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The Abbey Theatre Digital Archive: a digitization project with dramatic impact

National University of Ireland Galway digitized the archive of the Abbey Theatre between 2012 and 2015. This was the largest theatre archive digitization project worldwide and it has had a major impact on the University and its Library. The scale of the digitization project presented a series of challenges, including fragile material, limited time, streamlined workflows, complex digital rights management and effective systems. The project was completed on time and on budget in 2015, using a ‘more product, less process’ approach. Access to the Abbey Theatre Digital Archive has delivered strong academic impact for the University, generating new research income and international connections as well as contributing to improved institutional ranking. The Digital Archive enables new types of research, including text and data mining, and has reshaped undergraduate curricula. It has also had a transformative effect on the Library as leader of the project. The role of the archivist has changed and partnerships with the academic community have strengthened. A growing emphasis on digital publication has been a catalyst for a function- rather than subject-based organizational structure which promotes participation in digital scholarship initiatives, with archives and special collections occupying a new position of prominence.

Introduction

Projects come and go but occasionally there is one that turns everything upside down. This is how it has been with the digitization of the Abbey Theatre archive at National University of Ireland (NUI) Galway. I immediately had a sense that this might be the case when the President of the University rang me in November 2011 to charge the Library with leading the project. The prospect was daunting and on a far greater scale than anything we had undertaken before. Saying no was not an option, however, and I was excited at the opportunity to position the Library at the head of a high-profile digital humanities project of national and international as well as institutional significance. Digitizing this major archive has presented many challenges but also reshaped teaching, enabled new forms of research and transformed the Library agenda.

A significant archive

Founded in 1904, the Abbey is Ireland’s national theatre. W B Yeats and Lady Gregory established it to ‘bring upon the stage the deeper emotions of Ireland’ and it has influenced the country’s history. Some of its players participated in the Easter Rising of 1916 and it has staged controversial plays on themes ranging from the Northern Ireland Troubles to child abuse. The Abbey has attracted the attention of censors, as shown in Figure 1. Its archive is extensive, encompassing almost two million pages, 500 hours of video and 2,500 hours of audio recordings.
This collection of production, publicity, administrative and financial records represents a massive research resource and was the centrepiece of the institutional partnership established between the Abbey Theatre and NUI Galway and formally agreed in April 2012. The President of Ireland, Michael D Higgins, launched the partnership between the two institutions in October 2012 (see photograph).

Digitization was attractive to the Abbey both as a way of opening the archive to a wider audience and of securing its content against losses such as those sustained in a major fire in 1951. The focus of the partnership for NUI Galway was to build on research and teaching strengths in theatre and drama. This subject area had been prioritized for further development at the University and a process of further staff and student recruitment was already under way, with the intention of expanding the existing range of taught programmes at undergraduate and postgraduate level. There is a strong performing arts tradition in the west of Ireland, home to the founders of the Abbey Theatre, W B Yeats and Lady Gregory. The University had already developed local partnerships with the Galway International Arts Festival and the Druid Theatre. A partnership with the Abbey Theatre offered the
opportunity for mutual benefit at national level. The University President recognized access to unique archives as vital for the humanities, stimulating research as well as research-led teaching. There was already a focus on theatre archives in the Library’s collections. These include the archives of institutions such as the Druid, Taibhdhearc and Lyric theatres, of playwrights such as Thomas Kilroy and John Arden, and of the actors Arthur Shields and Siobhán McKenna. Exclusive access to the archive of the Abbey Theatre had the potential to increase the international reputation of the University in this field.

Digitization challenges

The scale of the Abbey archive, already outlined, would have presented a major challenge on its own but the stakes were raised by the need to complete the digitization in three years. Time was of the essence as the institutional partnership is for 26 years in the first instance. It was clear from an early stage that digitization on this scale and to this timescale could not be achieved through existing Library resources. This meant outsourcing a large proportion of the digitization and we were fortunate to select an excellent contractor, an archivist who understood the needs of all parties and employed qualified archivists to process an amount of difficult material appropriately. The material in question included fragile documents damaged in the 1951 fire, an array of formats and sizes from press cuttings to stage designs, a mix of handwritten correspondence and typescript records, and audio or video recordings in legacy formats and delicate condition.

