

Institution: Newcastle University		
Unit of Assessment: 32 Art and Design: History, Practice and Theory		
Title of case study: Magical Realism and Augmented Reality: Using Digital Technology to Bring Archives to New Audiences, Build Children's Engagement with Place, and Change Ways of Working at a Cultural Organisation		
Period when the underpinning research was undertaken: June 2018 – July 2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Tom Schofield	Role(s) (e.g. job title): Senior Lecturer in Digital Cultures	Period(s) employed by submitting HEI: 2013-2015, Research Assistant then Associate 2015-Present, Lecturer then Senior Lecturer
Period when the claimed impact occurred: July 2018 – December 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact <p>Schofield's research lies at the intersection of digital technology and creative design, and has focussed particularly on how carefully designed digital tools can present archival material to new publics in innovative and interactive ways. Two research projects, funded by the AHRC and EPSRC as part of their 'Next Generation of Immersive Experiences' programme, allowed Schofield and an interdisciplinary team to develop a pioneering smartphone app in partnership with Seven Stories, the National Centre for Children's Books. The app developed new strategies for presenting literary archives to children, using Augmented Reality technology to embed material from the Seven Stories collections into the landscape around the Visitor Centre. Equally original was the collaborative design process by which the app was developed, showing how museum professionals, designers and developers, teachers and children could work as equal partners in a process of co-design. These workshops, and the app itself, brought significant benefits to a large community of children, transforming their relationship with reading and cultural heritage, but also allowing children to re-appraise their local environments. A second beneficiary of the research process was Seven Stories, for whom the project significantly expanded their capacity to take an active role in digital collaborations, and to reach new and (although local) previously remote audiences in appealing, enriching and sustainable ways.</p>		
2. Underpinning research <p>A principal focus of Schofield's research since 2015 has been the use of creative digital technology to open up archives for public use. His work has argued that archives can be a resource for new forms of creativity as well as for scholarship. He has used emerging technologies like augmented reality and AI/machine learning to unlock these new senses of value for archives and bring them to new audiences both on the web and in physical spaces. [PUBS 1,2]. In 2018, a grant from the AHRC/EPSRC under the 'Next Generation of Immersive Experiences' programme enabled Schofield to take this interaction design research further in collaboration with a major cultural partner, Seven Stories, the National Centre for Children's Books, located in the Ouseburn Valley in Newcastle upon Tyne [Grant 1]. A second AHRC grant in 2019 enabled Schofield and his team to develop the creative digital workshop model they had devised to work with cultural organisations and children in disadvantaged areas, in order to creatively reappraise and encourage young people's place-making in their local environments [GRANT 2].</p>		

At the core of the research was the question of how to design digital technology that could open up for elements of the Seven Stories archive for public and creative uses. The specific focus was on the work of the children's author David Almond. Almond's fiction, for which he has been awarded many major international prizes (including the Hans Christian Andersen Award, the Eleanor Farjeon Award and the Carnegie Medal), is characterised by its Magical Realism (MR), a literary style characterised by a strong blurring of social reality with the presence of the magical or fantastical within everyday experience. Particularly important to the research were the connections between Magical Realism and Augmented Reality (AR). MR can be seen as a form of augmentation that – just like AR technology – adds hidden layers to particular geographical locations and deepens readers' relationships with place. This is particularly so with Almond's novels, such as *Skellig* (1998), which embedded concealed histories and fantastical creatures into the fabric of urban Newcastle in a way that can enrich everyday lives. Schofield's research set out to explore these productive parallels between AR and MR, exploiting their shared ability to bring about encounters with the apparently unreal within lived reality, and to transform users' engagement with even very familiar environments.

