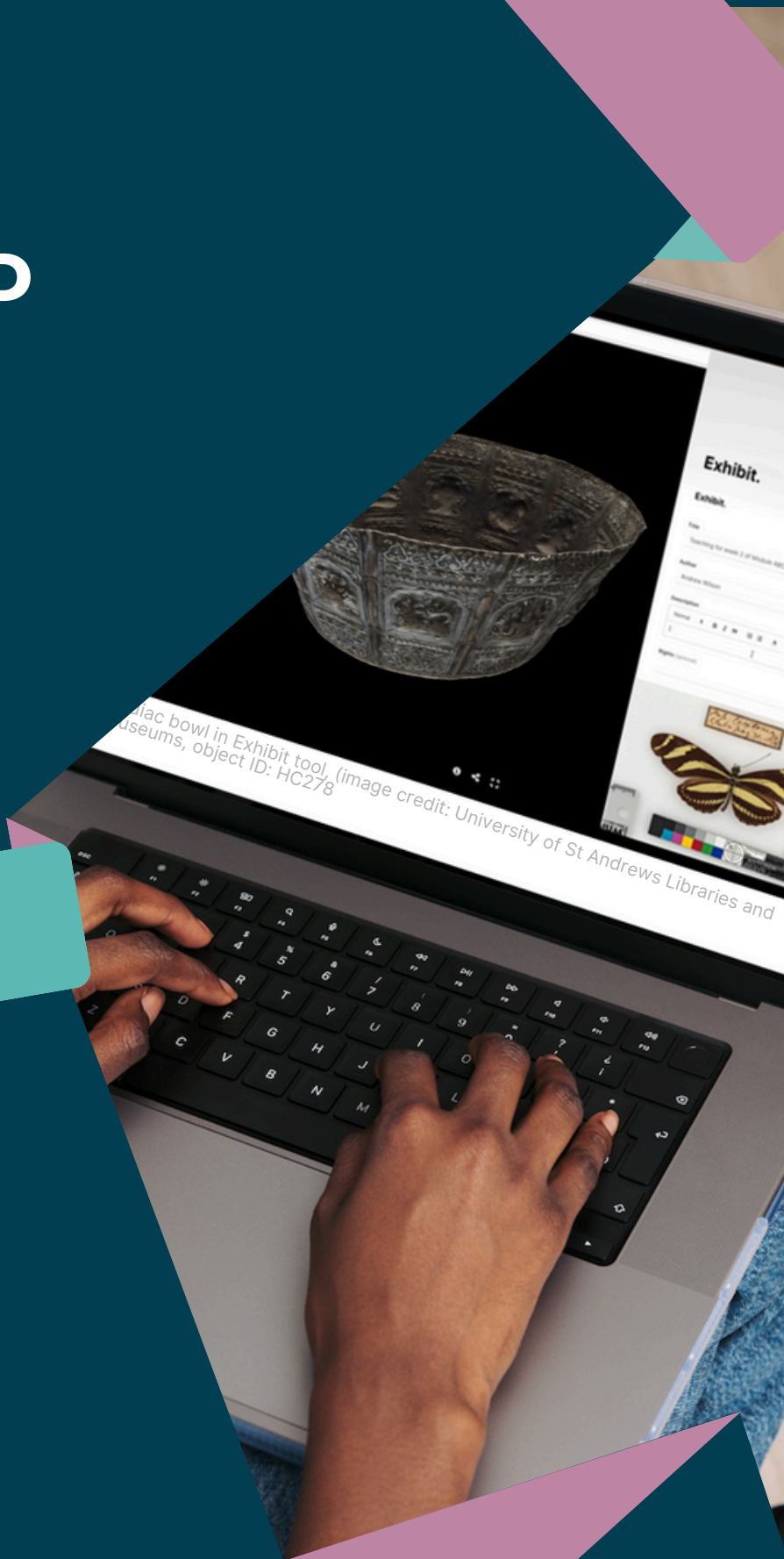
UMIS

University Museums in Scotland

ONLINE TEACHING AND LEARNING WITH DIGITISED COLLECTIONS

in Higher Education contexts, during the Covid-19 pandemic



CATHERINE EAGLETON
NEIL CURTIS
MARIA ECONOMOU
KAMILA OLES
SUSANNAH WATERS

Authors:
Catherine Eagleton
Neil Curtis
Maria Economou
Kamila Oles
Susannah Waters

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UKRI Arts and Humanities Research Council

UMIS University Museums in Scotland

About Us

University Museums in Scotland (UMIS) is a network of the nine Scottish university museum services that have achieved Accreditation – the UK industry standard for museums and galleries.

We work to raise the impact, profile and visibility of Scottish university museums and the local, regional and national collections we collectively care for, highlighting their value and vital position within our institutions and the wider cultural landscape. We create opportunities locally, nationally and internationally for university colleagues, students, researchers, schools and the public to investigate and enjoy the collections we hold and for our members to offer each other mutual support.

Figure 1. Assorted Busts on Gray Stand, Pixabay (CC0), https://www.pexels.com/

Scottish universities hold diverse and immensely rich collections of more than 2 million items. Collections in five universities have been Recognised as nationally significant to Scotland under the Scottish Government's Recognition Scheme.

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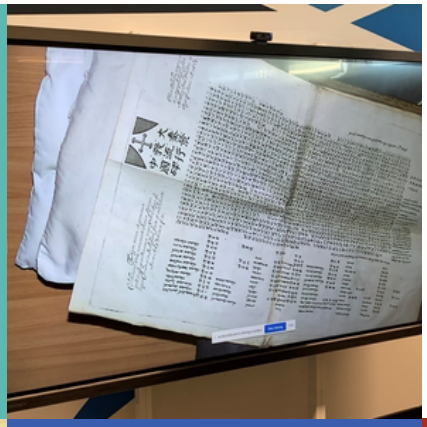
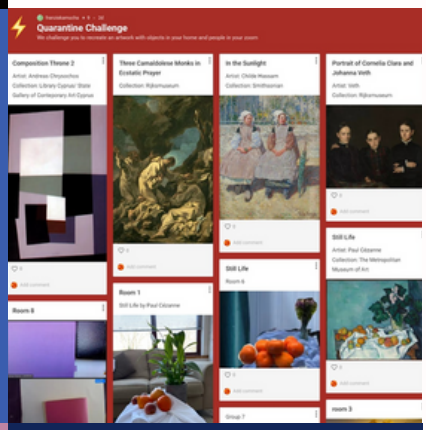




PROJECT CONTEXT AND AIMS

In 2020 and 2021, Covid-19 lockdowns led to an unprecedented interest in the use of digital collections in the Galleries, Libraries, Archives, and Museums (GLAM) sector, and for online teaching programmes in Higher Education. However, the impact of urgent digitisation to support university education remains unknown (International Association of Universities Global Survey, 2020), and there has been little research undertaken to support better practice in online and hybrid university-level teaching and learning with digitised collections.

Figure 2. Newspaper headlines relating to the transition from in-person to online Higher Education.

This research investigates new and developing practice relating to using digitised collections for teaching and learning in Higher Education in Scotland and worldwide. Led by members of University Museums in Scotland (UMIS), with the support of the Arts and Humanities Research Council (AHRC), the research aimed to identify activities which had worked (and those which hadn't!) as part of the move towards using digitised collections during the Covid-19 pandemic. The project intended to focus on university museum collections but soon expanded to also include archives and library special collections as in many universities these holdings are co-managed.

This resultant report aims to support the Higher Education and GLAM sectors by providing:

1. A review of the types of digital collections and technologies that have been used for teaching and learning, highlighting the opportunities and challenges these resources and tools present.
2. An overview of approaches to teaching with digitised collections, including their use in object-based learning, and their potential use in assessments and assignments.
3. Examples of approaches that have worked to date, and recommendations for future developments, including a consideration of the support required to enable further work.
4. Four case studies showing examples of digitisation and teaching approaches in action.

Although the project was inspired by the pandemic shift, it remains of relevance and value. We hope that it brings a better understanding of current possibilities, as well as future changes and investment needed to enable the delivery of the best possible online teaching and learning experience with collections in Higher Education. We wish to empower academics, GLAM-sector professionals, and others, to embrace new approaches to teaching and learning, prompting greater uptake in online, remote, blended, and hybrid learning.

METHODS AND DATA SOURCES

This project involved collecting and collating different types of data, working on this alongside the delivery of teaching and learning as it was happening through 2021. As the research progressed, the research team reviewed research publications and reports in this area, in parallel with collecting new data using a number of different approaches and methods.

Online Surveys

At project initiation, a preliminary survey asked the nine members of UMIS to identify key themes and issues, based on their experience of, or support for, teaching and learning with collections since March 2020.

An online survey was then developed by the project team to capture quantitative and qualitative data on the experience of those teaching with collections. Recruitment of participants to complete this 'main' survey was carried out using two different methods, creating a survey data set within which are two distinct subsets:

1. UMIS members were asked for details of staff who had coordinated and delivered the taught modules identified in the preliminary survey, with responses captured online using Qualtrics.

2. The same questions were used for a second online survey in Qualtrics, which was open to responses by anyone who had experience of teaching and learning online with collections during the pandemic. Announcements of the survey were sent to relevant sector email lists, and the survey link was shared at sector conferences.

Workshops

Workshop sessions were organised by the project team at *Discovering Collections, Discovering Communities* conference (Economou et al., 2021) organised by Research Libraries UK, The National Archives, and Jisc and at the 1st joint conference of ICOM's Committee for University Museums and Collections (UMAC) and UNIVERSEUM, the European Academic Heritage Network (Curtis et al., 2021).

Participants signing up for these sessions were first introduced to the project, followed by discussions in break-out rooms exploring their experience and views on the challenges and opportunities of teaching with digitised collections. Qualitative data was gathered via comments recorded anonymously on an online discussion board (Padlet) or through responses to presentation questions (using Slido).

Interviews

Drawing on survey responses from both academic staff and collections staff who had delivered or supported online and hybrid teaching with digitised collections, the project team identified a number of areas where more in-depth data collection would be beneficial. 12 participants were selected from among those who had – either in the online survey or in the workshops – indicated that they were willing to be contacted for a follow up interview and had been identified in the initial data collection as having interesting perspectives. Of these, 10 responded and were interviewed, of whom four were from outside Europe. These semi-structured interviews were carried out online and were recorded and transcribed.

Data analysis

Data from survey responses, group discussions, and interviews were analysed using a number of methods. Raw data that had been gathered as text, or recorded as audio and then transcribed, was imported into qualitative data analysis software (NVivo). Manual coding was complemented by Natural Language Processing

technology to model topics in and across the different datasets, and to identify patterns and themes. Data visualisations assisted the project team with identifying categories and connections and with querying the mixed dataset that had been collected.

Social media and web data

Complementing the survey data, workshops, and interviews, social media and online data was scraped and analysed to identify any information that could give a wider context for the project. Twitter data (used for contextual hashtags analysis and topic modelling) was queried through the API, and course and module information were captured via web scraping from the online catalogues published by Scottish universities for the 2020-21 and 2021-22 academic years. Both were then stored locally and analysed in R studio.

Student feedback

Survey respondents were asked to indicate whether they had student feedback on the modules identified that could be shared with this project as secondary data, in line with all necessary ethical and privacy requirements of their institution. However, few indicated that this was possible, and of those few, none were able in response to follow-up requests to share data appropriately anonymised for use in this project. It was also not possible to approach students directly due to the project's main data collection period being in summer 2021. In any follow up study, including these perspectives would be an important complement to the perspectives from staff.

Reflective case studies

While this research project was ongoing, members of the project team were themselves delivering teaching and learning online with collections. Regular discussions among the team, and a reflective approach to this practice-based insight, led to the development and inclusion of a group of case studies, presented

in this report. These were not, however, included in the data collection analysis set out in this section, and were written as this report was being compiled. They are included in this report as indicative examples of some of the themes that emerged within the research, providing richer and more in-depth insight and context without compromising the anonymity of participants.

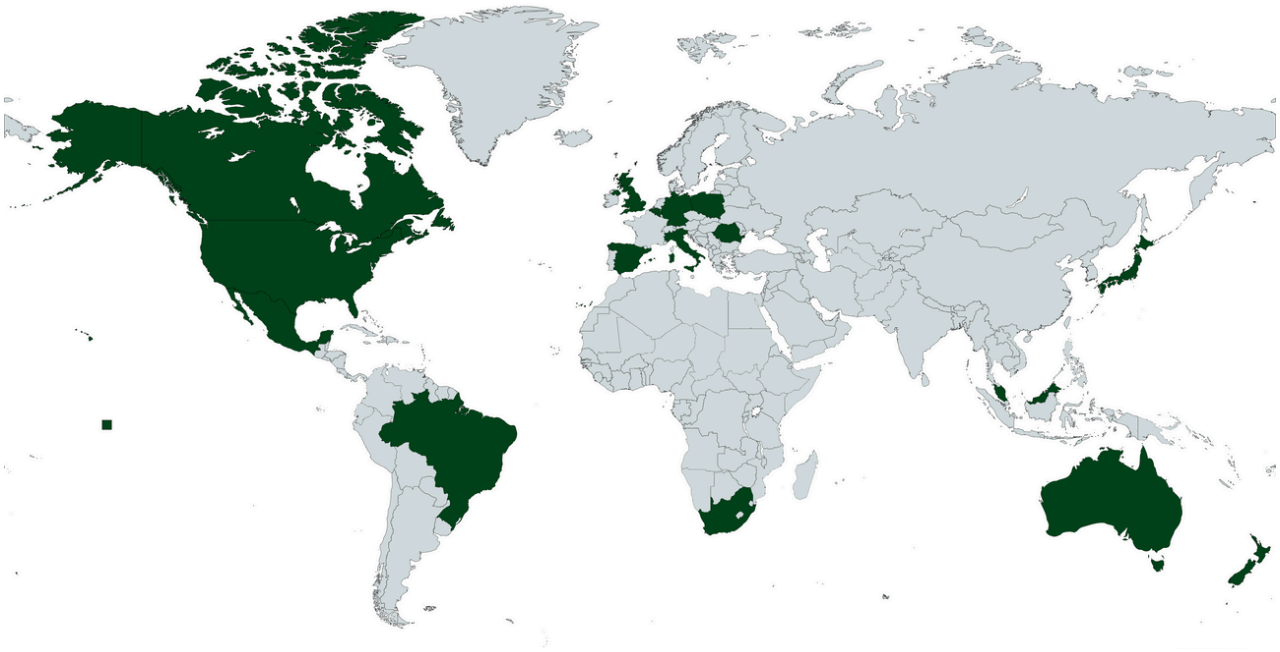


Figure 3. Geographic spread of responses to the survey open to all: Australia, Belgium, Brazil, Canada, Germany, Italy, Japan, Malaysia, Mexico, New Zealand, Poland, Romania, South Africa, Spain, United Kingdom, United States. Source: AHRC/UMIS Online teaching with digitised collections.

A NOTE ABOUT TERMINOLOGY

The sudden shift to online delivery of teaching and learning across the Higher Education sector produced a fluid understanding and use of the terminology of teaching and learning concepts, methods, and strategies. Within their 'Building a Taxonomy for Digital Learning' report, the Quality Assurance Agency for Higher Education (QAA) highlighted several terms and their definitions related to various elements and activities associated with online teaching and learning (QAA, 2020, pp. 6–16). However, it is clear from this report and other publications, including guides (such as Jisc, 2020) and literature reviews (for example, Rapanta et al., 2020), that across the Higher Education sector there is variation in the meanings of the different terms, and the ways they are used in different contexts.

