

## AUGMENTED REALITY - A CURATORIAL TOOL

Nina Lyons<sup>(a)</sup> & Matt Smith<sup>(b)</sup>

<sup>(a),(b)</sup>TU Dublin, Blanchardstown Campus

<sup>(a)</sup>[ninalyons@gmail.com](mailto:ninalyons@gmail.com), <sup>(b)</sup>[Matt.Smith@itb.ie](mailto:Matt.Smith@itb.ie)

### ABSTRACT

The flood of information in today's society makes it difficult for undergraduate students to source quality support materials to help in their study, as many are ill-equipped to distinguish the good from the bad. Because of this, the lecturer's role as curator of learning resources has developed and become a vital aspect of their job. It is no longer sufficient simply to provide reading lists. As more and more content of various levels of quality has become available online, some lecturers have taken it upon themselves to create personal websites with module content, a reading or resource list and extra materials to support their students' learning.

This paper looks at a simple approach where using AR can successfully bring online and published materials together to create a unique curatorial combination that takes support learning to a new space.

Keywords: reading lists, resource lists, augmented reality, AR, curatorial tool,

### 1. INTRODUCTION

Reading lists have long been a common feature on programmes of study in higher education (Stokes & Martin, 2008). In a study of tutors, it emerged that the "primary purposes of constructing a reading list was the pastoral aim of offering students a 'sense of direction' in relation to writing on a given field" (Stokes & Martin, 2008). However, these reading lists now "constitute a conventional information resource, which in recent years has been complemented by a plethora of supplementary electronic information sources, most potently, for example, the Internet and virtual learning environments such as WebCT" (Stokes & Martin, 2008). The flood of information in today's society makes it difficult for undergraduate students to source quality support materials to help in their study as many are ill-equipped to distinguish the good from the bad, the personal points of view from the peer-reviewed & accepted theories of academics. Reading materials provided by college courses develop critical reading skills in students. "Close reading leads students to infer and extend meaning by identifying main points and distinguishing supportive statements from illustrative details" (Conley, 2008). However, where once the library and the librarian were the first point of call for

all students, they have since been replaced by search engines. Unfortunately, the Internet is home to the voice of the masses rather than the voice of the well-articulated structured opinions of research and academic-approved materials. And even when the search engines provide such results, the 5-minute read or the 2-minute video from a blogger that gives a full overview is generally preferred by the undergraduate over the 20-page paper that is arguing only one aspect. However, while the blogger may have made a good point and the video makes sense, they cannot hope to provide the level of detail required for a full appreciation of the topic and they are not good academic references that can be cited in an assignment.

With published books, the content has been rigorously reviewed by the publisher before printing and reviewers from an academic community will have accepted or rejected it. Consequently, the book comes with a degree of authority and as such, a lecturer can confidently add it to a reading list. The same cannot be said for websites. No publishing standards exist for online content, so while many websites have good content there is no guarantee of the quality of the writing across all websites. Even some of the best websites fail in their own standards when advertising revenues demand daily content regardless of the effect it might have on the quality of the content. Also, websites change. With printed publications there is a date and edition, so lecturers can refer to a document knowing the student is reading the same text as they cite. However, when citing websites lecturers do not have the same confidence that the student is seeing the same content if they visit a website at a point in time after the lecturer added the url to the reading list.

Due to the increasing number of different types of information sources, reading lists have evolved to incorporate a wide variety of different resources resulting in a significant amount of non-textual information with many now referring to them as resource lists (Brewerton, 2014). In order to strike a balance some lecturers have taken it upon themselves to create personal websites with module content, the reading or resource list and extra materials to support their students' learning. These websites can and have grown into a vital support for their students on which both students and lecturer can confidently rely. Lecturers are satisfied that they are giving their students

access to up-to-date key information that will help develop their knowledge in a given subject area. The websites give lecturers the freedom to add information and links to books, articles, essays, videos and a host of other rich resources that they know are of good educational quality and will supplement the main key texts and themes of the subject area.

Augmented Reality (AR) is a technology that can help lecturers to link their content by knitting together online resources with printed resources.

A scan of popular college courses globally reveals that they still cite books as their main resource on reading/resource list. As books remain the main point of reference for students to read from, AR provides an array of exceptional opportunities that can enhance, supplement and create one-off learning experiences for students that centre around books & printed materials. This paper looks at a simple approach where using AR can successfully bring online and published materials together to create a unique curatorial combination that takes support learning to a new space.