Efficient workflows were key to rapid throughput and Library staff gained from the contractor’s expertise in this regard. It was important to share learning between contracted staff and archivists in the Library who digitized part of the archive, including the programmes. Other library staff engaged closely with the contractor to establish the systems infrastructure. This was a vital element in enabling large-scale digitization and meeting complex rights management requirements. Components included a range of digitization equipment to handle different formats, a productions database already created by the Abbey Theatre which reduced cataloguing effort by providing a metadata ‘spine’ for much of the material, and a bespoke digital asset management (DAM) system designed by Aetopia Limited in Belfast. The DAM was key to managing digital rights, enabling automatic redaction based on the occurrence of certain words, withholding of sections rather than whole documents and automatic release of documents after the expiry of agreed embargo periods for certain categories, e.g. 30 years for board minutes. Cloud-based computing and storage infrastructures have been successfully deployed throughout, with Amazon’s Safe Secure Storage (S3) service selected for this purpose.

Two aspects of the project are particularly noteworthy. Firstly, access to the Digital Archive is limited to designated workstations in the archives reading room at NUI Galway’s Library. This was specified in the partnership agreement with the Abbey Theatre which had concerns about publishing the digitized archive on the open web due to rights management issues and relationship management with living actors. Librarians generally favour open access (OA) and it is frustrating to limit the availability of the Digital Archive in this way. The reading room model is, however, advantageous in that exclusive access helps to recruit academic staff and students to the University in addition to attracting visitors from around the world. The minute books from the period 1904–1939 have been published on an OA basis and it is hoped that further content can be released.
The second area of interest concerns metadata. A streamlined methodology, characterized by the ‘more product, less process’ approach, has been adopted to enable full digitization to be completed in three years. The integration of the Abbey’s own productions database has enabled a lot of material, such as scripts or programmes, to be linked to specific plays. This associates the material with relevant cast and venues and brings all of the different document types relating to that play or production together (Figure 2). It is not possible to link all documents to a play, of course. For such material a brief descriptive record has been provided and OCR used where possible to maximize full-text retrieval. It is recognized that the online environment opens up different ways of locating material and that new approaches to processing archives are available, potentially saving time otherwise spent on detailed arrangement. The DAM offers powerful search facilities and users have reported positive experience with the digital archive.

Figure 2. Launch page for *The Plough and the Stars* (NUI Galway Abbey Theatre Digital Archive)

Expert archivists, efficient workflows and a robust systems infrastructure were all key to making rapid progress in digitizing the archive. The initial version of the archive became available in late 2013, just a year after the project commenced in September 2012, and the full digitization was completed on time and on budget at the end of August 2015. This was an excellent outcome. A rigorous deduplication exercise meant that the number of pages digitized was around 750,000 rather than the original two million calculated. Table 1 shows the categories of material involved. A project steering group, comprised of staff from the Abbey Theatre and NUI Galway along with the contractor, has played an important role throughout in monitoring progress, addressing issues and keeping stakeholders updated. Annual reports for the period 2013–2015 accounted for progress on digitization, rights management, user experience, academic uptake and public engagement. Three presentations to the University’s governing authority highlighted the strategic importance of the project and its impact at and beyond NUI Galway, further elaborated in the remaining sections of this article.
### Table 1. Abbey Theatre archive: volumes of digitized material per category

| Category                | Volume                  |
|-------------------------|-------------------------|
| Administrative files    | 320,674 pages           |
| Scripts                 | 135,131 pages           |
| Prompt scripts          | 126,740 pages           |
| Programmes              | 66,628 pages            |
| Photographs             | 38,402 items            |
| Press cuttings          | 33,815 items            |
| Stage management files  | 13,077 pages            |
| Audio                   | 3,068 recordings        |
| Set designs             | 1,977 pages             |
| Posters                 | 483 items               |
| Lighting designs        | 334 items               |
| Video                   | 324 recordings          |
| Venue designs           | 87 items                |
| Handbills               | 10 items                |

**Academic impact**

The success of a project is often judged on its impact and in the academic world this is closely linked to teaching, research and reputation. The Abbey Theatre Digital Archive has had a very positive influence in each of these areas. The headline most often associated with it is that it has generated more than €750,000 in research funding and student scholarships. Money is one measure, but reputational gain is at least as important. Unique access to such a major resource for research into different aspects of Ireland’s history has attracted scholars from around the world to the campus.