This project was a microcosm of the challenge, and at the outset the project team struggled to agree on terminology to be used when collecting data that was both clear and accurate, and likely to be universally understood by respondents. We quickly realised that among the four partner universities there was divergence – terms like 'hybrid' and 'blended' were especially likely to be used in slightly different ways in each of our institutional and other contexts.

Rather than imposing a standard terminology on survey, interview or discussion group participants, terminology became a question to investigate alongside the key research questions already posed for this project – how were academic staff and practitioners describing their teaching and learning during the pandemic?

This pragmatic approach meant that the project researchers could encourage those participating in surveys, interviews and group discussions to express themselves in the terms with which they were most familiar, seeking clarification (especially in interview contexts) where the different definitions might have been meaningful or significant.

After the data had been collected, the ways participants used key terminology was reviewed in its context, to assess the typical or usual meanings of key terminology by participants. Listed in order - from the most-used to the least-used by survey

respondents - these key terms were: onsite, in-person, online, remote, hybrid and blended. Interestingly, these last two terms were used only six times by survey respondents, but as set out in more detail in this section, terms overlap and are not always unambiguously defined. Readers of this report are therefore encouraged to reflect on their own context, especially when it comes to questions of terminology.

Onsite and in-person

The term 'onsite' at first glance seems to be the least problematic. For onsite delivery, either the staff member leading a class, or the students, or both, are in a particular location, usually a university teaching space, or a museum, archive, or library location. In survey responses, interviews, and workshop sessions, 'onsite' was sometimes used interchangeably with 'in-person' or 'face-to-face', especially when both staff and students were together on campus.

However, as set out in the QAA report, 'onsite' may or may not be 'in-person' or 'face-to-face', for example, in the situation where teaching material is prepared by staff but not delivered by them in-person, but students are onsite, perhaps together. Likewise, video conferencing and other synchronous online delivery of teaching and learning meant that 'in-person' or 'face-to-face' might be 'online' rather than 'onsite'. In this report, where necessary, the phrase 'onsite and in-person' is used to ensure clarity.

It was evident in the responses to the surveys and interviews, and in the workshops, that there was significant variation, and some conflation of 'face-to-face' or 'in-person' with 'onsite'. Interestingly, in a number of responses, there was an association between 'face-to-face' and 'traditional', suggesting that participants contrasted new modes of delivery during the pandemic with the ways things had been done before.

Online

Survey and interview participants generally defined 'online' delivery in similar ways to the QAA (2020, p. 2) – as web-based education that could be detached from

physical experience.

However, in a few survey responses and interviews, as well as in the workshops, when it came to teaching and learning with collections, the separation of 'onsite' and 'online' was not so clear. Staff members could be 'onsite' to present an object or give a tour of a collections store and create clear and strong connection to the physical experience even for students participating 'online'.

Little research has yet been done into the quality and character of connection that 'online' audiences feel with physical objects, and more work remains to be done in this area. However, indications from the survey and interview data suggest that for teaching and learning, it may relate in part to whether or not teaching was synchronous or asynchronous – whether students received pre-recorded material that could be accessed at any time, or whether it was broadcast live.

Remote

The QAA report reflects on the interchangeability of 'remote' and 'distance' – both indicating activities that happen away from the physical site (QAA, 2020, pp. 3-4). This was borne out by our survey and interview responses, in which 'distance' was only used when referring to social distancing and related safety measures in place for onsite teaching, and 'remote' consistently used for digital or online delivery of teaching and learning.

However, survey responses also revealed a layered meaning to 'remote' for those teaching and learning with collections, in that staff felt separated from the collections, and remote from them – but saw digital access and tools as ways back to objects that could not at that time be accessed onsite:

> ***[...] gave us at least a digital means of remote access to the collections that we could teach with.***

> ***[...] access to the whole material objects using REMOTE digital delivery.***

Hybrid and blended

The JISC guidance and QAA report emphasise that 'hybrid' modules are designed to be delivered both onsite and remotely, allowing students to 'have a greater degree of choice as to how they engage with their learning and can move between 'onsite' and 'remote' delivery seamlessly (Jisc, 2020; QAA, 2020, pp.3-4)'. Students decide how much time they wish to allocate to onsite and online activities. In contrast, 'blended' learning offers a combination of onsite learning and digital activities and materials available at all times. Unlike 'hybrid', 'blended' delivery requires students to engage with timetabled onsite activities throughout the semesters 'in addition to engaging with digital learning between these times' (QAA, 2020, p. 3). However, the QAA report also stresses the lack of fundamental difference between 'blended' and 'hybrid' delivery approaches (QAA, 202, p. 3). From survey and interview responses, and from contributions to the workshops (Economou et al., 2021; Curtis et al., 2021), it became clear that there was considerable blurring of the two terms, and variation in the specifics of the way each was used. Both terms were used, in some cases interchangeably (e.g., one interview participant used the term 'HyFlex', which shares the same definition as 'hybrid' in the QAA taxonomy (QAA, 2020)), and multiple factors and permutations were involved, including whether the person teaching a session is online, whether the students are online, and whether the session is delivered synchronously or asynchronously.

However, a degree of precision around the mode of delivery is important since the choice has practical implications for online teaching and learning with collections. For example, delivering a live, synchronous, 'hybrid' session requires attention to object handling while simultaneously presenting to students onsite and online. This increases the challenge to the staff member teaching the session, and some staff expressed concern that this could mean their attention was distracted from careful object handling. Meanwhile, a similar session presented in a 'blended' style with pre-recorded material may mitigate the risks around object handling and make it easier for staff members who have less experience with either object handling or online delivery to teach with collections but may impact student experience differently. 'Blended' delivery was also mentioned by some survey respondents as being more conducive to continuation or follow up on digital elements of a class.

Location, connectivity, content

Across all participants in our study, it was clear that more than a question of terminology, this was a question of the right mode of delivery for a specific class, with specific students, in a particular context. Factors including time zones (if a group of students were internationally dispersed due to Covid-19), class size, broadband coverage and speed, and other factors, combined to influence the choices made by participants in our project, and the success of online teaching and learning.

Wherever possible in this report, we have been consistent with the QAA report and recommended terminology. However, this study itself has already shown that clear definitions are difficult, and especially when we consider the perspectives of both teachers and learners. Interview participants, workshop attendees, and the project researchers alike discussed the problem of what to call different kinds of teaching and learning online.

Figure 4. Hybrid Museum Studies object study class at the University of Glasgow delivered synchronously with some students and staff onsite and others online.

To enable the sharing of best practice and examples, three factors might prove helpful to consider when assessing whether a particular approach or model might be applicable in another situation or context:

LOCATION

Are or were staff and students onsite or online, or both? Are they in a similar geographical area to each other, or are they more distant or remote?

CONNECTIVITY

Broadband infrastructure, the ability of staff and students to access materials and the session, and the reliability of live video connections, are factors here.

CONTENT

What are or were the aims of the class or course, and what pedagogical approaches are appropriate to those aims and to the material used? How much are students expected to prepare before or to follow up after the class, and what is the relationship between in-class time and other elements of the course?

RESULTS

Online survey

The preliminary survey sent to the nine members of the University Museums in Scotland group (UMIS) provided the project team with information about Scottish university courses using digitised collections and gave insights into the key themes and issues being tackled in relation to this work. This data showed that before the pandemic, collections-based teaching was practised by all nine UMIS institutions, but only six out of the nine offered teaching with digital or digitised collections. Since March 2020 (the beginning of lockdown in Scotland), the number of institutions offering teaching with digitised collections has increased. Eight of the nine UMIS institutions, including two institutions that had not taught with digitised collections before the pandemic, have been able to digitise and create digital content, supporting a dramatic shift to online and hybrid teaching by their universities. The only exception to this is one institution that did not teach with digitised collections before the pandemic and has not delivered teaching with collections during Covid-19.

The preliminary survey also revealed that in almost every case of online teaching with digitised collections during the pandemic, PowerPoint and video presentations were felt to be a less satisfactory alternative for modules in which the UMIS members would normally have had students engage with physical objects. Respondents reported that for other courses involving object engagement for which there was no viable digital alternative, whether due to the lack of an available digitised option, copyright restrictions, or for other reasons, the physical engagement element was removed, and they could not contribute to those courses during lockdown. Although digital transformation in the cultural heritage sector is generally thought to have been significantly accelerated during the pandemic, responses to this survey indicated that in some cases, Covid-19 and the resulting staffing limitations caused by social-distancing measures slowed down the process of developing digital content for course modules that had started before the pandemic.

The findings of the preliminary survey helped to shape a second survey (referred to in this report as the main survey) that was completed by two subgroups of respondents: those in Scottish universities who had been identified in the preliminary survey helped to shape a second survey (referred to in this report as the main survey) that was completed by two subgroups of respondents: those in Scottish universities who had been identified in the preliminary survey as having taught with collections during the pandemic (52 respondents, 85% of whom were academic staff), and those in wider international museum sector networks (147 respondents 31% of whom were academic staff). In some cases, especially where there are differences in the results from the two cohorts of respondents, the differences are worth taking into account. However, for the majority of questions and themes, there was much alignment and similarity between the two subsets within the main survey data relating to Scottish Universities and to wider and more international organisations and contexts. This indicates that – broadly – the Scottish experience of teaching with collections during the pandemic was similar to that in other countries, and that academic and non-academic colleagues had similar views.

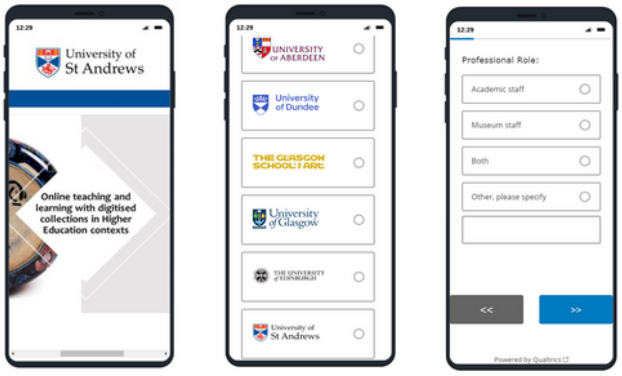


Figure 5. Qualtrics survey screens, gathering quantitative and qualitative data on online teaching and learning with digitised collections in higher education contexts.

Before and after March 2020

Around 60% of respondents in both subsets of the main survey reported that they had taught with digitised collections before the pandemic, which was higher than initially expected. Among those who had used digitised collections pre-pandemic, 35% had included a 2D image in a PowerPoint slide deck, 30% had linked to digital resources elsewhere, and only around 20% had used 3D models. Analysis of free-text comments in the survey responses confirmed that, in general, prior to March

2020 digitised collections were of secondary importance for core teaching, mainly supporting independent study or further investigation, whereas teaching was primarily delivered onsite and in-person.

> ***"[T]he need to deliver, to the best of our ability, a professionally focused museum and gallery studies course forced us (colleagues and students) to think to provide interactions within museum objects - in teaching object handling, collections management, conservation, disaster management and more - in another way."***

During the pandemic things changed and around 80% of respondents reported teaching with digitised collections during this period. The change was, however, more dramatic than simply an increase from 60% to 80%, since after March 2020 access to collections was limited, and at times not possible at all, so digitised collections had to also become the primary resources, rather than be used as secondary or supporting ones.

For some, the pivot to online teaching was less disruptive, and this was more likely to have been the case where digitised or digital objects had already been combined with in-person access to collections in pre-pandemic teaching. Some shared their skills and expertise with others to open up possibilities:

> ***"I taught with digitised biodiversity databases, online resources, and physical specimens. During Covid we were well prepared to change the modality to 100% online and ran some faculty mentoring networks to help other faculty use the resources."***

Topics, subjects, and levels

Survey respondents could enter information about one, or more, modules or courses for which they had used digitised collections after March 2020. The spread of subjects and topics recorded is noteworthy, with Museum Studies, History, and Art History all featuring prominently. However, there were also responses relating to the teaching of scientific and medical subjects, and topics in the social sciences, as well as creative subjects.

More than two thirds of the modules described by global respondents were at undergraduate level, while for Scottish respondents the situation was reversed, with their responses relating to modules of which two-thirds were for postgraduate students. This is a striking difference in the levels at which modules and classes were taught with digitised collections during the pandemic that cannot easily be accounted for by considering the different respondent profiles. It may result from differences in pedagogical approaches or curriculum development, or it may relate to how practice is shared. Further research would be needed to fully understand the reason for this difference.

Class sizes

The survey asked about class sizes, in part because this has been discussed as a pedagogical variable as important as teaching methods (e.g., Huxley et al., 2017, pp. 242-245). A study based on students across 23 academic departments in a leading UK university in 1999-2004 showed that learning outcomes of moving from a class with between 1 and 19 students to a class with 20-33 students are negative but increases in class size above 33 have no noticeable impact on student achievement (Bandiera et al., 2010, p. 1369). However, more recent research has shown different effects of class size for STEM and non-STEM subjects (Kara et al., 2021, Tables 7 and 8), and argues that there are clear benefits of smaller class sizes for some groups of students. Classifying the data in these categories, for modules and courses taught at Scottish universities, 60% were for 2-19 students, but for respondents to the survey open to global responses, class sizes tended to be larger. The difference may in part relate to more teaching with collections in Scottish universities being for postgraduate students, which was also a difference

	Universities in Scotland		Survey open to all	
Arts and Humanities	82.4%	Modern Languages and Cultures (29%)	73%	History (17%)
				Museum Studies (17%)
		Museum and Gallery Studies (24.5%)		Cultural Studies (11%)
				Art and Design (6%)
		Art History (17%)		Art History (6%)
				Ethnomusicology (6%)
		Information Studies (9%)		Writing (5%)
		Art & Design (2.9%)		Filmmaking (5%)
Social Sciences	11.8%	Anthropology (6%)	11%	Business (6%)
		Education (2.9%)		Education (5%)
		Law (2.9%)		
Science and Medicine	2.9%	Earth Science (2.9%)	16%	Science and Biology (11%)
Interdisciplinary and Other	2.9%	Cross-Discipline (2.9%)		Pathology and Medicine (5%)

Table 1. Subjects taught with digitised collections, as reported in both the survey open to respondents in Scotland, and the survey open to all.

seen in the responses. However, it is also the case that when teaching onsite and in-person with collections, practical considerations come into play, including security for collections, or supervision where a class involves object handling. Therefore, the class sizes reported may reflect practical considerations as much as pedagogical choices.

However, these results also suggest an opportunity. When hands-on experience with collections is vital, smaller class sizes are needed for practical reasons. But if new modes of teaching and learning with digitised collections can be developed that facilitate interactions with collections, using collaborative and digital tools to activate and effectively support the learning experience with digitised collections, then it would be possible in future to expand teaching and learning with collections well beyond the class size limits that would normally be possible when teaching in-person with physical collections.[1]

Resources

Survey respondents used different Virtual Learning Environments (VLEs) – Canvas, Moodle, and Blackboard were all represented. Different VLEs provide different functionality – and some of these are particularly relevant to collections teaching, such as the inclusion of hyperlinks and the ability to link out to resources within and outwith the University, as well as management of access and other rights. Digitised collections do not seem to have been consistently added to material in VLEs in the way that, for example, Library reading lists now typically are, given that the latter provision has for some years usually been overseen by specialist University Library staff. For fuller future integration, it will be important to improve the interoperability of VLEs with both online collections databases, resources, and aggregators, and with collaborative digital tools used for teaching with collections.