## **2. AUGMENTED REALITY**

Augmented Reality is an experience that supplements the real world with a virtual layer of information (Lowry, 2015). The virtual layer of digital content is overlaid into a person's view through a device such as a smartphone, smart glasses or an AR headset.

While the technology that enables AR has been around for some time, AR as a communicative medium is still being explored. Many sectors of industry have adopted AR as a demonstrative or an assistive tool for onsite applications and training (Little, 2018), marketing (Sandler, 2018) and education (Ingram, 2017), whereby they have taken the immediacy of the medium to give access to contextual information.

AR has been used for many years by magazines & marketing companies to link the static content of the magazines to online content such as interviews, behind-the-scenes videos of photoshoots, product demos and much more. It is a rich and dynamic way of linking static print to related online content in a tangible way.

A good example of this interaction between print and digital is the 2009 December issue of Esquire magazine. The cover featured Robert Downey Jr.,. When activated through AR, the cover "comes to life" with Downey talking and chatting promoting his movie. The animations, and use of video and embedded trailers provide an insight into what is achievable with AR when it is linked to a printed resource.

## **3. READING LISTS & THE ROLE OF LECTURERS**

A simplistic view of the role of the lecturer is to prepare and deliver the content of the module and to supply recommended and optional reading lists. Reading lists are developed as part of modules to help deepen the understanding of the subject area and of the thought and opinions that shape the knowledge domain of a particular subject. While many students understand the value of reading lists, many more have expressed frustration at how many of the recommended texts are not easily understandable or readable (Stokes & Martin,

2008). Couple this frustration with the ease of access to bite size nuggets of information on the internet and it is easy to understand the attraction of online resources.

While there is very little literature on reading lists (Brewerton, 2013), they are still in place as they offer support and indication for the student learner (Stokes & Martin, 2008). However, due to the ease of access of information online, the role of content curator has developed and become a vital aspect of a lecturer's job. Lecturers are uniquely positioned to know the good from the bad, the academically sound from the well-formed personal opinion, which makes their role of curator invaluable to students. With the proliferation of online content of various levels of quality, it is important for lecturers to point and guide students in the direction of the best resources.

As with most academic writing, the majority of the best is still within the confines of a printed book. That is not to say that there isn't some very good and useful content available online. As previously mentioned, many created their own websites where they have carefully created and curated content within the context of their modules that is suitable for their students and supports student learning. Where once these websites simply provided an overview of the module and made the lecture notes available, they now provide more material and a full list of resources, giving students 24-hour support in their learning. The websites bring together both the books and the online resources for their students. This approach gives lecturers confidence that they are guiding their students in the right direction. The websites are a perfect tool for lecturers as it gives them the freedom to update and grow the content as needs change.

However, as with any good idea there is a downside, as when information is provided in such an easy and accessible way, students may neglect the booklist and instead skim the website and select a few of the links to give themselves a general overview of the knowledge instead of fully reading and interacting with all the resources, especially the books. AR is uniquely placed to help avoid this by knitting both online and printed material together to create a contextual learning experience.

## **4. MAPPING RESOURCES**

AR virtual layers can be activated by GPS points, sensor technology and marker technology. Marker technology allows image targets to activate AR layers. It is this aspect of AR that best suits this curatorial application - knowing that some of the printed texts are vital for students to grasp subject themes, lecturers could build an AR space around these specific printed texts. Making the essential books the markers to activate the AR virtual layer, emphasises the importance of the material in the book.

Art History & Appreciation courses and modules, have extensive and varied reading lists with much of the quality content in book format. A World History Of Art by Hugh Honour & John Fleming, is a mammoth book of over 900 pages. Currently in its 7th edition, it gives an overview of and insights into periods of art across the world, starting at approximately 30,000 BC and

continuing up to the modern era. It is one of the most popular art books and finds itself on the majority of reading lists for first year undergraduates for critical and contextual studies. It is a good reference book as it gives concise explanations and overviews and also includes in-depth essay extracts from other publications. It shows full images and detail images and so is a very good overall descriptive book.

Alongside such books, lecturers now have a wide variety of rich content to point to, including online resources such as articles, essays, documentaries and new research now available online. However, while a website is ideal for listing and giving access to these resources AR has the opportunity to organise the content in a more visual and tactile manner while also emphasising the fact that the books are the most important of all the resources by mapping the other resources on to the books.

Using AR marker technology a specific image can activate an AR layer. This provides an opportunity to map the resources to the main texts that they support. The resources can be put together visually in a contextual manner. So instead of a webpage that lists all the resources, the resources are now visually plotted to a marker in the context of the book and the section which all these external resources support.