New international connections with other universities have developed and boosted NUI Galway’s profile in theatre and drama, making it a frequently referenced institution in this field. This is significant since mentions of an institution play an important part in university ranking systems, helping NUI Galway into the top 250 bracket in a number of tables. Patrick Lonergan, Professor of Drama and Theatre Studies at NUI Galway, has commented that ‘Digital access to the Abbey Archive has been vital in strengthening academic participation in international research networks in digital humanities and other fields’. This heightened level of external engagement has included multi-partner funding bids and the hosting of major conferences, as described later.

Publications are still the major currency in terms of academic impact and the Digital Archive has underpinned a lot of published research. The best example is the *Oxford Handbook of Modern Irish Theatre*, a landmark publication with more than 40 chapters. Most of the contributors visited NUI Galway to use the Abbey and related archives. As a result, this publication contains more than 80 citations of archives held by the University, along with 33 images reproduced from those collections. NUI Galway authors feature prominently in the *Handbook* and academic staff in the Centre for Drama, Theatre and Performance are committed to using the Digital Archive and related collections in their publications. The Head of the Centre will publish a monograph on theatre and digital archives in 2018, and this reflects the development of a very close relationship with the Library, based on the archives.
The Abbey Theatre Digital Archive has strongly influenced teaching and learning. It underpinned the shaping of a new undergraduate curriculum for theatre and drama in 2015 and has generated a series of new modules, some at master’s level, including one focused specifically on the Archive and another on Irish theatre and archives more generally. Existing and new programmes require intensive use of the archives by students, often in very active ways, for instance to develop their own playwriting skills. Some students are also able to get work experience at the Abbey Theatre as part of the internships programme included in the partnership agreement. A recent innovation has been the appointment of a Teaching Fellow in the Centre for Drama, Theatre and Performance who will focus on creating archives-related teaching and learning materials. This is a very positive development, unique to this discipline at NUI Galway, and a further stimulus to close collaboration between the Library and the Centre.

Digital archives make new types of engagement with teaching, learning and research possible and Chris Morash, Seamus Heaney Professor of Irish Writing at Trinity College Dublin, has observed that the archive ‘is really transforming the way in which we do theatre history research in Ireland’. In the first instance, the whole collection is accessible for searching, rather than only its metadata as for print archives, and users can view any document, not just those requested for consultation. The range of search facilities available for the Digital Archive has enabled new connections to be made. Text and data mining offer interesting possibilities and studies to date include analyses of advertisements published in programmes over the decades, the use of profanities, and gender representation in the language of plays and the personnel involved. This work has generated interdisciplinary collaborations on campus, bringing together humanities scholars with academic staff from the Insight Centre for Data Analytics.

Fintan O’Toole, one of Ireland’s leading commentators, highlighted the value of digital archives for theatre research in an Irish Times review of the Oxford Handbook of Modern Irish Theatre in late 2016. He noted that ‘Reconstructing or evoking what actually happened is far tougher. It has, though, become possible, not just with changes of attitudes but with the availability of archives, many of them digitized by institutions, notably the James Hardiman Library at NUI Galway’.

The changed role of the archivist

The Abbey Theatre project represented the largest theatre archive digitization worldwide and has had a profound impact on the library at NUI Galway. Change initially concentrated itself in the archives team. One member was designated to digitize the programmes and some other materials from the archive, working closely with the contractor’s staff. This has proved invaluable in developing expertise around workflows, quality control and metadata requirements to identify specific plays and tours. There can be a tendency to think of digitization as a simple process, but things can go wrong and we learned that distributing work among groups of students will only work with clear instructions, robust processes and an eye for complexity. The post in question has been redesignated as Digital Archivist and now underpins the creation of other digital collections, as well as managing the addition of new content to the Digital Archive annually.