Survey respondents were asked to outline, in a free-text response, other class elements or resources used alongside collections. Despite the shift to online delivery, what was listed in responses was similar to the resources and class elements used in pre-pandemic contexts, with digital resources and tools being additional rather than altering core teaching resources.

However, for around half of respondents, limited availability of digitised assets had

[1] Two examples of this are discussed in case studies – especially those relating to using 'Exhibit' at St Andrews, and to the first year 'Being Human' module at Glasgow School of Art. At the University of Glasgow, a first-year Economic and Social History module for more than 180 students that was delivered online during the pandemic was able to give access to archival documents for the first time at this level of study, thanks to the use of a visualiser and related digital tools.

limited teaching and learning with collections during the pandemic. Most respondents reported that they were familiar with collections at their own institution that could have been digitised for teaching, and some (but not all) requested this. Strikingly, despite the use of digitised collections having the potential to open up the use of collections and resources from anywhere, most respondents reported using digitised collections from their own institution. There may be a number of overlapping reasons for this, and the ways academic staff discover and access digitised collections would be worth further study in future.

A more mixed picture than all-online delivery

Despite the challenges of lockdowns and other restrictions, a higher-than-expected proportion of respondents did do at least some onsite and in-person teaching with collections – only about half of modules reported in our survey were delivered solely online. This very likely represents and reflects the substantial efforts that many universities made to enable small group teaching to continue to be delivered in-person, when possible, even while larger lectures and classes remained online.

However, differences between different countries, and changes in requirements and restrictions over time, mean that this data is a broad generalisation rather than a reliable or stable picture. Comments from survey respondents made clear that it was often the case that within a module – sometimes week to week – staff were changing their plans:

> ***"We started the semester with a short, one-week lockdown, but by the time we got to our week on numismatics, we were back to in-person classes as per usual."***

The majority of online-only classes were live and delivered synchronously with all students participating at the same time, but a significant proportion of classes and modules were also delivered with pre-recorded materials. When both staff and students were onsite, the majority of classes involved both viewing and handling of

physical objects, which was achieved despite the sometimes-complex requirements around sanitisation and quarantining of objects that staff had to manage to make this possible. When staff (but not students) were onsite, some classes presented only objects, or presented both objects and spaces, including video tours of museums or storage areas.

> ***"We experimented with all modes of delivery in the last year across several platforms."***

Modes of delivery	Description	Scotland (%)	All (%)
Onsite delivery with staff and students onsite	Object viewing and handling	18%	9%
	Object viewing but not handling	3%	4%
	Neither object handling nor viewing		2%
Online delivery with staff on site	Online presentation of both objects and spaces	13%	9%
	Online presentation of objects	9%	7%
Online-only delivery	Live and synchronous	21%	27%
	Prerecorded and asynchronous	11%	14%
	Prerecorded and synchronous	7%	7%
	Other online-only delivery	4%	7%
	Live and asynchronous	1%	7%
Other responses		13%	7%

Table 2. Modes of delivery since March 2020, as reported in both the survey open to respondents in Scotland, and the survey open to all.

Growing confidence, but widening gaps

More than half (59%) of respondents from Scottish universities reported being confident about their use of digitised collections in teaching before the pandemic, while 73% of respondents to the global survey reported confidence in this. However, these averages conceal differences within the two groups. Responses from global participants were more widely spread when it came to their assessments of their own confidence, with more reporting very low or very high scores, whereas for Scottish universities the respondents clustered more in the middle. It is possible that this reflects the fact that the international respondents were more likely to self-select to participate in the survey (either because they were particularly digitally confident, or because they did not feel confident), whereas the Scottish respondents were contacted directly based on modules that staff in UMIS member museums knew they had taught with collections.

After a year of pandemic teaching, the proportion of those in both groups reporting themselves to be 'extremely confident' teaching with digitised collections had grown, but so had the number of respondents who said that they did not feel confident at all. As we continue to move post-pandemic, this suggests that skill-sharing and mentoring to support those with lower confidence will be of importance in both the cultural heritage and higher education sectors.

Looking to the future

Despite the challenges, almost 90% of survey respondents said that they would either probably or definitely teach with digitised collections again, with only around 10% saying they definitely would not. The latter group were not asked why they gave that response, and nor is it clear whether a similarly worded survey question today would result in similar responses.

A large majority, representing more than 80% of participants, also said they had tried new things during the pandemic that they would continue. These included using new software and tools, hardware (particularly visualisers), and use of digital and digitised resources, including online catalogues and online exhibitions, or virtual trips to global museums.

However, these new approaches and new tools in some cases proved a mixed blessing, leading one participant to reflect that a particular tool had been useful but had not led to:

> ***"(...) the kind of probing and productive discussion we've had in in-person sessions in the past."***

The importance of the materiality of objects and collections also emerged as a theme, but also with mixed responses. Some expressed a sense of loss at not being able to handle objects as readily as before the pandemic or explained that they had struggled to replicate more hands-on collections activities online. Some others, however, saw potential for a new way of thinking where the primacy of the physical object might be challenged, and that this encouraged students to gain skills in working with digitised and digital objects that would be relevant and transferrable in their future career paths.

Workshops

The project facilitated two online workshops, the first on 30 June 2021 during the DCDC21 conference (Economou et al., 2021) and the second on 1 September 2021 during the joint UMAC-UNIVERSEUM online conference (Curtis et al., 2021).

40 participants took part in the DCDC21 workshop, representing a range of specialties from the GLAM sector both within and outside the Higher Education sector, including archivists, special collections and museum professionals, as well as academics. 30 participants took part in the joint UMAC-UNIVERSEUM workshop and breakout group discussions, which due to the nature of both these professional groups, represented collection staff and academic staff working with(in) university museums and collections. Although specific data was not collected, the international context for and attendance at the UMAC-UNIVERSEUM group was correspondingly more international, whereas DCDC21 was attended primarily by UK-based professionals.

At both workshops, participants were asked to share their experiences and views

on the creation and use of digitised collections for higher education teaching during the pandemic - on what had worked well, as well as what had been more challenging, and what the future might hold. The structure of both workshops was similar, with participants randomly allocated to breakout groups, with two discussions, one looking backwards and one looking forwards. In both workshops, participants were asked to note their thoughts on shared Padlet digital notice boards (Fig. 10 and 11), and this was then reviewed, coded and analysed after the workshop.

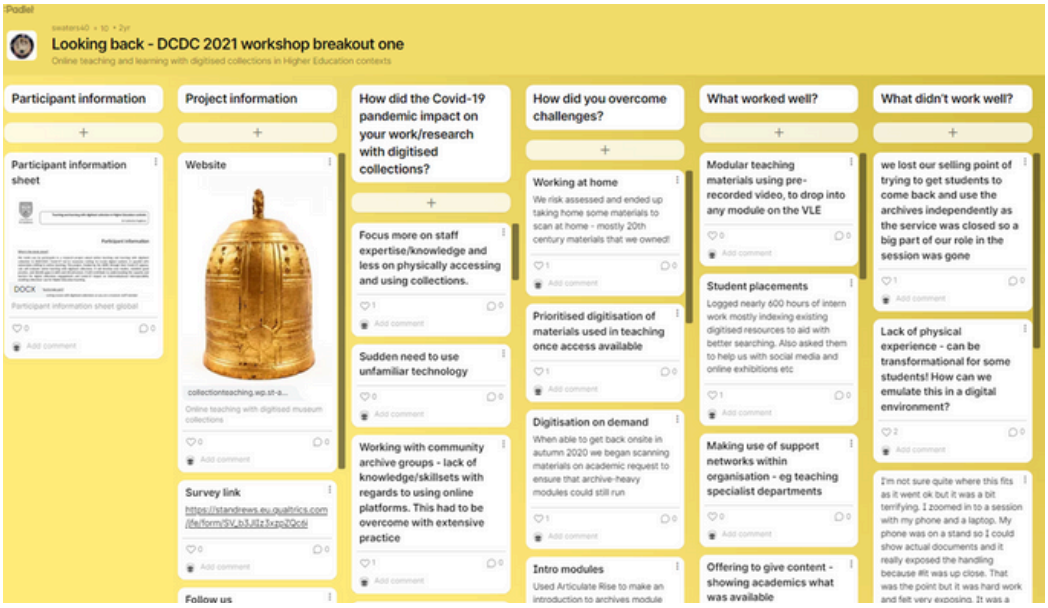


Figure 6. A screenshot of Padlet from one of the breakout groups in the DCDC 2021 workshop 'Online teaching and learning with digitised collections within higher education contexts' where participants shared their insights on the impact of the COVID-19 pandemic and strategies for navigating challenges looking backwards.

DCDC21

How did the Covid-19 pandemic impact your work with digitised collections?

The data gathered from the DCDC workshop (summarised in Table 3, below) shows that the most impacted area of work was loss or strictly limited access to physical collections, with both physical object-based teaching and research, and on-demand digitisation, being suspended at some points due to lockdown restrictions.

The data also suggests that the second most impacted aspect of work was a transition into teaching with digitised collections as an alternative to physical access, an activity many participants had not previously undertaken. As a result,

this new challenge, along with a significantly constrained digitisation process, triggered a noticeable tendency to rethink collection development towards digital teaching and research needs, prioritising time spent onsite for digitisation to deliver teaching resources above other onsite activities. The data implies that the third most impacted aspect of work was limited or cancelled onsite and in-person teaching, and even when students were allowed onsite, imposed social distancing measures significantly reduced the capacity of teaching spaces, especially for large year groups.

The data indicates an intriguing dispersion in demand for teaching with digitised collections. One group of participants claimed a high number of requests for digitisation from academics trying to adapt their modules to online teaching, emphasising, however, a lack of knowledge about what had already been digitised and what could be offered remotely. A second group experienced a low demand for digital resources, as academics felt overwhelmed and focused on the shift to online teaching - trying to 'find their feet digitally' - constraining their creativity in seeking teaching resources. In addition to this, a small number of participants expressed that digital engagement with collections was viewed as less valuable, so as soon as allowed, teaching would be resumed in the in-person mode of delivery with physical objects.

THEMES	Comments
Limited focus on physically accessing and using collections	13
Started teaching with digitised collections due to Covid-19	7
Limited or no teaching onsite	5
Rethinking collection development with regards to teaching and research	4
Digital engagement with collections seen as less valuable	3
Higher demand for teaching with digitised collections	3
Lower demand for teaching with digitised collections	3
Object research limitations	2

Table 3. DCDC21 workshop participant responses about Covid-19 impact on work/research with digitised collections, ordered by number of comments on each theme.

How did you overcome challenges?

The most challenging transition forced by Covid -19 (summarised in Table 4, below) was the pivot to online teaching that required familiarity with online platforms, including the virtual learning environment, communicators, digital tools, software and hardware. Some participants claimed that once they had adapted working practices by, for example, getting access to secure shared drives, engaging with online platforms for teaching delivery and Office 365, they were able to provide opportunities for showcasing collections with digital media that were easy for both teachers and students to pick up.

Extensive practice and successful implementation of digital tools (for example, content management systems, or online training systems) allowed the majority of participants to overcome the challenges associated with the dramatic shift to online delivery.

Looking at the mode of online delivery at a more granular level of detail, pre-recorded videos of objects, videos for catalogue searching and looking at documents, and videos showing the process of accessing, handling, and moving objects were seen as having been beneficial not only for academics and students engaged in asynchronous, synchronous or mixed sessions but also added to collections documentation. Others commented on the benefits of being able to prioritise digitisation when access to the physical collections was once more possible.

As already noted in this section and seen also in the survey data, among these participants there was a relatively low usage of other institutions' digital resources, and a focus on their own institution’s collections. A small number of participants reported being able to take home and scan some twentieth-century collections, but this was not possible in all organisations or for other types of collections.

THEMES	Comments
Extensive practice in using online platforms, digital tools, and learning IT skills	13
Mode of online delivery	11
Mode of online delivery \ Pre-recorded videos of objects	4
Prioritised digitisation of collections for teaching once access available	3
Mode of online delivery \ Mixed sessions (synchronous and asynchronous)	2
Mode of online delivery \ Synchronous (with visualiser)	2
Object quarantine period	1
Using digital content of other institutions	1
Digitisation at home	1

Table 4. DCDC21 workshop participant responses about ways of overcoming Covid-19 challenges.

What worked well and what didn't work well?

DCDC21 workshop participants noted (summarised in Table 5, below) that the impact of the pandemic encouraged innovation and the creation of new digital initiatives. The role of collections staff in facilitating tailor-made solutions to support teaching staff was also recognised. Examples of this work given included the establishment of a digital search room, working with student placements, and developing new sessions. The importance of using existing digital resources (created pre-pandemic) and of being supported through networks was also discussed.

The main challenges noted in the workshop (summarised in Table 6, below) were limited staff resources (7) as well as limited ability to digitise collections for teaching purposes. Participants also noted that communication between collections staff and academics could be improved and that the move to online teaching would have benefitted from more creative thinking around how to use collections. The data shows a desire for more guidance and training in this area, with a lack of guidance and a lack of skills being noted as obstacles to moving to collections-based online teaching.

WORKED WELL	Comments
New digital establishments and initiatives	7
Collections staff tailor-made approach to help tutors	5
Using of already existing digital resources (pre-pandemic)	5
Support networking within organisations	5
Digital documentation of collections and museum practices	2
New digital establishments and initiatives \ online student placement	2
New digital establishments and initiatives \ establishment of a digital search room and digital humanities hub	1
New sessions development	1

Table 5. DCDC21 workshop participant responses about what worked well for overcoming Covid-19 challenges.

DID NOT WORK WELL	Comments
Staffing limitations	7
Limited access and capacity to digitise collections for teaching resources	5
The communication gap between collections staff and academics	5
Lack of creative thinking of using collections at pivoting to online teaching	5
Lack of guidance on how to emulate interaction with collection in a digital environment	4
Lack of skills in using online platforms	2
Collections staff roles (service) have changed or gone	1
Problems with getting feedback from students	1
Too big seminar groups of students	1

Table 6. DCDC21 workshop participant responses about what did not work well for overcoming Covid-19 challenges.

UMAC-UNIVERSEUM 2021

For this second workshop, due to the more international profile of attendees at this conference and the wish to allow participants more freely to share experiences with each other, the prompts for discussion were left as more open-ended questions, with free-text responses coded as positive or negative after the workshop. These responses are organised in a similar way (coded positive or negative) in the tables in this section, showing clearly that some similar themes manifested for different participants as positive or as negative, depending on their individual or institutional circumstances.

How did the Covid-19 pandemic impact your work with digitised collections?

Overall, participants reported similar positive and negative impacts to the DCDC participants (summarised in Table 7, below). Positive impacts included the creation of new digital initiatives and support networks, and concerns raised included the problem of limited staffing and the heavy pressure that this created due to the increased demand for digitisation, as well as the difficulties with lack of staff training, skills, and guidance in the use of digital tools. Several participants of this more international group spoke positively about new collaborations with academics and other collections staff which emerged and did not refer to the communication gap between these groups that the more UK-based DCDC participants had raised.