Working with an interdisciplinary team, including a freelance artist (Diego Trujillo-Pisanty) and a Professor of Children's Literature in the University's School of English (Kimberley Reynolds), Schofield's action research devised new methods of partnership working with archivists, storytellers, literature specialists, designers and technical developers, education professionals, as well as children themselves, which resulted in a smartphone app – 'Magical Reality' – embedding digitised content, experienced through AR technology on mobile phones, as part of a series of walking tours [PUB6]. On a technical level, the research's originality stemmed from new understandings of how mobile experiences in AR space could be inspired by MR techniques. The project showed, for example, how the use of space in MR (for instance in the selection of particular kinds of site) can be reflected in AR design, and how fantasy elements of texts could be used to 'dramatize search' within interface design [PUB 3,5,7]. No previous research has explored the relationship between AR and MR. Equally important were significant advances in the deployment of literary archive material in AR space. Seven Stories holds manuscripts, artwork and other materials related to Almond's work. The workshops and app focussed on longhand book drafts, messy diagrams, enigmatic half sentences and small drawings Almond produced, weaving them into the landscape. A key problematic addressed by the research was how AR could bring literary archives alive for an audience specifically of children, while remaining mindful of unequal levels of access to, and familiarity with, both digital technology and literary texts [PUB4].

The project's findings were published in a set of articles in journals spanning a wide range of relevant disciplines, including museum management and curatorship [PUB4], children's literature studies [PUB5] and interactive systems research [PUB 3,7]. The quality of these outputs is indicated by the status of the outlets. The DIS conference [PUB 3,7]), for instance, is the leading publication outlet of any sort for interaction design research, and Schofield's paper received the rare distinction of an 'honorable mention'.

3. References to the research

The below journal articles and published conference proceedings are of at least 2* quality. They have all been rigorously peer reviewed and are in leading journals and conferences. P4 was awarded an 'honourable mention' for the quality and originality of its contribution to design.

PUB1. **Schofield T.**, Whitelaw M, Kirk D. Research through design and digital humanities in practice: What, how and who in an archive research project. *Digital Scholarship in the Humanities* 2017, 132(Suppl 1), i103-i120. <https://doi.org/10.1093/llc/fqx005>

PUB2. **Schofield T.**, Kirk D, Amaral T, Dörk M, Whitelaw M, Schofield G, Ploetz T. Archival Liveness: Designing with Collections Before and During Cataloguing and Digitization. *Digital Humanities Quarterly* 2015, 9(3). <http://www.digitalhumanities.org/dhq/vol/9/3/000227/000227.html>

PUB3. **Schofield, T.**, Trujillo-Pisanty, D., Arrigoni, G., Reynolds, K., & Pattinson, R. (2019). Magical Realism and Augmented Reality: designing apps with children in a cultural

institution. In DIS '19: Proceedings of the 2019 Designing Interactive Systems Conference. San Jose, CA, USA: ACM. <https://doi.org/10.1145/3322276.3322293>

PUB4. Arrigoni, G., **Schofield, T.**, Trujillo-Pisanty, D. (2019) Framing collaborative processes of digital transformation in cultural organisations: from magical realism to augmented reality.

Museum Management and Curatorship. <https://doi.org/10.1080/09647775.2019.1683880>

PUB5. Reynolds, K., **Schofield, T.**, & Trujillo-Pisanty, D. (2019). Children's Magical Realism for New Spatial Interactions: Augmented Reality and the David Almond Archives. Children's Literature in Education, 1–17. <https://doi.org/10.1007/s10583-019-09389-2>

PUB6. **Schofield T.**, Trujillo Pisanty D. *Magical Reality*. 2019. Mobile App.

PUB7. **Schofield, T.**, Bowers, J., & Trujillo Pisanty, D. (2020). Magical Realist Design. In *DIS '20: Proceedings of the 2020 Designing Interactive Systems Conference* Eindhoven: ACM. <https://doi.org/10.1145/3357236.3395530>

Grant 1. Children's Magical Realism for New Spatial Interactions: AR and Archives. AH/R009155/1. 2018 (GBP59,544)

Grant 2. Embedding Magic: AR in outreach. AH/S010661/1. 2019 (GBP31,988)

4. Details of the impact

Seven Stories is the UK's National Centre for Children's Literature, with a remit to collect and safeguard this distinctive national heritage, and to present its internationally significant archive of manuscript, print and artwork to as wide an audience as possible. However, Seven Stories has struggled to reach some sections of the public, including children and young people in Byker and Walker, the Newcastle wards that adjoin the Seven Stories Visitor Centre, both of which are among the most deprived areas in the North East and the UK. Moreover, in common with many cultural organisations, Seven Stories has struggled to capitalise on the possibilities of new technologies, like Augmented Reality (AR), to bring its collections to new audiences.