Utilising the books as the marker to launch the other resource materials underlines the importance of the books and highlights that everything else plays a supporting role to the main text. It also successfully groups the information and maps the module content in an easily accessible manner. Different sections in each book can be points of access to different resources. Essentially, AR becomes the ultimate sticky note, full of tangible resources for students.

AR has the ability to be a better communicative medium than websites for this curatorial purpose. Where the website is removed from the printed material, such as the books and or handouts, AR puts the printed material at the centre. The AR layer that houses the support resources is only available when accessed through the books. This creates a rich learning environment with visual links that encourages learning. AR becomes a curatorial tool for lecturers to use to make a new rich learning platform.

## 5. TOWARDS A WORKING PROTOTYPE

The Renaissance is an influential and pivotal part of art history for many reasons and so there are many cross-referencing additional texts that relate to this period in art. In the last 30 years, more has been written about the period and some of its most prolific artists such as Michelangelo. The period is a rich area for research papers, essays, articles and tv documentaries, as different discoveries have been made and new theories about the period and the artists have been proposed.

There is a lot of material from a variety of sources that can be hard to pull together at times. However, AR could prove to be the tool required to do this.

Figure 1 shows a double page spread from the book, A World History Of Art, showing information on Michelangelo including his famous statue of David.

While this book is an excellent resource an AR layer could build another level to improve insight by displaying and linking with external resources.

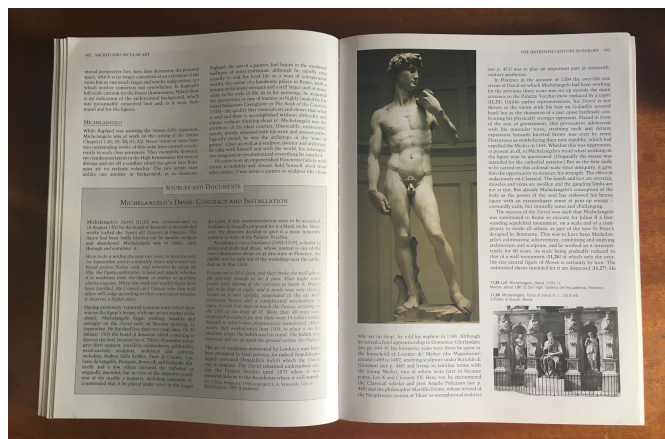


Figure 1: Double page spread from book to serve as marker for AR Layer

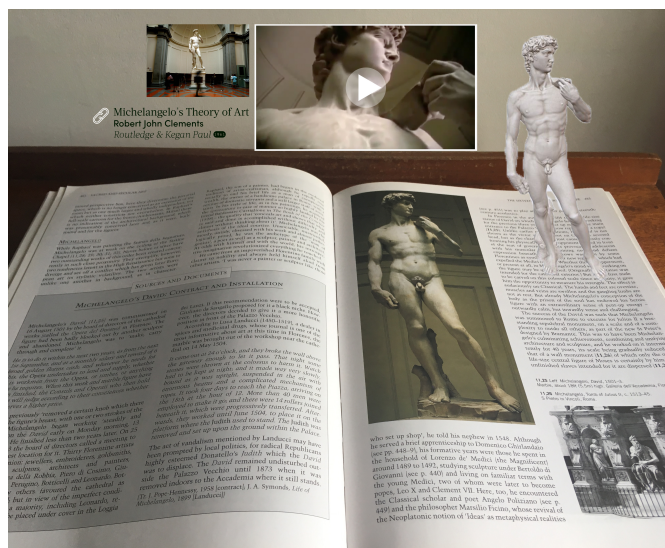


Figure 2: Sample AR layer

Figure 2 is a simple example of what is achievable through AR, whether viewing through a smart phone or an AR headset. The virtual layer is made up of a couple of elements, a 3D model, a video, image, and url links.

It is possible to add a range of content types to an AR layer to bring a variety of resources together. Figure 2 is a simple example, using the double page spread from figure 1 and adding a few different content types to illustrate what is achievable with the AR layer. These are:

- 3D Model
- Video file
- Supplementary image
- Linked resources

3D model: This can be rotated and zoomed in on and can be annotated with labels and descriptions.

Video file: A video file can be embedded into the AR layer.

Supplementary image: The image in the book is a full image of the statue and takes up half the length of the page in order to show it as large as possible, which is the case with most art books; they aim to give the reader as much detail as they can. However, an important aspect of sculpture is its size comparison. The image in the book does not give any clue as to the size, whereas the secondary image in the AR layer gives a very clear indication of the size and its position in the gallery where it resides.