There were also more references made to the pedagogical implications of teaching with digitised collections, both positive and negative, such as the potential to enhance accessibility of collections for students, support new ways of teaching (e.g., enquiry-based learning), but also the gap shown by limited knowledge or experience of online collections teaching by some staff, that had to be built up suddenly.

Teaching with digitised collections: the future?

Building on their existing experience, participants in this workshop stressed the importance of collaboration as a positive way forward. Some of the positive outcomes of working in this way that were highlighted included interdisciplinarity, sharing of good practice, support of opportunities to collaborate with colleagues and for universities to collaborate with each other.

	Positive		Negative	
PEDAGOGY	New ways of teaching, e.g. Enquiry-based learning lends itself to digital OBL - each student can 'hold' and examine the same object at the same time, and take their time with the objects	5	Students struggled	5
	Works better for disabled; Enhancing accessibility	2	Digital poverty	5
	Well-structured courses easier to move online	3	Hybrid modules are more challenging to deliver	2
	The new potential of creating resources, class elements, pre-recording and live streams material	3	Cancelled modules	2
COLLABORATION	Collaboration with other institutions and donors	3		
	New collaboration with other collections staff (e.g., library, archives)	3		
	New collaboration with academics	1		
STAFFING AND SKILLS	New skills in digital collections for students and staff	7	Lack of technical knowledge	2
			Poor management of online collections or poor knowledge of online collections teaching	7
			Overwhelming digital demand from teaching staff	2
			Limited staff, or staff spread thinly, doing multiple roles	2
DIGITISATION AND DIGITAL TECHNOLOGY	New digital projects (including digitisation)	7	Struggling with digitisation, e.g. Not enough time to focus on building digital capacity	2
	Data consolidation	1	Data consolidation	1
PHYSICAL ACCESS TO COLLECTIONS			Closing and opening of museums due to lockdowns	2
			No access to physical collections to digitise them	2

Table 7. UMAC-UNIVERSEUM workshop participant responses about Covid-19 impact on work/research with digitised collections.

Moving forward, other important aspects that should be taken into account were noted, including the need for specialised staff to support this type of work and the need for training and guidance. This group also mentioned the potential for students to help staff and even to lead in the co-creation of digital resources.

Furthermore, workshop participants raised important questions of ethics and environmental sustainability with online materials delivered to global audiences.

The need to decolonise our data was mentioned as well as ethical issues around the appropriate digitisation, use, and reproduction of collections, especially of sensitive material such as human remains, objects from graves, or those linked with colonial contexts. Participants highlighted the importance of open discussion around these issues as well as clear policies about the handling of this type of material.

	FUTURE NEEDS AND POSSIBILITIES
PEDAGOGY	Limitations of online teaching possibilities, so online teaching should be balanced with onsite delivery; Importance of blended/hybrid learning, with hands-on experience enhanced by online experience
	Guidance on how to use digital collections for teaching and learning
	Getting students to co-create digital resources
	Sharing students' work more widely online (democratisation of access)
	Communication and dissemination of available resources within and outwith university; can we find the resources that have been created?
COLLABORATION	Working group for academics to show and present collections to academics and make academic staff aware of the digital resources we've created
	Importance of collaboration between universities so we don't need to create duplicated online resources
	Expansion of number of disciplines working with materiality of objects in teaching; Network between faculty members; Interdisciplinary working group
	Support: more opportunities to collaborate with colleagues
	Space for organisations to connect with wider sector and social issues
	Sharing experiences about what works well when setting up digitisation projects
	Money and policies are needed to support collaboration
STAFFING AND SKILLS	Need dedicated people working in the collections
	Guidance on how to use digital media
	Guidance on how to set up digitisation projects and create team to do digitisation
	Creating of knowledge (know-how) pool to share experience to build skills and capacity when no funds for training
	Support in technical aspects
	Lots of creation of digital content, but do other people want to / have the skills to use it?
DIGITISATION AND DIGITAL TECHNOLOGY	Infrastructure and awareness
	Museum spaces – as well as teaching spaces – need to be upgraded with technology for blended learning
ETHICS AND SUSTAINABILITY	Open discussion and clear policies regarding digital reproduction of cultural heritage material, sensitive material, e.g., grave contexts, colonial contexts
	Ethical questions as well as issues around copyright: how to use these collections digitally in the right way, e.g., human remains online?
	Think about more sustainable approaches to deliver online courses to global student audiences: less moving people around the planet on airplanes!

Table 8. UMAC-UNIVERSEUM workshop participant responses about future needs and possibilities.

Interviews

Semi-structured interviews were organised with survey and workshop participants who had indicated they were happy to be contacted for further discussion. In total, eleven interviews were undertaken, with twelve participants, from eight institutions across five countries. 33.3% of participants were academic staff, 50% collections staff (working in museums, archives, and libraries), and 16.6% represented both roles. Although the information gathered represented a small sample of participants in the data collection for this project, interviewees represented a range of contexts (covering different organisational sizes, resource availability, geographical locations, and pandemic regulations), enabling a number of re-occurring themes to be identified.

Interviews provided qualitative data and a deeper insight into individuals' experiences of delivering and supporting teaching with digitised objects. Questions focussed on the availability, creation, and use of digitised resources; the challenges and opportunities of online teaching with digitised collections; and the requirements for and/or the provision of support and advice.

Participants were all asked a set of core questions, though time was also given for further discussion on related activities or themes if these arose.

Information from the interviews included details of the technologies used to deliver online teaching, ranging from widely used software such as blogs, discussion boards, and/or video conferencing software with its polling and chat functions, to more specialist online exhibition tools, virtual reality and augmented reality applications. Information about the types of digital material being used for online teaching was also gathered. In most cases, the move to online teaching used digital versions of material that had previously been used in face-to-face teaching. These materials tended to be from in-house collections, with the creation of digital versions and the delivery of online collections-based teaching being supported by in-house collections staff.

Indeed, the importance of collaboration between collections staff and teaching staff within institutions was evident from the interviews, with existing links being strengthened. A desire for further collaboration (between these groups but also

with students and wider stakeholders) was also expressed with a view to better sharing of skills, expertise and resources, and to developing more content including digital objects, interpretation materials, and teaching activities.

However, the interviews also showed that the pivot to digital delivery was a steep learning curve for many and, in some cases, teaching with collections declined during lockdown.

> ***"I think that we all needed a lot of training at the beginning and thinking how to use media... and to learn it was exhausting."***

For those who delivered online teaching, the move to digital working had encouraged some adaptation of existing approaches to learning and teaching in order to make the most of the opportunities presented by working with digital platforms and objects. For example, collaborative activities, encouraging questions, comments and discussion as opposed to one-way communication (from tutor to students) were developed to promote student engagement. In some cases, assessments were also changed to take advantage of digital tools, with students being asked to create outputs such as online exhibitions, blogs, or podcasts. There was a sense that these activities could lay the groundwork for further developments, but also that there was a risk that such activities would recede as physical access returned to nearer pre-pandemic levels. In some cases, both onsite and online teaching were being delivered simultaneously and this proved particularly challenging.

> ***"(...) the challenges of hybrid teaching are that it's very difficult to achieve what the university wanted to achieve, which was parity of experience for the student."***

A number of re-occurring themes around the advantages and challenges of teaching with digitised collections were identified from the interview data. Advantages noted included: the ability to offer all students close-up, high-quality

viewing experiences, more so than in a face-to-face environment; the elimination of geographical/physical barriers to accessing material; and the ability to make learning content available over a greater time period (so not just within a fixed teaching slot).

The main challenges noted were around the loss of the materiality of items in object-based sessions (for example, not being able to convey texture, smell, or the feel of an item); and around the resources and training required to ensure that digital material could be made available and fully exploited for teaching purposes, and that users had the technology (hardware, software, and internet connectivity) and the skills needed to access digital objects and learning resources.

> ***"(...) in some cases, the 3D model is better because you can get up close, students can manipulate it. They can see things that that is very hard to see or ... that they just simply can't handle in the museum for fragile objects and things like that. But I think also ... I mean, it's not the real object. And most students understand that. And in most ... cases, students are more keen to come back to the museum to see the real thing once they've engaged with the 3D object."***

Social media and online information

The project team also undertook preliminary analysis of social media data with the aim of identifying quantitative data which could complement the data collected from surveys, interviews, and workshop sessions and provide a different scale and perspective to these other sources.

Snapshots of social media data were captured from June to September 2021, through the Twitter API. Each snapshot captured a six- to nine-day window, during the summer vacation period for most UK universities. Data captured was identified using keywords and hashtags, including for example #digitalmuseum or #onlinelearning, that are relevant to the topic of teaching and learning online with collections. The data was then analysed using R Studio, looking at relative frequencies, trends in the data, and colocations of terms.

The analysis showed that only rarely were these kinds of terms associated with terms relating to teaching, learning, or pedagogy. Conversely, from a set of 10,597 users whose tweets included #onlinelearning and other terms relating to the online delivery of teaching and learning, most did not also include terms relating to museums, collections, or heritage. Both sets of topics were being talked about on social media during summer 2021, only not at the same time for a large enough dataset to be created and analysed, from which conclusions relevant to this project could be drawn.

Another set of online data was also extracted and analysed, from the websites of the nine universities in Scotland whose museums are members of UMIS. The expectation was that there would be information from this on where and how collections formed part of teaching and learning in Higher Education in course and programme catalogues published online for the 2020-21 and 2021-22 academic years.

However, surprisingly few of the descriptions of modules and courses, including those which it was clear from survey data and interview responses were heavily based on collections, included information about object-based learning or mentioned collections or museums in any detail. Where collections were mentioned, they were typically presented as supporting elements, accessed by visiting a museum or during an onsite and in-person session.

There is therefore a clear opportunity to update module and course descriptions so that the information presented online more clearly reflects the use of collections in teaching and learning in Higher Education and so that, where possible, the contributions of collections staff to the delivery of teaching are more visible.

CASE STUDIES

New ways of teaching with digitised collections using Exhibit, at St Andrews

Catherine Eagleton, with input from and thanks to Jess Burdge, Kevin Knox, Nicole Meehan and Catherine Spencer, University of St Andrews

Figure 7. Gorilla skull (BPM 25511) in Exhibit Tool © University of St Andrews Libraries and Museums.

In summer 2020, Museum staff at the University of St Andrews worked with a specialist developer to create an object storytelling tool (https://exhibit.so), directly in response to the challenge of how to deliver teaching and learning with digitised collections online. Grant funding from the Esmée Fairbairn Collections Fund, managed by the Museums Association, supported both the development of the object storytelling tool, and a programme of rapidly increased digitisation, and University funds supported purchasing of new equipment for 3D digitisation. In parallel, internal staff capacity was allocated towards the ingest of a backlog of previously digitised images and assets into the collections database, making tens of thousands of digitised collection items discoverable and accessible online for the first time. What might have taken five years to achieve pre-pandemic, was accomplished in under a year, largely due to the close collaboration between collections staff and IT services specialists.

Throughout the academic year 2020-21, museum and academic staff worked closely together on ways to use this tool, including for assessment and assignments, alongside another freely available annotation tool (https://recogito.pelagios.org/).

Students on the postgraduate Museum and Gallery Studies course used the Exhibit object storytelling tool in an object study assignment submitted in autumn 2020. With access to only images and 3D models of objects online, students were asked to present part of their work on Exhibit, thus allowing them to develop skills in writing for digital audiences and awareness of digital accessibility.

Figure 8. The British Library @britishlibrary (15 October 2021)
https://twitter.com/britishlibrary/status/1448985664528297986?s=20&t=oN9XbU7zH5BmSDbSM2TVxA

In 2021, the object study assignment again used Exhibit, but with an in-person class in which the students could study and handle the objects. After the class, students were given the option to arrange to further study the objects in-person, by making an appointment to study them in the reading room, but none did. However, there was a noticeable 'bump' in access to the records for this group of objects following the class, indicating that even when given the choice, this group of Museum and Gallery Studies students preferred the online and digitised resource over the 'real' thing. Work submitted by students shows a range of approaches to creating exhibits with many making use digitised objects from other collections as well as those at St Andrews to create visually appealing displays, while others opted to create something playful or even gamified.

Alongside this use of Exhibit for Museums Studies teaching and learning in 2020 and 2021, academic staff from the School of Art History collaborated with museum staff to pilot ways of using Exhibit together with the University's fully digitised art collection for other modules and courses. The aim was to find ways to teach and assess at a larger scale, and with larger classes, than would previously have been possible, including core first- and second-year undergraduate classes in visual analysis. Student feedback was that this approach helped them develop skills in different forms of writing, of relevance to their future career, but also that presenting art historical argument in this way meant that they could share with their friends and family what they were studying and learning.

Exhibit is now also in use by a number of other cultural heritage organisations including The British Library. The programme of work including digital upskilling, digitisation and the development of the Exhibit tool was nationally recognised in the Times Higher Education Awards in 2022, when the team were shortlisted for 'Outstanding Library Team'.

Teaching the first-year module *Being Human* at The Glasgow School of Art

Katy West, Cat Doyle and Susannah Waters, The Glasgow School or Art

Figure 9. In previous years students undertook visits to museum and archive collections © Stephen Keane, The Glasgow School of Art.

The First Year Experience (FYE) brings together all Year 1 students at The Glasgow School of Art (GSA) for two shared projects. Each project is led by an overarching theme which evolves every academic year to reflect current and relevant topics and issues. The FYE introduces students to art school: it offers them the opportunity to explore the breadth of the disciplinary domain in which they will study, work and practice, its relationship with other specialist subjects at GSA, and the wider context of Glasgow.

The FYE was established in academic year 2019/2020 and was delivered through in-person teaching, including visits to local archives, museum collections, and sites of interest.

Due to the Covid-19 pandemic, all teaching moved online in 2020/21, including

virtual visits to:

- The Moving Image Archive, part of the National Library of Scotland, which houses film and video footage covering around 100 years of Scotland's history.
- GSA's Archives & Collections, which hold the School's institutional archive alongside records and examples of work by former and current staff and students, and related organisations.
- A private collection containing primarily examples of Scottish gold and silverware.
- The Royal College of Physicians and Surgeons of Glasgow's heritage collections, including library, archives and artefacts relating to medical history.
- Rhizome, who support born-digital art and culture through commissions, exhibitions, digital preservation, and software development.