The mobile phone app [PUB6] developed by Schofield and his team was designed to address both these problems. It was launched in September 2018 as a major element of Seven Stories' contribution to the programme of the Great Exhibition of the North, the Government-sponsored cultural festival celebrating innovation, culture and technology, attracting 3,800,000 visitors. Available freely to download from the Apple App Store and Google Play, the app was carefully designed to engage children with material from the archive by using AR technology to digitally embed drawings, texts and diagrams relating to the work of David Almond in the physical environment around Seven Stories, organised in a series of walking tours. Thus the archival 'bones' of Almond's Magical Realist (MR) texts were composed into new stories woven through the landscape by the power of AR technology. And thus, the archive, usually accessible only by accredited researchers or in small, personalised handling sessions, was opened up to an entirely new constituency of users.

The impact of the app can be understood best from highly positive feedback from local children and education professionals. Comments focussed on how the MR/AR affordances of the app changed children's relationships to their own neighbourhoods, re-presenting familiar spaces in surprising ways. As one pupil put it, *'I like how something unusual can just come out of nowhere'*, adding *'with AR it comes to you'* [IMP1]. A central concern of the research was that the project should not result in a 'makeover' of the environment, imposing a new version of the space to fit a pre-determined agenda, but rather that children's own lives should be braided into the landscape. The combination of MR and AR facilitated this. As one 'Reading Champion' from a local school put it, *'it was almost, instead of allowing them to see space in a completely different way, that it facilitated something quite imaginative that was already there'* [IMP8]. What was 'already there' was the children's familiar built environment, but also their own personal and social contexts. One year 8 pupil, for instance, focused on the app's placement of Almond's characteristic angel and devil figures in her neighbourhood: *'angel is by the flowers. The devil would say, "haha get away, you're homeless you're poor and everything." And when you pass the angel they'd say, "no, the devil's just naughty and his mam will just tell them off, cos his mam would be an angel.'* [IMP1].

At the same time, the app was intended to transform these young people's awareness and understanding of archives. Feedback emphasised that the app significantly enhanced the accessibility of the archive, significantly changing children's relationship to this kind of cultural heritage. A school 'Reading Champion' noted, *'I think it was really important and really good that the archival elements were embedded in the imaginative experience. I think it would have felt very different to the children if they had been taken to look at archival items in any museum or centre [...] that could have had the effect of making some the children feel a little bit shut out.'* [IMP8].

Central to the project was the use of a co-production methodology, working with children in a series of workshops to design all aspects of the app. The first were conducted at Seven Stories in 2018, consolidated in 2019 when the workshops were taken as a package to community centres and schools in the West End of Newcastle (another area of nationally low socio-economic indicators). These workshops produced the project's most direct impacts, introducing more than 150 children, across 5,400 hours of participant engagement, to magical realist literature, to literary archives, and to the design and technology of AR deployments. Feedback emphasised the role of the workshops in breaking down barriers for the children (*'Those children are the kind of children who might not have the opportunity to go and visit seven stories, for example, and have that sort of experience at the weekend.'* [IMP8]), and their increased confidence and ownership of local resources (*'some of those children don't often come into the library. [...] And that seemed to really help with those children [...] they felt they could come in, they always felt confident being here'* [IMP8]). Also frequently noted was the workshops' success in using reading to generate children's sense of belonging in their own neighbourhoods: *'you didn't just sit there with the book, you took them out, and you made them proud of their estate and look around their estate. That's a really good thing'* [IMP4]. Teaching staff who supported the workshops reported extremely high levels of pupil engagement and a transformation of the quality of pupil work. Reading Champions recorded being impressed by *'how specific [the children's] ideas were': 'Whether it was how carefully the workshops were being thought through, or how sympathetically the toolkit and the app had been designed, the quality of their work was very high'* [IMP8].

