AR systems (Kerawalla *et al*, 2006). Since the content and interactions are fixed, changes cannot quickly be made to meet institutional requirements. It might thus be more productive were MMU to regard AR as a concept rather than a certain type of technology.

Use of AR with University students

Augmented Reality is particularly relevant for education because it aligns well with Constructivist concepts and situated learning, where learning is unintentional rather than deliberate. Lave and Wenger (1991) call this process "legitimate peripheral participation". AR is an active, not passive, technology; students are able to construct new understanding. The visual and interactive form of learning is now seeing AR appropriate to and used by such different disciplines as Biology, French, PE and Mathematics.

For many graduates, finding employment in today's economy can be difficult. A traditional or chronological CV is the standard format advised for job application by many Careers Services at Higher Educational institutions. *Guardian Careers,* however, states that the growing popularity of social networks has made a supplementary online presence for

graduates vital in many industries, as many recruiters and managers are increasingly checking prospective candidates online. This is not to say that the traditional CV and covering letter are not still the standard methods of job application. Josh Tolan, CEO of *SparkHire*, states, "*This is why many candidates are using new and less traditional methods of applying for great jobs.*"

Since employers receive a large number of traditional CV.s from applicants, the standard job application method may not be sufficient to make an individual stand out. The inclusion of 'buzzwords', based on the job specification in the application, may likewise fall short of the self-presentation impact a candidate might hope to achieve: it is evidence, not the use of buzzwords, which will help a CV to be noticed.

A visual CV enables an employer to view the personality of the candidate and presents the person behind the formal achievements. A continuous online presence can be interlinked to other social media sites such as Facebook and Tumblr, providing a potential employer with further opportunities to view their skills. Jill Corbey, Business Development Manager at *ThisCityAgency* states:

> "*In the last few years, social media has changed how things work on every level in the business world – but in terms of how students use social media to find a job, not much has changed at all. Although students may use social media to look for extra background on a recruiter, it's clear that they aren't interacting with them online.*"

The ARCV illustrated in Figure 4 was the first visual CV developed by a student in a Higher Education establishment; however, this form of media-based CV would not be suitable for all disciplines. This approach represents a departure from the traditional CV (based on a standardised and largely unchanged layout) that Careers and Employability centres at many universities currently offer.

We see AR as providing an opportunity for both learners and teachers to re-think the way they engage in learning and teaching with each other. Luckin and Stanton Fraser (2011) state that it can "*bridge the learning gap between abstract descriptions and the real world phenomena*". This redefines the ability of the learner to engage actively with the content. We are aware of the current 'wow' factor and the fact that it can evaporate quickly. Sener (2007) suggests that a move towards students' creating their own content increases student engagement and can result in products of lasting value.

In accordance with teachers' belief that learning improves when students are interested, creative and inspired, student engagement can stimulate curiosity. A central role in the transformation of pedagogy is learner creativity and productivity (Leadbetter, 2006). However, adopting an approach where student-generated content is intended for consumption by others may generate concern for the validity and reliability of the content. The student is no longer simply a passive learner at the receiving end of a tool (Hilton, 2006).

Conclusions

Some recommendations for the implementation of augmented reality are:

- It is important the development and deployment of AR within a university has strategic management support.

- Senior management support must be provided to develop augmented reality as part of the student engagement experience.

- The development of AR within a university involves all staff and/or students who want to develop the content and promote the use of AR.

- Analytical data must be available to determine the effectiveness of AR implementation.

- The development of a University Open Day app can enhance student engagement and be of major benefit to the student experience.

- Staff should work in partnership with students to develop immersive media-based content for classroom and employability purposes.

Students and MMU academic colleagues are now collaborating to implement and extend the use of AR in classrooms across the University. Providing the opportunity to 'flip the classroom', whereby students gain first exposure to new materials outside the class through reading, audio or video using AR, is a new concept within Higher Education and requires further research to determine its success or failure. Based on the cloud service, the flipped classroom has the advantage of effectively combining modern educational technology with classroom teaching. AR provides an opportunity for the development of an immersive media-based experience that enhances student engagement outside the normal classroom. Augmented reality is able to combine factual learning with imaginative and creative thinking.

Reference list

Caudell, T.P., Mizell, D.W. 'Augmented Reality: An Application of Heads-Up Display Technology to Manual Manufacturing Processes.' Proceedings Hawaii International Conference on System Sciences, Jan 1992. Vol. 2, 659-669.

Gauntlett, D. (2011) *Making is Connecting*. Cambridge, UK: Polity Press

Hilton, J. (2006) 'The future for higher education: Sunrise or perfect storm.' *EDUCAUSE Review*, 41(2), 58-71. Available at: http://www.educause.edu/ir/library/pdf/erm0623.pdf (Accessed: 3 January 2007).

Jisc. (2013) 'Engaging learners in education and beyond, Employment and social media, How can your students use social media to get a job?' *JISC Inform, Issue 37/Summer* Available at: http://www.jisc.ac.uk/inform/inform37/EmploymentAndSocialMedia.html#.VD_Vpvkp9GY (Accessed: 13 January 2015).

Kerawalla, L., Luckin, R., Seljeflot, S. and Woolard, A. (2006) 'Making it real: exploring the potential of augmented reality for teaching primary school science.' *Virtual Reality*, 10 (3), 163–174.

Lave, J., and Wenger, E. (1990) *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press

Luckin, R. and Stanton Fraser, D. (2011) 'Limitless or pointless? An evaluation of augmented reality technology in the school and home.' *International Journal of Technology Enhanced Learning*, 3 (5), 510-524. Available at: http://knowledgeillusion.files.wordpress.com/2012/02/limitlessorpointlessarpaper2011ijtel.pdf (Accessed: 7 January 2015).

Sener, J. (2007) 'In Search of Student-generated content in Online Education.' *E-mentor 4 (21)* Available at: http://www.e-mentor.edupl/eng (Accessed: 10 February 2015).

Vygotsky, L.S. (1978) *Mind and society: the development of higher mental processes.* Cambridge, MA: Harvard University Press.

Whitmell, C. (2012) *Why a traditional CV isn't always enough*. Available at: http://www.theguardian.com/careers/careers-blog/cv-writing-traditional-application (Accessed: 28 January 2015).