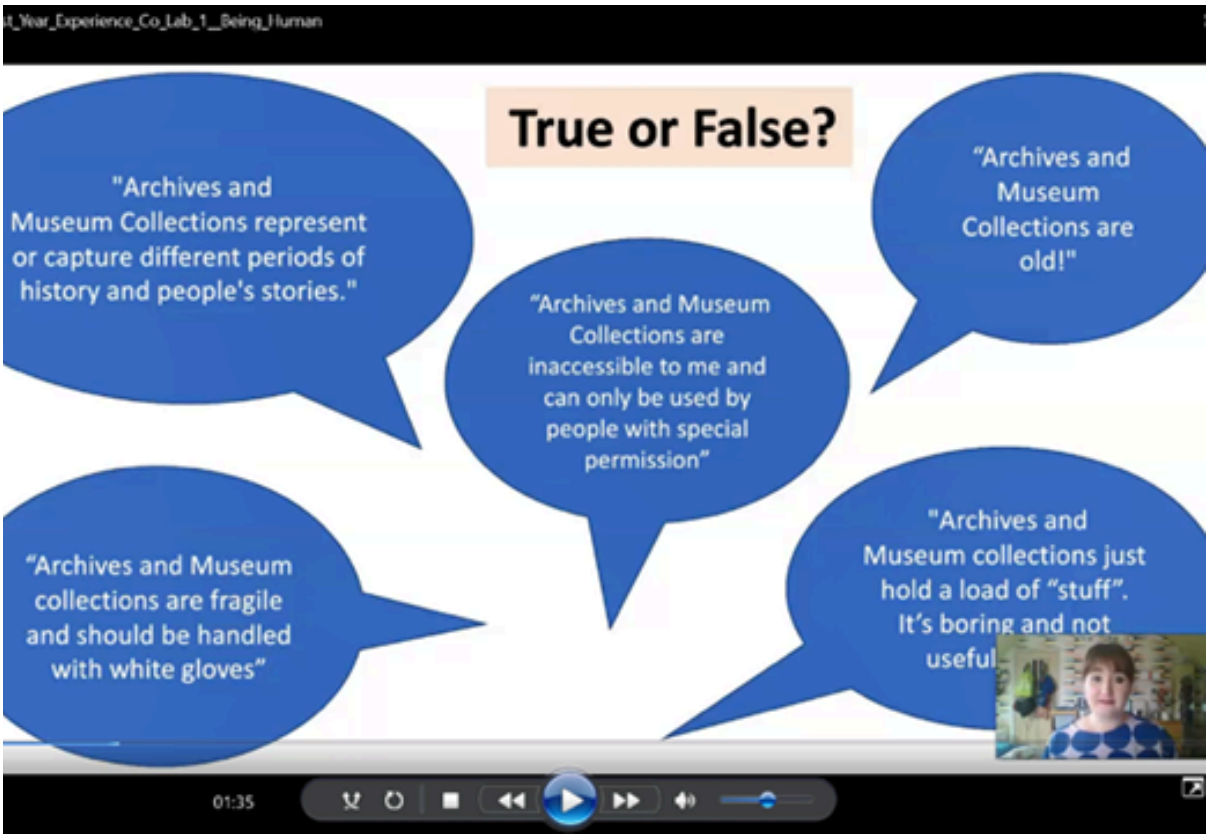


Figure 10. Preparing for a Virtual Museum Visit in 2020: Students engaged in pre-recorded videos and online tasks before exploring collections online.

Online Zoom sessions were held with the custodians of each collection in which students were introduced to a selection of items and encouraged to ask questions and direct the analysis of the objects. As students were unable to visit the sites in-person, learning materials were developed by GSA Archives & Collections staff in conjunction with the course coordinator, for students to complete asynchronously

prior to their live sessions. Videos were made and subtitled using Screen-Cast-O-Matic software, and quizzes were created in Canvas, GSA's Virtual Learning Environment.

> ***"For the Being Human project, we looked at items in our collection that related to perceptions and attitudes towards disability and how over the centuries, doctors and surgeons tried to treat these conditions. Working with the students and lecturers at GSA on this project is always really rewarding as it gives us the opportunity to look at our collections in a very different way and helps to demonstrate how the archive, museum and library can be relevant to so many different disciplines outside of the medical world." (Royal College of Physicians and Surgeons of Glasgow)***

Students were introduced to archives and collections through a short video covering their similarities and differences, how they came to be (whether collected by an individual, local authority, educational board, or community) and their purpose. The video also explored common misconceptions (debunking myths through a game of true or false), and how archives and collections can inspire creative practice.

A second video then provided a step-by-step guide for browsing the online catalogues of different organisations involved, and accessing any additional sources of information they provided, such as blogs and social media channels. This video also gave a list of examples of other archive and museum repositories that students may wish to explore in their own time. Students were asked to watch this video and then complete an online quiz in relation to the organisation they would be virtually visiting. They were also encouraged to find and comment on items and collections that they were personally interested in.

Building on existing relationships between GSA collections and teaching staff, and with external archives and museums, allowed the course to be adapted to an online environment while taking into consideration the varying resources (including staffing and digital infrastructure) of each contributor. Different organisations were able to offer different levels of digital access to their collections, but most were

able to share digital images on Canvas and/or via their existing online catalogue.

Students were assessed by a submission that included digital documentation of a piece of creative work, (this could be a physical item, made in a 'real life' studio environment, or a born-digital work), alongside a written critical and reflective essay that discussed the connection between the archives explored, further contextual research, and the work made in response to this research and processes developed in the studio. Feedback from students indicated they found working with collections a valuable learning experience and that they would apply skills learnt on this course to other areas of their studies.

> ***"I found using an archive very interesting and engaging. I enjoyed working with it and using it as a stimulus for ideas." (Painting & Printmaking student)***

> ***"It was nice to engage with topics outside of art and design and let them infiltrate into my work. Looking at archives was an interesting and inspiring way to begin a project that I'd never thought of before." (Communication Design student)***

> ***"I discovered how easy it is to access an archive and may use it [in] future when researching for a project." (Fine Art Photography student)***

Virtual collections classrooms with visualisers at the University of Glasgow

Maria Economou, Robert MacLean, Johanna Green†, and Lizzie O'Neill,
University of Glasgow

Figure 11. Image from object handling video showing staff photos from Scott-Lithgow shipbuilding collection (GD323/13/10/4) captured with ceiling-mounted camera at the University of Glasgow Archives and Special Collections' Virtual Collections Classroom for Digital Cultural Heritage course, Museum Studies MSc © University of Glasgow.

In response to Covid-19 limitations for accessing collections, academic and collection custodian staff at the University of Glasgow set up virtual classrooms using visualisers to support collections-based teaching and learning, initially at Archives and Special Collections (summer 2020) and subsequently at the Hunterian Collections Study Centre at Kelvin Hall (spring 2021).

The virtual classrooms enabled staff to increase access to learning materials during the pandemic and address the limited room capacity due to social distancing measures when limited on-campus teaching was allowed. This enabled hybrid or

† Dr Johanna Green (1983-2023), see Acknowledgements, pp.96-97.

fully remote collections-based teaching and learning and access to a much wider student body. The target audience for the virtual classrooms were primarily students, university staff, but also external researchers, and local and international communities engaging with the collections.

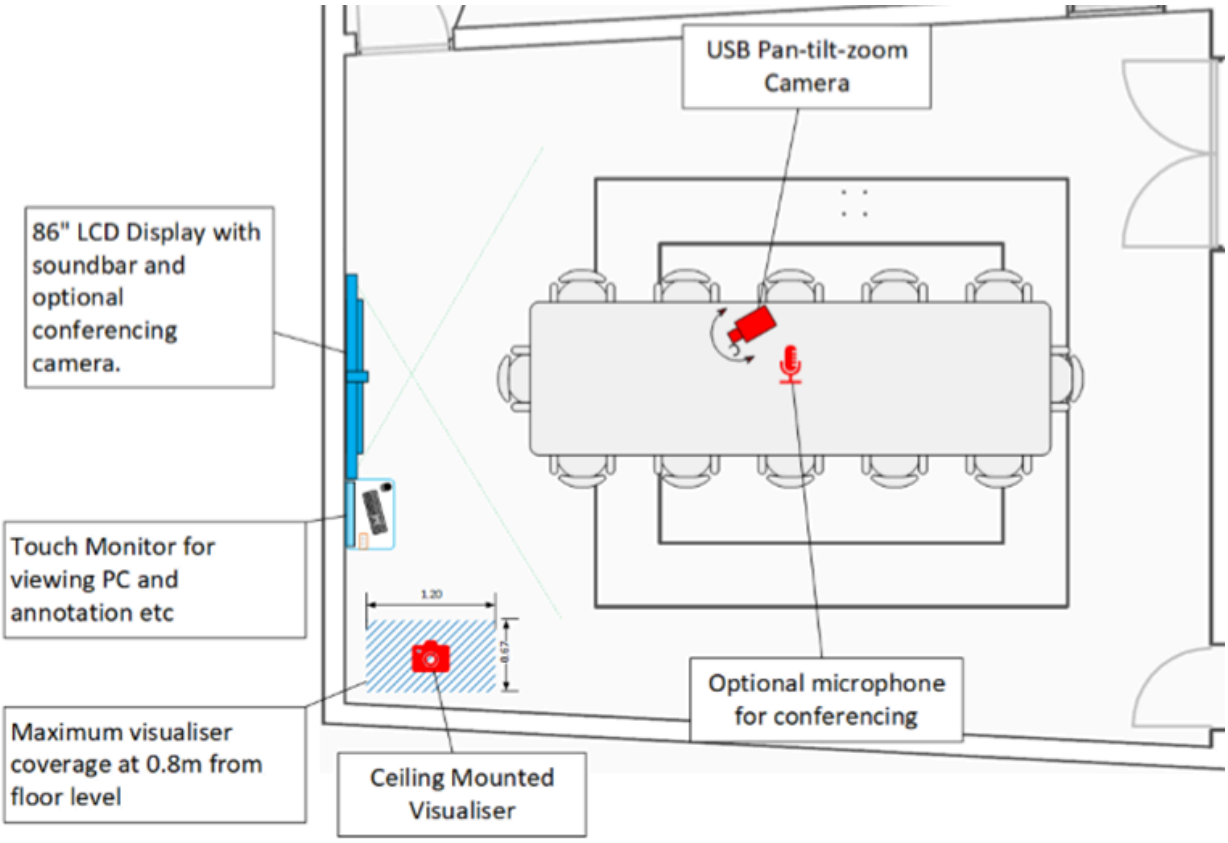


Figure 12. The technical setup of the Virtual Classroom at Archives and Special Collections, University of Glasgow © Jo Tinkler, Learning Spaces Specialist, University of Glasgow.

The technical setup at the ASC Virtual Classroom at the Main Library (Figures 3 and 10) initially included: 1) 86” LCD display on the teaching wall with a soundbar below for audio; 2) a wide-angle USB camera mounted above the display for video conferencing; 3) an AV cabinet with a touch monitor to enable lecturers to use whiteboard and annotation; 4) a high-definition ceiling-mounted visualiser with remote control, allowing items from 1.2x0.7m to 2.5x1.6cm to be presented in detail on the main LCD display and shared remotely; 5) A USB PTZ camera positioned towards the centre of the room, offering coverage of the presenter/lecturer; 6) A radio lavalier microphone for consistent audio from the presenter; 7) a wall-mounted microphone in the centre of the room for conferencing and assistive listening, and; 8) an IR transmitter and personal receiver pack to enable hard-of-hearing users to hear both microphone and playback audio through a personal neck loop. In 2021-22, ASC further extended the technical setup to support online and

hybrid teaching and learning at their Thurso Street Reading Room. In the case of the Hunterian's Virtual Classroom, the visualiser is trolley-mounted to allow more flexibility for close viewing of larger objects.

> ***"[The Virtual Collections Classroom offered] overall a more comprehensive experience than simply viewing a flat 2D digitised item because we could get a sense of the object itself ... The ability to zoom in to such a high degree to see tiny details was also fantastic ...to see miniscule details like the texture of the parchment."***
> ***(Information Management and Preservation MSc student)***

Demand for the visualisers was high in 2021-22 (almost twice as many student visits and teaching sessions at ASC compared to 2020-21) and included virtual teaching and learning (with students connecting remotely over Zoom, and staff on campus using overhead-camera teaching), in-person small group socially-distanced teaching and learning (with object handling and in-room use of screens and cameras), and hybrid teaching and learning (utilising the in-room technology to support interactions, e.g., between onsite and online students).

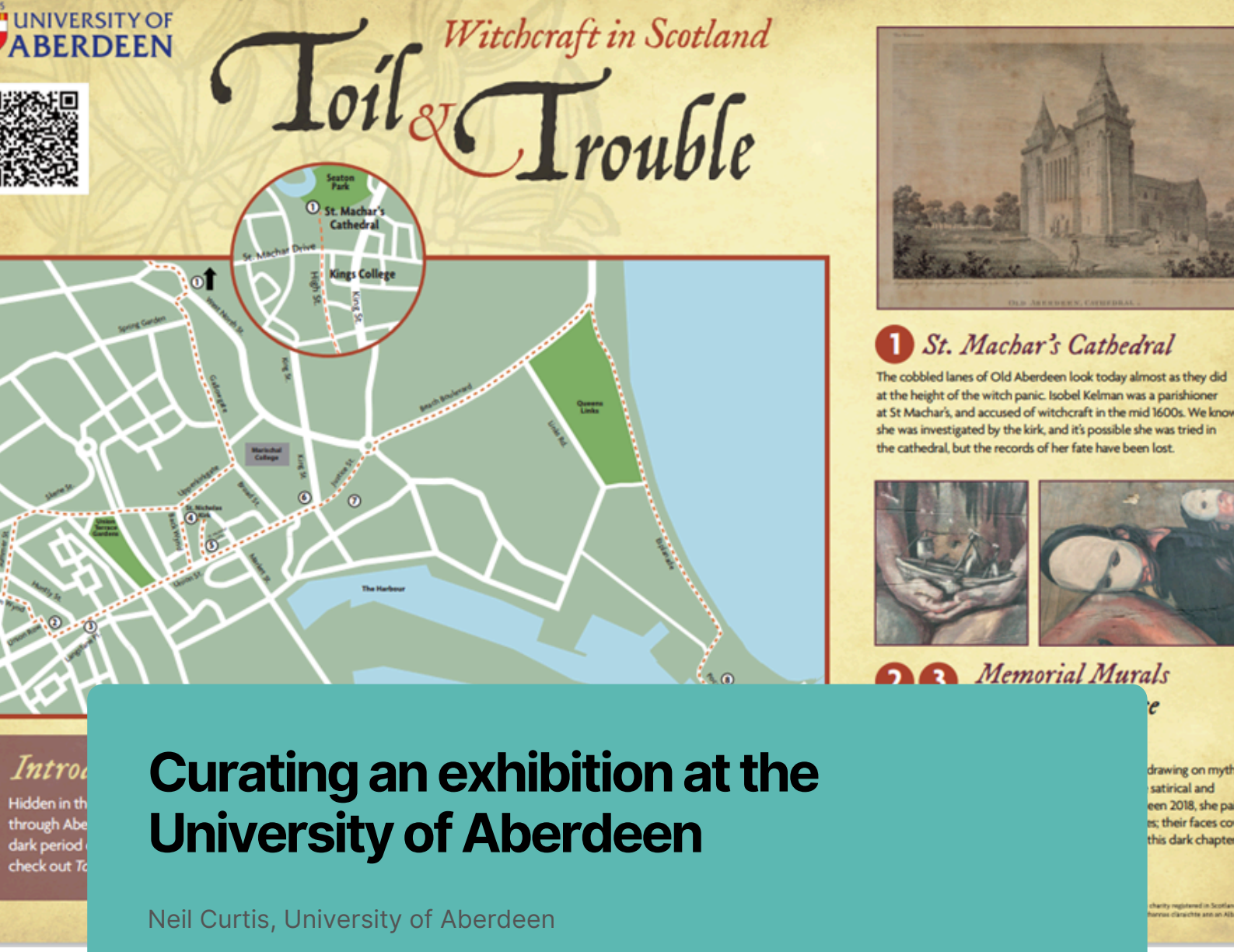
In 2021-22, half of all demand for semester 1 was for hybrid sessions, and from 30 sessions taught, 8 were in person, and 15 blended or hybrid, with only 7 fully online. Then in semester 2 as restrictions eased, there was a marked pivot back to in-person teaching with 30 of the 40 classes delivered only in-person, and only 3 blended or hybrid.