The role of the archivist as advisor and mediator of collections has really advanced in a digital environment. A digital archive of this size presents challenges of navigation and discovery. The collection is large, running to about 750,000 pages and containing a wide range of material, some of it unfamiliar to users of traditional archives. Video recordings of live performances, for example, are sources not usually available to users. Instruction on how to search and, importantly, why to search for set designers, costume designers, even voice coaches and choreographers, are new approaches for users to learn and they lead to dynamic material with which to undertake new studies. Users also value an explanation of the scope and context of the archive, notably what is included or excluded, what embargo periods apply, how redaction impacts access and what the conditions are for reuse.
of material. Feedback on the user interface is positive and users value features such as a self-generating citation for every individual item and zooming facilities to enhance viewing of material.

All of our archivists provide training and guidance on the use of the Digital Archive to groups and to individuals. They have also developed a new ‘Discovering the Archives’ module whose uptake is increasing at both undergraduate and postgraduate levels. There is no need to deliver original material from the stores to users of the digital archive and this saving of archivist time enables a greater emphasis on providing expert mediation of detailed queries, often by connecting users with material in other collections. As noted earlier, the Library had specialized in theatre archives previously, including those of the Druid and Lyric theatres, of the playwright Thomas Kilroy, and the actor Arthur Shields\(^9\). Archivists are taking every opportunity to link the use of the Digital Archive to these and other collections which offer valuable contextual linkages to enhance the scholarly understanding of the Abbey Theatre’s own history.

Closer relationships between archivists and academic staff have developed, as evidenced by the inclusion of archivists as presenters in programme modules and at locally organized conferences or seminars. Curation of exhibitions, such as an exhibition of costumes from the Abbey Theatre wardrobe, has developed as a key area of collaboration. The archivists have taken a very entrepreneurial role in promoting the Digital Archive at international events but also in collaborating with academics to co-host a major conference titled ‘Performing the Archive’ in July 2015, which attracted an international audience of more than 300 to the University. Since then, one of the archivists has led a successful bid to host the SIBMAS (International Association of Libraries, Museums, Archives and Documentation Centres of the Performing Arts) conference in 2022 at NUI Galway. Archivist participation in academic funding bids has had positive outcomes, including a recent award of €50,000 for a project related to the study of the Gate Theatre. A further manifestation of the outward-facing approach of the archivists and their embedding into the academic community is the editing of a monograph on Irish theatre archives by one of the team\(^10\).

**Library engagement with digital scholarship**

Digitizing the Abbey Theatre archive has shaped new roles for NUI Galway’s Library in general. Perceptions of the Library have been changed by leadership of a project of this scale, and academic staff have turned in our direction for advice on their own digital projects. Library staff have engaged in collaborations on a range of projects in digital humanities and, more broadly, digital scholarship. Outputs have included new digital archive collections such as those of the cartographer Tim Robinson, who has documented the landscape of the west of Ireland extensively\(^11\), or the peacemaker Brendan Duddy, who played a key role in Northern Ireland\(^12\). A major data set for eighteenth-century Irish trade has been published as a result of a collaboration with an academic in economics\(^13\). The emphasis on theatre has resulted in the publication of a historical database of Shakespearean productions in Ireland\(^14\) and a transcription of the early Abbey Theatre minute books, mentioned previously\(^15\) (Figure 3). The Abbey project has undoubtedly raised ambitions around archives, helping to attract high-quality collections and to take on their digitization. Examples are the archives of the Gate Theatre, second only to the Abbey in Ireland, and of Mary Robinson, former President of Ireland and United Nations High Commissioner for Human Rights.
Academic libraries are increasingly vital to enabling digital scholarship\(^6\) but this brings real challenges. Effective participation needs the right infrastructures in place, particularly in terms of technology and human support. At NUI Galway the need to consolidate a number of disparate digital preservation and publishing platforms soon became evident, triggering a move towards systems such as Islandora, which are commonly used worldwide, and adherence to international metadata standards. The publication of a digital scholarship enablement strategy\(^7\) in 2014 guided a more joined-up approach and helped to position the Library as a key player in digital projects on campus. Most important of all has been the establishment of a new Digital Publishing and Innovation Team to bring together a number of staff with an appropriate mix of skills, including programming, metadata, web publishing and data management. Members of this team have backgrounds in libraries, IT and archives, and are key to continued strong engagement with the many aspects of digital scholarship which at NUI Galway have ranged from complex rights management to the development of a new technology-rich makerspace to facilitate digital projects.