Equally marked were the changes recorded in children's attitudes to digital technology. The workshops showed children at first-hand how technology can be developed differently, through processes of co-production which included themselves. A head of high school Computer Science told us, *'When we teach computer science generally it's very much down the science route. It's not coupled with anything. So going down the route of storytelling and linking it with art was really interesting to see, and giving them a bit of a broad range.'* [IMP7] More generally, the project allowed children to participate in arts and literature, and to overcome barriers to their participation. The Engagement Manager at one community association said, *'Some children aren't surrounded by books, especially on this estate with the poverty and the reading age is peaking at 8 at the minute for adults. I just feel that projects like the one you've done with Seven Stories are so important to connect people into that literature. The way you did it as well; you didn't shove a book in front of children and say "now read this". You brought it to life with that beautiful – your colleague made those beautiful boxes, and just the way that you and your colleague worked with the young people was absolutely fabulous'* [IMP4].

The other principal beneficiary of this work was Seven Stories itself. As the Creative Producer of Seven Stories notes, a key mission of the institution is *'to reach out and do much more work on in our doorstep community, and specifically in Byker'*. She confirms that the projects have *'been really helpful in developing a lot of that work'* [IMP9]. More specifically, the projects demonstrated *'different work that we can bring to those communities and work with those communities on'*, showing how a focus on books and archives (which have formed the basis of Seven Stories' standard offer) can be supplemented by digital technology, embedded in local environments, and co-produced with local children through community workshops [IMP9]. The workshop model provided Seven Stories with a new way of working. Previously, their standard practice had been to commission external providers for outreach activities, particularly those including a digital component. For this project, however, Schofield and his team provided training

sessions for 'Creative Associates' (Seven Stories employees who would deliver their workshop programmes), instructing them in delivery of not only the MR/AR workshops but also in the process of co-production with communities and digital developers [IMP2]. A Creative Associate took a lead role in each of the workshops. The project demonstrated to Seven Stories that it was technically possible to develop digital tools using internal resources, and that a key element of ensuring their success was the full involvement of the intended end users in the design process. As the Seven Stories Creative Director notes, *'I also think that museums, cultural organizations, buy people into do this work and don't get involved themselves. So it was really good to be able to have a place where we could kind of work on all that together'* [IMP9]. A further key impact on Seven Stories was the realisation, generated from the project, that schools would be encouraged to engage with the institution and its holdings by outreach strategies that involved technology alongside children's books. Before this project, Seven Stories' educational outreach offer was typically directed to schools' English or Art departments. By providing an offer to the Computer Science curriculum, the project broadened Seven Stories' appeal to schools, as well as demonstrating to the Computer Scientists of the future that stories and creative design are as important to the subject as technical theory or coding, a point reflected in the comments of the high school Computer Science head above [IMP7].

5. Sources to corroborate the impact

- IMP1. Interviews with children participating in workshops
- IMP2. Summary of training session conducted by Seven Stories for creative associates to conduct workshops
- IMP3. Feedback sheets from workshops between cultural organisations and designers/developers focusing on the research's collaborative methods
- IMP4. Interview with Community Engagement Manager, Byker Community Association
- IMP5. Interview with Manager, Kids Kabin
- IMP6. Interview with Literacy Manager and Year 5 and 6 Teaching Assistants, Percy Main Primary School
- IMP7. Interview with Head of Department for Computer Science, Churchill Community College
- IMP8. Interview with Reading Champion, Gosforth Central Middle School
- IMP9. Interview with Creative Producer – Partnerships, Seven Stories
- IMP10. Interview with Partnership Manager, Seven Stories and Newcastle University