However, the technology used for hybrid delivery continued to play an important part in in-person teaching, with the camera and LCDs being used in many classes to share details of objects in the room (particularly useful for very small objects) and for peer-to-peer teaching and learning, with students sharing findings.

In 2021-22 there were almost twice as many student visits to Archives and Special Collections outside taught classes and sessions as there had been in 2020-21, and this figure was 25% higher than in any previous academic year. In large part these high figures are a result of virtual visits, either online or hybrid (which were 78% of

the total), which speaks to the potential of this technology to support the learning of far more students than ever before. Over 1,000 of the virtual student visits were attributed to just two Level 1 History sessions. This is a level of reach that can continue to help support early undergraduate teaching in a way we have long wished to be able to.

This collaboration of academic and collections staff during the pandemic enabled a cross-University and cross-collections approach to digital teaching and learning, which continues to shape best practice across disciplines within the University of Glasgow and beyond. Examples include staff training for virtual collections teaching organised collaboratively in October 2021, and course re-design. For example, the Museum Studies MSc 'Managing and Using Collections' was redesigned to include enhancements to the Moodle VLE to provide greater student support outside formal contact hours, e.g., structured activities to complement independent learning and synchronous and asynchronous discussion tools. Moving forward, we see this technology as key for multi-site, multi-disciplinary blended and hybrid collections teaching and learning. This might see, e.g., an in-person class in the ASC Library Reading Room using Special Collections items stored locally with an archivist joining via the large screen to share an archival object from another site, and/or Hunterian curatorial/collections staff joining to share objects stored at Kelvin Hall (including objects difficult to bring together due to logistical/conservation issues).



Curating an exhibition at the University of Aberdeen

Neil Curtis, University of Aberdeen

Figure 13. Students' exhibition 'Toil and Trouble: Witchcraft in Scotland', University of Aberdeen.

For the past few years, one of the courses in the postgraduate MLitt Museums Studies programme has been 'Curating an Exhibition', in which students work as a team to curate a summer exhibition. The details of the course have changed from year to year, usually under pressure of circumstances (such as which exhibition venue is available), but the Covid-19 pandemic was a more dramatic change for the 2020 students, occurring after the course had begun. This case study considers both the online shift and how the course ran, fully online, in 2021. It also draws on a new undergraduate course in Art History running for the first time in 2021 which took a blended approach to students developing group exhibition proposals.

Students at Aberdeen benefit from access to the University's museum collections when curating exhibitions as part of their course. As in the previous year, in 2020 Curating an Exhibition students started their course with a two-day workshop in the museum stores, finding items that interested them and thinking of possible topics

for the exhibition. They followed this with a group discussion to hone the exhibition topic and ending by reviewing the list of potential items.

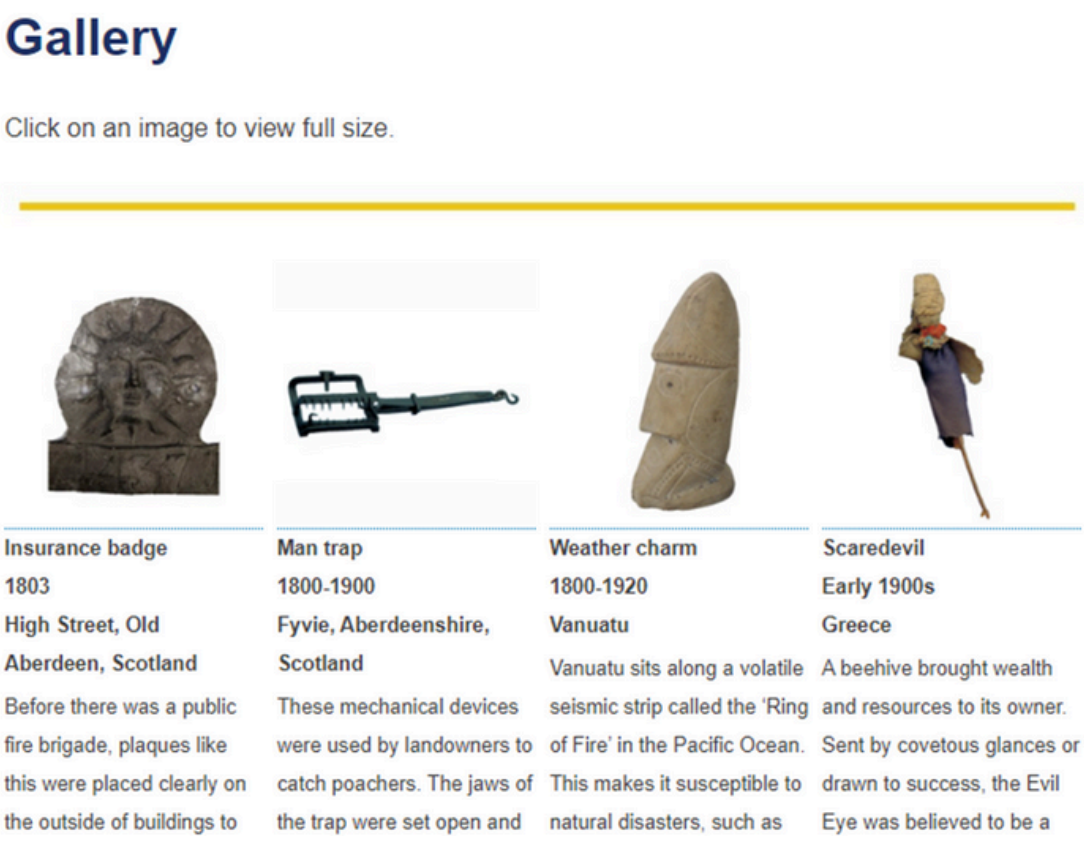


Figure 14. Online students' exhibition 'Safekeeping: protecting what is valued', University of Aberdeen.

The 2019-20 students chose their topic 'Safekeeping: protecting what is valued' and started planning a physical exhibition in the university's main library. Within weeks, however, the topic of their exhibition had taken on a new relevance, and they had to work to create the exhibition online. This proved to be the opportunity for launching a planned virtual exhibition site exhibitions.abdn.ac.uk using Omeka software. For 2020-21, we were able to start with the assumption that the exhibition would be online, with students having to do everything digitally, from the first step of selecting objects from the online image database and choosing their exhibition topic.

The 2020-21 class quickly chose the topic which became 'Toil and Trouble: Witchcraft in Scotland' and, as in previous years, worked in smaller teams to deliver the exhibition, including logistics co-ordination, object selection and image editing, design and marketing, and interpretation and text editing. Main class meetings took place using Blackboard Collaborate, with individual teams meeting in-person, via Zoom, and using Facebook. An informal group also worked together to create a

walking trail around Aberdeen, while a single display case in the library acted as a taster to the online exhibition with a QR code linking to the exhibition and the trail. Course feedback showed that the students were frustrated by not having physical access to the collections, particularly as only a small proportion of items had images available online. They also found that Omeka offered a limited functionality and required a reliance on staff with expertise in using the application. However, they were proud of the online exhibition and enjoyed creating the walking trail and taster case as they resulted in a richer, hybrid, exhibition experience.

DISCUSSION: RESOURCES

Resources, discoverability, and access

The ways that people identified resources for use in teaching were investigated in the surveys and interviews. While this project focuses on the impact of Covid-19, the survey showed that many respondents had previous experience of using digital material in their teaching.

Figure 15. Digitisation of an international collection of chair designs, University of Dundee © Matthew Jarron.

Resources used included internal and external cataloguing systems, open access repositories and aggregators (e.g., Google Art Project, Smithsonian 3D collections, eHive, Europeana, Gallica, Digital Public Library of America (DPLA), Deutsche Digitale Bibliothek (DDB), Art UK), music files, digitised film collections, and virtual reconstructions of museums spaces. However, given that not all collections had been digitised pre-pandemic, the availability of resources was a significant factor. A commissioned report on digital collections in the UK's leading cultural heritage organisations in 2021-2 concluded that digitisation and the digital accessibility of collections has become concentrated in large and relatively well-resourced organisations – and even more concentrated than are the holdings collections across the UK's institutions (Gosling et al., 2022, p. 33). One interviewee noted that:

> ***"I was really lucky that all of the video work that I wanted to show had already been digitised and uploaded."***

One of the most striking findings was that around a third of survey respondents did not use digitised collections from sources outwith their own institutions, but the reasons for this were not explored in detail. Possible reasons discussed within the project team included new material not being added to repositories during Covid lockdowns, and the fact that it may have been easier to get support from collections staff within the same institution. Teaching staff may have also sought to keep a sense of connection with their own university, at a time when students were online, and potentially learning at a distance. However, further research would be needed to investigate this more fully.

External resources were most likely to be from familiar sources, such as one Scotland-based respondent listing only UK-based repositories of online sources. However, it is also noteworthy that in the survey open to all respondents, and in interviews with non-UK participants, there was a more global range of resources used, and a diversity of selected materials in terms of disciplines taught. For example, one teacher made use of Europeana (a European online cultural heritage portal), Gallica (the French national aggregator for digital collections), the Digital Public Library of America, and DBB (the German Digital Library). However, this difference may be because the international respondents were more likely to be

digitally confident in seeking out and using resources from a wider range of sources.

Collating the list of external repositories used by respondents to the survey, most were those with a reliable 'brand image', that have been created by national or regional bodies such as the British Library, Archive Library of Congress (e.g., Chronicling America), National Records of Scotland, Statistical Accounts of Scotland, British Newspaper Archive, Wellcome Collection, National Library of Scotland, British Museum, National Museums Scotland, Glasgow Museums, SCRAN – which is run by Historic Environment Scotland, or well-known multinational companies such as Google Arts and Culture, Sketchfab, Spectrum Heritage 3D models, YouTube, and Vimeo.

While many of the former are repositories of large collections, some examples of aggregators or multi-collection sites were mentioned, such as Art UK, which records works of art from a wide variety of institutions. Specific resources, such as the 'Every Name Counts' crowdsourcing initiative by the Arolsen Archives which is creating a digital memorial of the victims of the Holocaust, were also mentioned where the resource had a close relationship to the subject matter of the course being taught.

Specific discovery tools and guidance also had an impact on the use of resource from non-local sources. An example mentioned by one respondent was the 'Guide to Reading Old Handwriting' from the National Archives, the 'Scottish Handwriting' website of National Records of Scotland and associated discovery tools. Confident familiarity with a repository with a relevant – rather than diverse – collection, and an effective interface was therefore key.

Anecdotally, it seemed that users needed to know where to look – and how to search – to find what they needed. This aligns with the findings of a report for the AHRC-funded Towards a National Collection programme, which indicates that search and discovery behaviour is heavily focussed on users knowing where to look (Woodley & Towell, 2002).

The focus on local resources was also highlighted by the amount of local digitisation which occurred during the pandemic. As one interviewee said:

> ***"I think a gut reaction would be to say nothing was digitised during the pandemic. And actually, it's not true. In fact, lots of stuff was digitised and it was prioritised for teaching and teaching collections."***

However, much of this work was carried out in an ad hoc way, often relating to material that had previously been used for in-person classes, or using material that was to hand for other purposes. One international interviewee said:

> ***"I myself have only used images that I was provided by my boss.... if I needed them for my online presentations."***

This was sometimes exacerbated by pre-existing weakness in institutional databases, for example within one institution where the archive catalogue was in the process of being merged with the museum catalogue, or others where the descriptive information was inadequate to identify what should be digitised. Before access was restricted by the pandemic, teaching staff would often base their digitisation requests on visits to look at material. While access was restricted during the pandemic, there was even more reliance on library, archive or museum staff to guide and advise. This reliance on experienced staff to signpost relevant material, rather than the discoverability of material from database searches, has significant implications for the use of digital resources – as well as for the future development of collection databases and online content. That personal and professional relationships and pre-existing expertise and experience were seen to be so important is also consistent with the findings of the AHRC-funded One by one - building digitally confident museums project (One by One - Resources, 2021), which argued that despite a growing deeper understanding by museums of the digital skills, knowledge and expertise needed, museums are not yet systematically assessing and identifying these needs.

As a result, 'informal collections' such as personal collections of images and photographs taken by staff, along with those found on Flickr or Google Images, complemented by personal lists of URLs and websites where suitable resources

could be found, were frequently used in preference to those hosted by cultural institutions. However, the associated metadata for these is often poor, such as information about which institution cares for an item or about copyright licensing, which significantly limits their usefulness and sustainability.

Quality of images and file size was noted as another limiting factor. Multiple high-resolution images can be essential for teaching, particularly if there is a desire for students to explore a resource, consider the contexts for individual items and make their own selections for personal research. Even an individual manuscript could require hundreds of large TIFF files. As one interviewee commented, Virtual Learning Environments (VLEs) such as Moodle, Blackboard, and Canvas were not designed to host large numbers of images, and have very poor search functionality, so teaching can be limited to using a selection in a compressed PowerPoint. That interviewee was able to use an educational file sharing system (EdShare) which had an image preview which could open up in a browser, so students did not have to download large image files. Such issues are particularly important when students are reliant on low-speed internet connections. Digital poverty is a particularly critical issue when considering the use of high-resolution images in teaching, so images that require large bandwidth should be accompanied by alternatives suitable for slow internet connections, such as tiling or lower quality images.

Alongside these challenges around discoverability and accessibility, the licensing of images is a significant factor in how people select digitised material. Some institutions continue to have restrictive approaches, which may encourage people to use material in their host institution, where there are often more flexible approaches. Greater use of open licensing, such as Creative Commons, is frequently discussed in the sector, but it was noteworthy that it was not raised by participants in our research.

Technologies and tools

The surveys, interviews and workshop discussion sessions for this project demonstrated that technologies and digital tools are at the core of the pivot to digital object-based learning. In the survey results, two main types of digital transformation are evident: gradual and fast-paced. For those who had used digital tools and technologies before the pandemic, the pivot to teaching and learning

online was less abrupt. For those who implemented and used new technologies and tools as a result of the pandemic, the change felt more rapid and sudden.

Figure 16. Digital tools for teaching with Manuscripts, based on IIIF and Universal Viewer, University of St Andrews.

Survey respondents highlighted that, particularly during the first lockdowns, the urgency of using digital resources for teaching did not leave much room for training and the exploration or development of new approaches. By 2021, as one participant highlighted, people were still working out how things could work:

> ***"It feels like everyone is still finding their feet in this area after the rush to explore it last year when lockdown hit."***

It was evident in survey responses that staff experience and familiarity with digital tools gained prior to the pandemic played a vital role in the pivot to online teaching and learning with digitised collections (cf. Zuanni, 2020). However, the variable levels of digital readiness of staff and of institutions in the first lockdown levelled out later, especially if there was active support for digital skills, and time (usually in between periods of tighter restrictions) to prepare resources or develop new tools and approaches:

> ***"Wide range of digitised and digital resources, many scanned ahead since August as back up in case this module had to revert to online-only."***

Interestingly, neither subset of data from the main survey found a clear pattern when it came to formal IT or digital skills support. Some participants reported more collaboration with IT services staff, while others found that IT specialists were too busy to be able to allocate enough time for supporting digital object-based teaching. Whatever the level of support, some collections and academic staff took the initiative to seek out digital tools or to establish partnerships to develop them:

> ***"We don't have a dedicated IT person... so [had to] do most of this ourselves with trial and error and it has been a steep learning curve."***

Some collections staff organised workshops or created video tutorials to encourage academic staff to use digital tools and technologies for teaching with collections. Some survey respondents (typically those who undertook more digital projects on their own initiative) emphasised that with the wide availability of technical support accessible on the internet, an essential factor in digital familiarisation can be self-determination and willingness. However, responses also indicated that this was not on its own enough to develop the confidence needed.