Five new teams in total were created as part of an extensive process of analysis and consultation among staff and users about the future role of the Library, stimulated at least in part by the challenges and opportunities arising from the Abbey digital archive project. This process resulted in the publication in 2016 of a Library strategy to 2020\(^8\) in which archives and special collections featured prominently and high-impact publication of research, data and digital content emerged as one of six priorities. The new team structure has a number of distinguishing features, including a move from a subject librarian team to a functional approach to organizing staff, described elsewhere\(^9\). That change reflects a need to meet an expanding range of user expectations, many of them related to the stimulation by the Abbey project of digital scholarship activities and an increased profile for archives and special collections whose functions are now distributed across three teams.

**Conclusion**

The project to digitize the Abbey Theatre archive at NUI Galway has certainly provided its share of drama. The task appeared Sisyphean at the outset but the digitization was completed on schedule thanks to the expertise and teamwork of the contractor, archivists, librarians and academics involved. Access to the Digital Archive has yielded many benefits for the University, beyond even the high expectations expressed from an early stage, generating significant research funding, reshaping curricula, enabling new modes of enquiry and advancing institutional reputation.

Digitized archives do not always have the impact expected of them and the limitation of access to the archives reading room at NUI Galway might have had a negative effect in this instance. A combination of factors has,
however, delivered a favourable outcome. The most important has been the support and enthusiasm of the University President for the project. That support has generated the necessary funding and given the digital archive a positive profile within and beyond the institution. Investment in a major initiative for the humanities has also added a level of scrutiny which has helped to maintain momentum and to ensure accountability among the different partners involved, resulting in annual reports and presentations about the project to the University’s governing authority.

The inter-institutional partnership has been important but a local partnership within NUI Galway has made the greatest difference. The closeness of the relationship developed through the project between the Library and the Centre for Drama, Theatre and Performance has been unique in my experience and both departments have helped to differentiate the University. As a discipline, drama has flourished at NUI Galway in recent years through innovative teaching, local partnerships, a strong publications record and an award-winning building. Archives have similarly thrived, with strong University support enabling increases in staffing and a new building with excellent facilities to attract, use and exhibit collections. Archivists and academic staff in drama have matched each other in bringing great energy and complementary resources to the project.

Another significant factor has been the somewhat restricted access afforded to the archive in paper format. The Abbey Theatre has only a small consultation area and a single archivist. As a result cataloguing was limited, making it difficult to identify material of interest. In addition, the small amount of space for researchers meant that the waiting list was long and a significant level of unsatisfied demand had built up over a period of time. Multi-user access to the Digital Archive was therefore much welcomed by scholars. The timing has also been favourable. Research and publication activity in theatre and drama has been strong recently, with the Oxford Handbook of Modern Irish Theatre20, published in 2016, a leading example.

Initially daunted by the project, the Library has emerged stronger from it, reorganized, refocused and perceived differently in the institution as a partner in the academic mission, not simply a service to support it. A few lessons have emerged along the way. It is usually better to take on a challenge than to sidestep it and this project has been a case in point. Ambition is not a word associated frequently enough with libraries and archives but it is often a force for good. Archives occupy a sweet spot in the University strategy at NUI Galway right now and strong institutional support has raised their profile, attracting a series of prestigious collections. The digitization of the Gate Theatre archive emerged as a successor project21 and others in a range of disciplines are in the pipeline, showing the University’s continuing intent to advance its academic mission through distinctive collections.

The positive experience and outcomes associated with the Abbey Theatre archive digitization have stimulated these developments. Inputs are vital but impact is ultimately a big differentiator for any project. The ‘more product, less process’ mantra challenges our thinking but its focus on outputs, backed by streamlined workflows, has much to commend it, increasing impact and liberating time for new areas of contribution and recognition.