Linked resources: Links to essays and articles can have a visual form, from which they can be downloaded.

This results in a new rich experience for learning.

While this paper has focussed on books as the main marker for activating the AR virtual resources, this does not mean that it can only be books. The printed handouts given out in class can also serve as a marker.

## 6. CONCLUSION

Building an application like this that groups textual and non-textual, printed and digital information together in one place, placing the book or the handout at the centre of learning creates a rich learning environment. This highlights the importance of the information within the book or handout, while giving access to reliable external resources. This gives students tangible points to access during their study. This type of application of AR system has been highlighted as having a positive impact on user experience (Li & Fessender, 2016). An AR system such as this is proactive by taking appropriate action when triggered, meaning that there is a decrease in interaction cost. In our proposed system we have created a new environment that has all the resources displayed in one place, making the interaction efficient and requiring little action from the user. Consequently, combining multiple resources minimises attention switching (Li & Fessender, 2016). So instead of the student switching their attention from the book to an external source, e.g. an interactive 3D model on a website, all the materials are instead combined in one place, making for a richer deployment of content.

AR gives lecturers a new platform to grow their resource lists for students in a fully contextual way. Plotting the selected external resources to the main reading text makes for a more diverse learning environment for learners but also allows lecturers to arrange quality content in the way that best suits the learning of the subject area. AR as a curatorial tool for lecturers gives greater freedom and flexibility for arranging the reading and resource materials together, knitting the digital and the print together in a bespoke learning environment.

## REFERENCES

Brewerton, G. (2013) Implications of Student and Lecturer Qualitative Views on Reading Lists: A Case Study at Loughborough University, UK. *New Review of Academic Librarianship*. 20 (1), pp. 78-90.

Conley, D.T. (2008) *College Knowledge: What it really Takes for Students to Succeed and what we can do to Get them Ready*. 2 ed. San Francisco: Jossey-Bass Education.

Ingram, M. (2017, May) Medical Students Are Using Augmented Reality to Study Patients in 3D. Available from <http://fortune.com/2017/05/03/medical-augmented-reality/> [June, 2018].

Li, A. & Fessenden, T. (2016) Augmented Reality: What Does It Mean for UX?. Available from: <https://www.nngroup.com/articles/augmented-reality-ux/> [June, 2018].

Little, A. (2018, March) Automation & Networking, Design & Development | Analysis and Trends, Augmented Reality. Available from <https://www.manufacturingtomorrow.com/article/2018/03/howautomotive-manufacturers-are-utilizing-augmented-reality-11117> [June, 2018].

Lowry, J. (2015, August) Augmented reality is the future of design. Available from: <https://thenextweb.com/augmented-reality/2015/08/31/augmented-reality-is-the-future-of-design/> [June, 2018].

Piscioneri, M. & Hlavac, J. (2012) The Minimalist Reading Model: Rethinking Reading Lists in Arts and Education Subjects. *Arts & Humanities in Higher Education*. 12 (4), pp. 424-445.

Stokes, P. & Martin, L. (2008) Reading Lists: A Study of Tutor and Student Perceptions, Expectations and Realities. *Studies in Higher Education*. 33 (2), pp. 113-125.

## ACKNOWLEDGMENTS

3D model of Michelangelo's David by Gerry Fisher - <https://sketchfab.com/jerryfisher>

## AUTHOR BIOGRAPHIES

**Nina Lyons** is a graphic designer with over 15 years of experience in the industry. She holds a BDes from the Limerick School of Art & Design, Ireland, a Masters in Design Practice from the Dublin Institute of Technology Dublin (now TU Dublin) and HDip in Science in Computing from Institute of Technology Blanchardstown (now TU Dublin). She is currently completing the second year of a full-time structured research masters at TU Dublin, where she successfully applied for a fully funded scholarship to work with Dr. Matt Smith on a project investigating how AR can improve the experience of visitors to outdoor Irish cultural heritage sites.

**Dr. Matt Smith** is an academic who has researched and lectured for over 25 years at the University of Winchester and Middlesex University in the UK, and TU Dublin, Ireland. His work involves investigating the design and evaluation of interactive multimedia interfaces, especially for systems that formally, or informally, support learning. In recent years Matt has targeted the exploitation of game technology (he is author of Unity Cookbooks published by Packt), and novel interface techniques including Virtual and Augmented Reality