Almost all survey respondents agreed that more training and support is needed. When asked to expand on this and indicate what would help, responses tended to focus on in-person support as preferable:

> ***"Online support while you are doing it would also be nice, or even someone who could come to the session while you are teaching."***

> ***"Now we're doing hybrid [and] having to deal with the pedagogical side, it's nice not having to deal with the technical issues too."***

Virtual conferencing services

Throughout the pandemic, video conferencing software became an integral part of both work and social interactions, so it was unsurprising that this was the main technology mentioned by participants in our study. MS Teams and Zoom were the most frequently mentioned tools, but some participants also mentioned Google Meet (integrated with Google Classroom) or Webex by Cisco. Some Virtual Learning Environments mentioned (such as Blackboard Collaborate) also include video conferencing functionality.

Both subsets of the main survey data showed that the capability of MS Teams and Zoom to facilitate interactions with collections was appreciated, including to support active engagement and online collaboration. Functionality that was found to be effective included:

- Polling and hand-raising, for example for voting or for more individual input and reflection from students
- Digital whiteboards, used to support group interaction and collaboration
- Annotation tools (in Zoom) allowing digital annotations to be made to the presenter's screen while sharing slides, used for example in studying medieval manuscripts online
- Breakout rooms, to enable students to interact with or collaborate with each other in real time
- Chat as a complement to other in-class engagement, including enabling students to express choices about what to examine or to guide the onsite interaction with an object by the instructor
- Transcription and live captions, supporting inclusive learning and increased accessibility for object-based sessions, and providing instant notes from a session
- Recording functionality, to enable lectures and object handling sessions to be accessed asynchronously, for example by students in different time zones
- Integration with MS Office (in MS Teams) to support collaborative working on objects and projects
- File-sharing and linking to follow-up activities, collection objects, videos, and presentations.

Online collaborative and publishing platforms

Complementing video conferencing, and the standard Virtual Learning Environments (VLE) typically used by universities, many staff used other online platforms to support collaboration. These included Padlet, Miro, and Mahara, which were all mentioned by survey respondents in relation to student engagement. Some also mentioned extensions to VLEs that support collaboration and interaction, including for example Moodle's interactive book resource, or VoiceThread, which supports reflective group discussion.

A number of online platforms for sharing and annotating digitised objects were also mentioned by survey participants, and some collections took advantage of technologies designed to bring together material from different museums, libraries, and archives. Most examples of this were based around the Universal Viewer and International Image Interoperability Framework (IIIF), and the support these can offer for 2D images, 3D models, audio, video, and pdf, among other file formats and data types. Extensions and plugins were added to enable analysis and annotation, and the manipulation of digital objects, for example by panning, rotating, or zooming. However, it is important to acknowledge that this infrastructure is not available to all collections-holding institutions.

> ***"All collections items were digitised in IIIF format for use with this module and included loose [single-leaf] documents."***

> ***"Enhancements gained by use of IIIF images on Collections' site to supplement in-person classes and to enable online-only delivery."***

Digital surrogates of physical spaces

Some survey participants presented physical spaces online, using simple mobile phone or video tours, or using more sophisticated tools that create digital surrogates of physical spaces. Among the tools mentioned were Matterport, which supports 3D space capture, and other software (for example, Omeka or Kuula) that

can create interactive teaching spaces, museum galleries, collection centres and storage facilities, archives, and special collection rooms.

Digital access without digitisation

A number of respondents discussed the use of visualisers to show and interact with collection objects in real-time. This technology is discussed in more detail in a 2021 report by Research Libraries UK (RLUK) on Virtual Reading Rooms and Virtual Teaching Spaces, which defined these as 'human-mediated remote digital access to collections' using a visualiser (Kamposiori, 2022, p. 8). These setups are highly customisable, and survey respondents mentioned their use for teaching and learning, for example:

> ***"The only object used was the one from our handling collection, which was the subject of an object-study session using a ceiling-mounted camera and held over zoom."***

Opportunities, but also challenges

A number of survey participants emphasised that video conferencing has opened up opportunities to accommodate larger classes, to support classes with students across multiple sites or locations, or to enable visiting speakers to join classes from much further afield than would have been possible for onsite and in-person sessions.

However, some also mentioned that the hardware required for full participation (including a camera and microphone) presented challenges for some students, either because they did not have the hardware required, or their internet connection was not good enough for video. For some students, however, privacy concerns impacted their participation in video-conferencing-based classes.

> ***"Access to technical equipment for students studying from home was not a level playing field, and it was generally harder to garner responses from within the museum and among the students."***

People make it work

One of the most important factors we found to have a direct and significant impact on this type of work was the role of people. It was evident from survey responses, and particularly clear in the interviews, that people across higher education institutions of different sizes and types are instrumental in carrying out but also in supporting, inspiring, innovating, and championing teaching with digitised collections. The nature and complexity of teaching was of course significant, combining in-person and remote delivery, the use of 'live' objects and digital resources, and the delivery of synchronous and asynchronous activities.

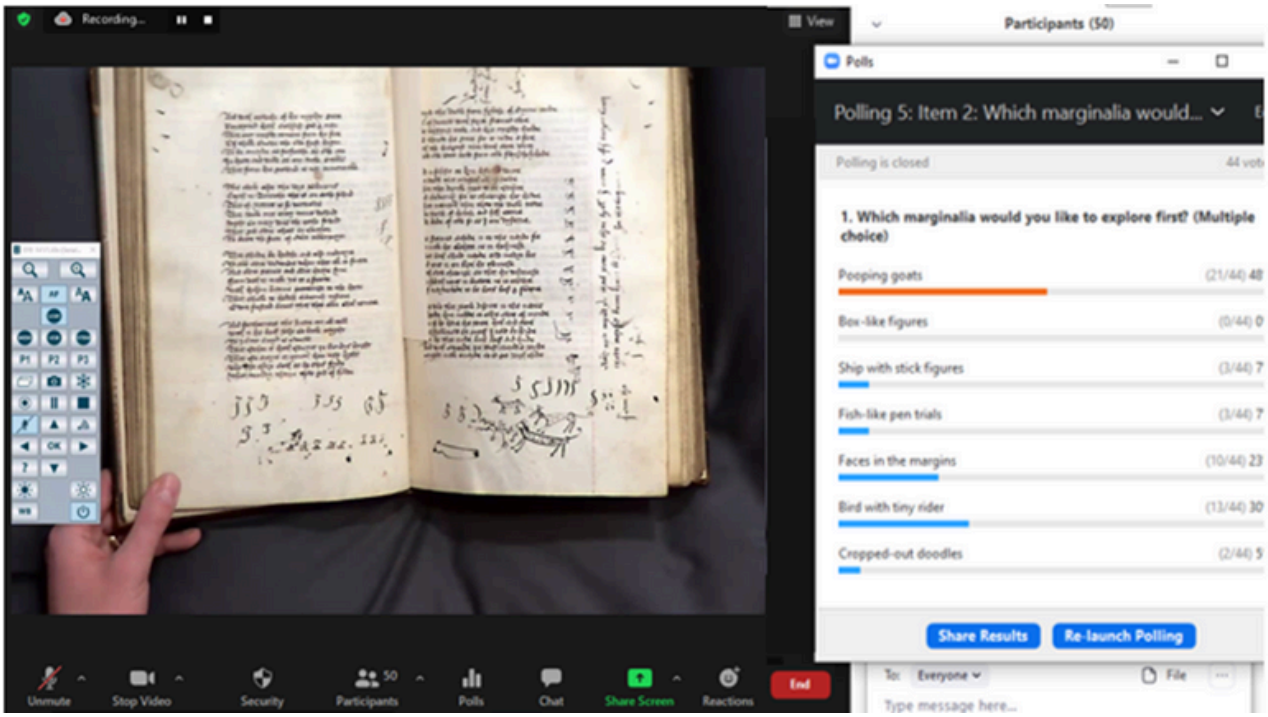


Figure 17. Use of zoom poll at the University of Glasgow Archives and Special Collections' Virtual Collections Classroom for Records and Evidence course, Information Management and Preservation MSc © Johanna Green, University of Glasgow.

Learning and sharing new skills

Developing new skills was critical to the success of many approaches. While our research showed that people who had been innovative in their digitisation of collections, use of digital collections, and integration in teaching before Covid-19 continued to be innovative, others who were struggling in these areas continued to struggle during the pandemic. This underscores the importance of training being available for staff so that they are able to take advantage of new approaches, and of time and capacity for staff to develop their professional skills and knowledge. The significant additional work needed for this type of teaching to be effective was recognised by most interviewees, but some stated also that it has often been 'invisible' work, without proper recognition in workload models or similar systems for keeping track and managing workload, nor in recognition and award for career progression.

Our interviews highlighted the importance of not only high-level support from the top but also peer networks, mentoring, and sharing on the ground. Incentivising this type of work, such as with small grants or other career incentives, and recognition by peers and senior staff, can encourage experimentation and innovation with new tools and approaches, but also evaluation and reflection. For example, at the University of Glasgow, the internal Learning and Teaching Development Fund supported the evaluation of postgraduate teaching with Special Collections using a visualiser, while the Exhibit tool was developed at the University of St Andrews with similar support.

The levels of confidence related not only to skills and experience, but to a positive and open culture which encouraged sharing of lessons learned, and to collaborative relationships between academic and collections staff in developing proposals. This is particularly important for supporting the adaptation to change and the transition to new ways of teaching and engaging with collections and was also reflected in the interest in and feedback from our workshops at the DCDC and UMAC-UNIVERSEUM conferences. Staff confidence levels related to working and teaching with digitised collections varied considerably among our research participants, even though those who responded to the survey and agreed to take part in the interviews are likely to be more experienced and skilled in this type of work compared to their peers. Confidence was built with practice and depended

on a range of skills being developed and deployed simultaneously.

> ***"But it's a skill. I had one of my [Graduate Teaching Assistants] come in for one of the classes, ... it was at the end of the course, and ... it was kind of amazing just to watch her handling [objects while using the technology at the same time]... But when I first used it, it was an absolute shambles... and of course, you have to constantly remind yourself, I think, "you're going to hold down an item with your hand and reach for the remote" and you're like, "no, prioritise the item and set it up with you and then change it". And that takes a little bit of learning."***

Collaborations with specialist staff

The need for specialist staff to support this type of work was noted by many participants, particularly the need for mutual respect and a good relationship between the academic and collections staff, where these are not combined in one member of staff with mixed skills and responsibilities.

> ***"(...) it would be nice to, I think, get a bit more confidence about putting forward digital projects that might involve work with special collections. And I suppose what I need there is a sense of the skills that are available and special collections and who ... would be able to support and research projects and things like that."***

This type of collaboration also has resource implications, as it was evident from the data that we collected that structural support was important even simply to provide the opportunity to practice these skills and way of working. As staff from one group of university museums in Africa highlighted, there was a need for specialist technical roles to work alongside collections and academic staff in support of this work:

> ***"We've ... recently discussed in the [organisation] that we actually need a digital content manager that is becoming more and more important because curators and museum [staff], they are doing the job currently that a digital content creator would do. So, we would actually need more staff and we're very limited staff. But of course, this is, again, a funding problem and so on, and [has] so far-reaching consequences which are not really easy to solve at this stage."***

Specialist staff worked to digitise collections in support of teaching, but this could be very time-consuming. Our research showed that effective teaching with digitised collections often requires an increase in staff time to support teaching in this way, as well as the work involved to create and maintain related resources and tools — far from the misconception that teaching using digitised collections saves on staff time. At the University of St Andrews, digitisation to support teaching was closely tracked for the first half of academic year 2020-21 and found to take an average of five hours of digitisation per hour of teaching, across a wide range of types of material, where the digitised resources did not already exist. Once digitisation has been done to appropriate standards the resulting resources can be reused in future, but the initial investment to create the digitised and digital resources is considerable.

Hybrid classes provided to students, some of whom participate onsite and in-person and others participate online for the same class, typically took at least two staff members to deliver. At St Andrews, including preparation time to lay out objects for a class and ensure appropriate security and supervision of them in breaks between classes, the average was an additional 2.25 hours of staff time required, plus any time needed to pack and move collections from storage to the teaching location, if those were not co-located.

In some cases, for example when large classes were taught with collections online, the role of teaching assistants or other staff was considerable. This could include not only working with the objects and collections, but also undertaking additional elements such as preparing Zoom polls in advance of the class to keep the sessions interactive and enable students to more directly influence how to explore the collections.

More so than before Covid, such work often resulted in co-production and collaboration between staff, with courses being genuinely co-taught, with a greater sense of equal collaboration between academic and collections staff, as well as collaboration with other staff who had relevant skills. It could also involve the co-development of skills with students and staff learning together. As one lecturer at a UMIS university mentioned in relation to a session which relied on the use of a visualiser:

> ***"[O]ne of the key things that I wanted to do was to make the students feel as though they were kind of in charge of the session in a way that they would have been if we'd been in in-person. And so, one of the things that I did was concentrating on using the technology so that the students could reflect on their own experiences and to start to discuss some of the issues like, you know, you're going into this area with new professionals. You could end up in any size of archive of any type. So at least they had those skills going into the sector and I learnt a huge amount from their feedback."***

DISCUSSION: PEDAGOGY

Object-based learning

The research captured examples of how collections had been used in learning and teaching activities during Covid-19 lockdowns when access to physical objects was limited. It also explored how the shift to using digitised collections had impacted on object-based learning and attitudes towards authenticity, the aura of the encounter, and in-person investigation.

In some universities, academic staff from certain departments were only interested in physical access to objects, so the impact of Covid-19 restrictions caused the use of collections to decline. However, at the same time, pandemic lockdowns often had the opposite impact, with staff engagement from other departments (in some cases at the same university) increasing, and digital object-based learning sessions being established.