Abbreviations and Acronyms
A list of the abbreviations and acronyms used in this and other Insights articles can be accessed here – click on the URL below and then select the ‘Abbreviations and Acronyms’ link at the top of the page it directs you to: http://www.uksg.org/publications#aa

Competing interests
The author has declared no competing interests.
References

1. Abbey Theatre:  
   https://www.abbeytheatre.ie/about/ (accessed 6 September 2017).

2. Bradley M and Keane A, The Abbey Theatre Digitization Project in NUI Galway, New Review of Information Networking, 2015, 20(1–2), 35–47; DOI:  
   https://doi.org/10.1080/13614576.2015.1116827 (accessed 6 September 2017).

3. NUI Galway Digital Collections, Abbey Theatre Minute Books Jan 1904–May 1939:  
   https://digital.library.nuigalway.ie/islandora/object/nuigalway%3Aabbey-theatre-minute-books (accessed 6 September 2017).

4. Greene M A and Meissner D, More Product, Less Process: Revamping Traditional Archival Processing, The American Archivist, 2008, 68(2) Fall/Winter, 208–263; DOI:  
   https://doi.org/10.17723/aarc.68.2.c74182377665863 (accessed 6 September 2017).

5. NUI Galway Library, Abbey Theatre Digital Archive:  
   http://library.nuigalway.ie/collections/archives/depositedcollections/featuredcollections/abbeytheatredigitalarchive/ (accessed 6 September 2017).

6. Grene, N and Morash, C, eds., The Oxford Handbook of Modern Irish Theatre, 2016, Oxford, Oxford University Press. DOI:  
   https://doi.org/10.1093/oxfordhb/9780198706137.001.0001

7. Lonergan P, Irish Theatre Since 1950, 2018, London, Bloomsbury Press.

8. O’Toole F, The Oxford Handbook of Modern Irish Theatre Review: The best single volume on the subject, The Irish Times, 19 November 2016:  
   http://www.irishtimes.com/culture/books/the-oxford-handbook-of-modern-irish-theatre-review-the-best-single-volume-on-the-subject-1.2867361 (accessed 6 September 2017).

9. NUI Galway Library, Archives Catalogue:  
   http://archivesearch.library.nuigalway.ie/NUIG/CalmView/default.aspx (accessed 6 September 2017).

10. Houlihan B, ed., Negotiating Ireland’s Theatre Archive: Theory, Practice, Performance, 2018, Oxford, Peter Lang.

11. NUI Galway Digital Collections, Tim Robinson’s townland Index for Connemara and the Aran Islands:  
    https://digital.library.nuigalway.ie/islandora/object/nuigalway%3Ar Robinson (accessed 6 September 2017).

12. NUI Galway Digital Collections, Brendan Duddy Papers:  
    https://digital.library.nuigalway.ie/islandora/object/nuigalway%3Aduddy (accessed 6 September 2017).

13. Duanaire: a Treasury of Digital Data for Irish Economic History:  
    http://duanaire.ie/ (accessed 6 September 2017).

14. Shakespeare’s Plays in Dublin, 1660–1904:  
    http://www.nuigalway.ie/drama/shakespeare/ (accessed 6 September 2017).

15. Abbey Theatre Minute Books, Ref. 3.

16. Cox J, Communicating New Library Roles to Enable Digital Scholarship, New Review of Academic Librarianship, 2016, 22, 132–147; DOI:  
    https://doi.org/10.1080/13614533.2016.1181665 (accessed 6 September 2017).

17. NUI Galway Library, Digital Scholarship Enablement Strategy:  
    http://library.nuigalway.ie/media/jameshardimanlibrary/Digital-Scholarship-Enablement-Strategy.pdf (accessed 6 September 2017).

18. NUI Galway Library, Library Strategy: The Journey to 2020:  
    http://library.nuigalway.ie/media/jameshardimanlibrary/Library-Strategy---The-Journey-to-2020.pdf (accessed 6 September 2017).

19. Cox J, New Directions for Academic Libraries in Research Staffing: a Case Study at National University of Ireland Galway, New Review of Academic Librarianship, 2017, in press; DOI:  
    https://doi.org/10.1080/13614533.2017.1316748 (accessed 6 September 2017).

20. Grene N and Morash C, eds., Ref. 6.

21. NUI Galway, Gate Theatre:  
    https://www.nuigalway.ie/gatetheatre/ (accessed 6 September 2017).