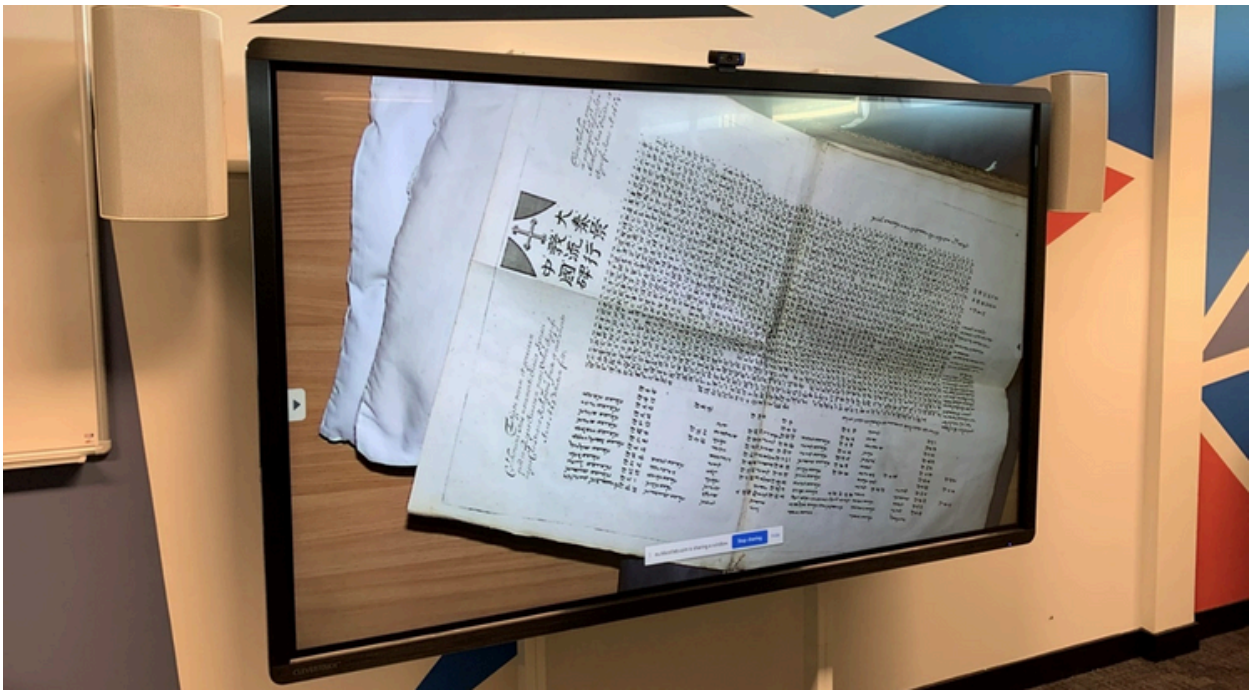


Figure 18. November 2020, Digital Scholarship Centre in the Centre for Research Collections, University of Edinburgh © Richard Oosterhoff.

During the pandemic, courses were restructured to include recorded lectures with digital versions of objects which students could watch in their own time (an approach which was noted as worth preserving beyond Covid). A number of teachers also created digital surrogates to replace the role of objects used previously in face-to-face classes, and some were able to combine this with live sessions, sometimes using a visualiser to allow close inspection of items. Object-based learning was also used to support independent and self-directed learning, for example, as one survey respondent described:

> ***"(...) scaffolded self-directed student study outside of contact hours supported by screencast demonstrations."***

The combination of asynchronous learning resources and synchronous live sessions brought, and continues to bring, many new opportunities to enrich object-based learning beyond 'show-and-tell'. Interviewees noted that working with digital objects allowed items to be viewed in more detail than is often feasible during in-person activities, and that this approach also gave participants an equity of experience which is difficult to achieve in face-to-face sessions. As one survey respondent explained:

> ***"The object study session using a ceiling mounted camera was a great success and I hope to continue this. Students really enjoyed the detail that the camera offered and all of them could look at the same detail at once which is not possible with a classroom situation."***

An academic who used the visualiser for teaching during the pandemic noted during their interview:

> ***"All had an equity of visual access, connection issues aside. But typically, when you're in a collection, you're all gathered around an item and not everyone can see what you're talking about. You're kind of getting people out of the way to have a look. Everyone had the same kind of visual access. And... I think that was a big, big improvement actually, on the way that we've done things before."***

However, as one interviewee commented:

> ***"(...) [y]ou can't replicate the smell, the feel, the texture of a manuscript."***

While one survey respondent noted that visualisers:

> ***"(...) are no substitute for allowing students to see, experience and touch the actual material ... and I will always put that first. Material and tactile qualities are essential to... teaching the designers I work with."***

Quality of resources

As noted previously, for many teachers the materiality of the objects remained a key concern in the process of engaging students and other audiences with objects online. This raised a problem when using digitised material where the focus of digitisation had been on creating textual transcriptions of an item's contents, rather than on capturing its material attributes. As a result, teachers sometimes used their own, poorer quality images or those from social media posts to show archives and books as objects.

The quality of resources in general was an important factor in the quality of learning experiences and, as our research showed, was extremely variable across higher education institutions. It ranged from high-quality manipulable 3D objects to low resolution 2D images with limited metadata. The learning opportunities that the use of high-resolution images and 3D models open up, and the ways they have helped overcome lockdown limitation, were highlighted by several of our participants. As one interviewee said:

> ***"(...) when they click on these images here, they've got really high res and they can blow [these] up into quite a lot of detail just to look at the 2D image ... But then they also have got a link there, which will then take them to Sketchfab."***

Opportunities and challenges

Covid-19 restrictions for some of the universities participating in our research led to new forms of digital engagement with objects, building on previous relationships with students and staff, and transferring or extending these to the digital realm. This was the case at one university where collections staff worked with Cultural Tourism students during Covid-19 restrictions to develop and offer five virtual tours of their museums on International Museum Day, 18 May 2020. Commenting on these tours, a member of the collections staff said:

> ***"That was a huge success. We reached many people online that day, so that collaboration has actually improved, and others declined because of difficulties of physical access."***

Survey respondents indicated that digital assets were used for a number of purposes within classes. A fifth of respondents used digital assets as part of interactive activities, and about the same percentage used digitised objects in presentations. However, fewer examined digitised objects live from a collection catalogue, and fewer still (only around 12%) used digitised objects as part of pre-session preparation or post-session follow up. Visiting a store or reading room for a tour or talk followed by use of digitised collections as part of student assessment were significantly less frequent still.

However, among survey respondents, only 15% indicated that the digitised object was the central focus of sessions, rather than being supporting content. This suggests that there is more thinking to do about object-based learning with digitised collections, to fully realise the potential for object-based learning in a digital environment. Some collections staff were thoughtful about this point, and about how to do more than simply replicate the face-to-face experience when teaching and learning with collections online:

> ***"(...) you have to learn online what opportunities are there, what is an object anyway? What does the digital object have? What can we do with it? Can we tag out to different museums around the world more effectively and compare parallels? Can we bring in more contextual information about these objects at the touch of a button? Can we enrich the learning experience because we're digital in a way that would be much more challenging to do if we were in the room, rather than trying to approximate the face- to-face experience by filming it?"***

Digital poverty is, however, a significant factor when considering access to digital collections. This was raised particularly powerfully by an interviewee from South Africa who explained that:

> ***"(...) the digital divide in South Africa will continue to make things very difficult because university students, especially poor students who were previously disempowered, disadvantaged and who are still disadvantaged... [Covid] has not been kind to them. And they are students who sit in rural areas who don't have access to all data and to laptops."***

This interviewee went on to explain that the problem was ameliorated by the creation of funds to buy laptops and to provide students with free access to data so they could carry out research as part of their learning and for assessment.

In some cases, the investment in resources and staff with extensive object-based learning skills and experience made this transition from physical to digital object-based learning almost seamless for the related staff. Nonetheless, most university staff who did not work directly with object-based learning were still surprised to see how much was achieved. As noted by one curator:

> ***"(...) people say 'oh, is this the only class you're doing this semester?'. And we say, 'well, no, we've already done five of the classes today... We teach every week'. And everyone's like 'Oh, really? Wow!' So, I know that's still very much an attitude that [object-based learning] is not possible to do unless [you engage physically with the objects]. I think there's still a lot of the gap of understanding in what we can do with digital object-based learning."***

Skills- and enquiry-based learning

In some cases, staff taught with digitised collections during the pandemic to support specialist subjects and training, for example, in Dress and Textile History or Biodiversity. In other cases, however, and often in parallel with the previous model, collections-based teaching was used for skills- and enquiry-based learning across disciplines, for example, for Medicine or Business students. In this approach, it is not so much the objects themselves that are important, but more the skills that they can cultivate. These can include observation, deductive reasoning, desire for further enquiry, and creative thinking, to mention only a few. Staff often try to find unexpected objects to make these connections so that the knowledge and the skills acquired are transferable. Several of our research participants reported that they were lucky in having very diverse collections to support this type of work.

The skills-based teaching and learning approach offers the potential to open up scalable options in a range of subject areas, which would be interesting to investigate further.

Assessment and assignments

In survey questions and interviews, participants were asked about how students were assessed and what assignments had been set for the courses they had supported and/or delivered. In survey responses, the most frequently mentioned forms of assessment and assignments continued to be essays, reviews, and

reports, sometimes in combination. There were, however, differences between the two subsets of global respondents and those based at Scottish universities within the survey data that may reflect the different respondent profiles of each subset.

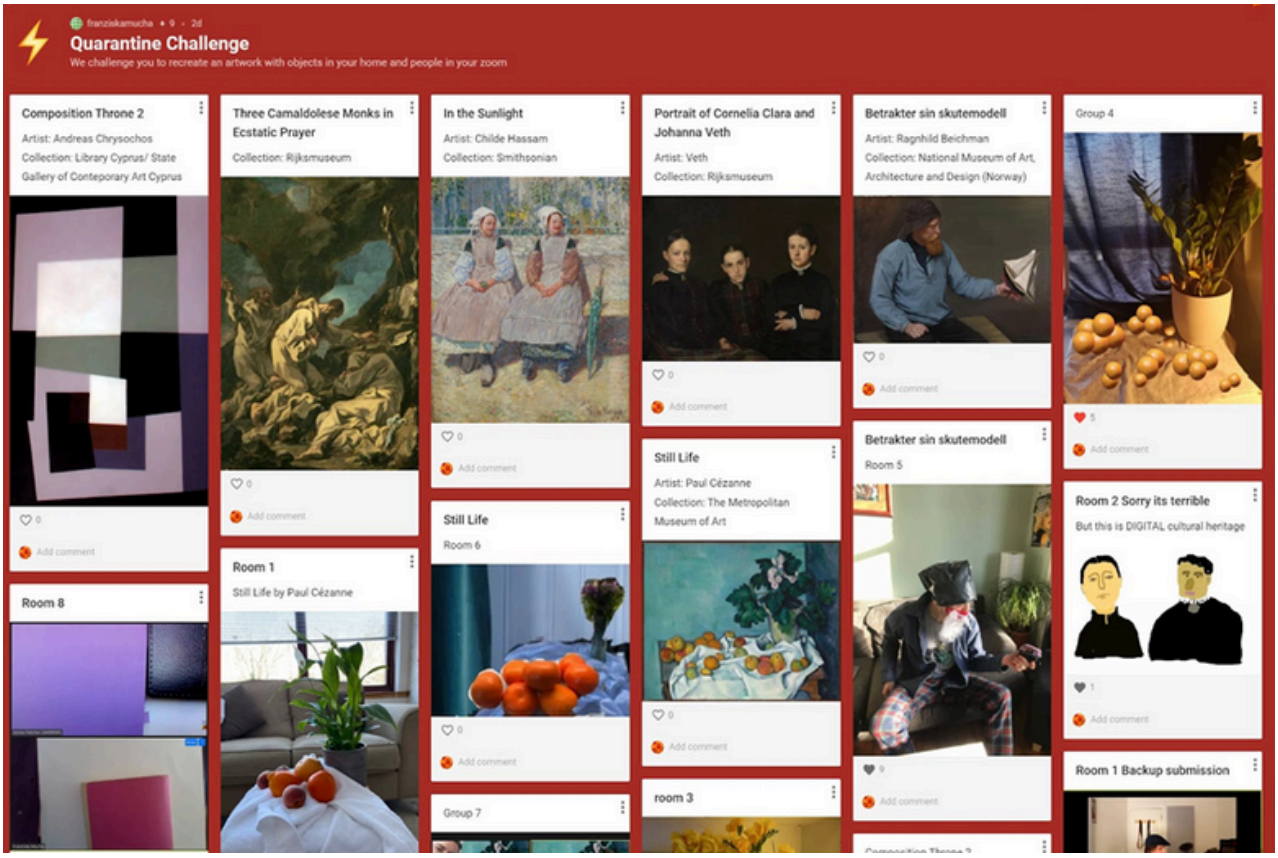


Figure 19. Digital Cultural Heritage class during Covid, Feb 2021, University of Glasgow. In the Quarantine Challenge activity shown, students are asked to recreate an artwork with objects in their home and/or people in their Zoom breakout room © Franziska Mucha.

Assessments for some modules made use of digitised and digital resources, for example using online collections databases to source images for online exhibitions. While others were changed to allow for the use of alternative resources where collections were inaccessible, or museum spaces closed. However, only rarely was the mode of assessment or the weighting of elements changed in 2020. One example where this did happen was for a module in a university in Scotland, for which 30% of the final marks had been based on an in-class presentation but which in 2020 was changed so that students were asked to make a podcast instead.

Another approach mentioned by several survey respondents and interviewees was the writing of blogs as assignments. These facilitated the sharing and preserving of ideas developed by students in their assignments, and prompted students to think more deeply about their own practice and work:

> ***"(...) the students came up with some fantastic proposals and ideas... some of which can never be realised, but yet posed really good questions and challenges to us about what we're doing and why."***

Several interviewees pointed out that it can be good for students to see that others thought similarly (or differently) to them, and to learn from others in the group. Another activity that encouraged the sharing and comparison of ideas was the development of interpretation or label text. One interviewee discussed how when working with undergraduate students on a label-writing activity they were able to:

> ***"(...) get them to think about interpretation... about the language they use and the process that happens when you're writing these labels in an institution... the kind of thinking that goes into that and the different... voices you can deploy, that differs... from writing in academic cases."***

However, although this type of activity (i.e., the development of interpretation or label text), is not uncommon in collections-related courses, it is surprising how infrequently it is the main form of assessment, especially given that it provides ways of developing a broader range of writing, editing, and communication skills.

Audio and video are still not frequently used for assignments, even though students are often familiar with these media, perhaps because staff are less comfortable with the technologies involved. One interviewee noted that they had changed the format of student assignments from audio to video, and noted that students' familiarity with this technology opened up options for the future:

> ***"I realised that this group of students had already done podcasts last year because they [were] already completely used to this sort of thing. So now they're doing... a video presentation. But that is different because they used to do presentations in class. And I decided to get rid of that because I realised... we can actually do things a little bit differently."***

In general, it is the case that staff using forms of assessment other than essays, reviews, or reports were typically already doing so before the pandemic. There is clear potential for looking more closely at this, and at the possibilities for teaching and learning with collections to be assessed through a wider range of approaches. As participants in this study noted, object studies, blogs, exhibition-style interpretation, or audio and video assignments can develop and test a wider range of skills, including some relevant to collections and to the students' future careers within and outwith the cultural heritage sector.

From the data collected for this project, it is clear that despite significant change and creativity in the delivery of teaching and learning activities, there was less change to assessment and assignment elements of classes, modules, and courses. Where modules did use essays, reports, object studies, and other forms of written assignment, these generally transferred to online delivery relatively smoothly, and this, in combination with the longer lead-in times and approval processes required for changes to assessment types or weightings, probably explains why there was less change in assessment methods and assignment types compared to changes in teaching and learning activities.

More worryingly, there were some indications from participants in this study that the pressure to deliver teaching during the pandemic meant that where collections were not integral to the assessment, it could be tempting to cut them out. As noted in the Methods and Data Sources section, scraping of data from course descriptions on university websites to see where teaching with collections was noted revealed that the vast majority of courses did not explicitly mention collections-based teaching in their descriptions. One interviewee discussed a module they taught for in which collections were included but not as part of the core content of the module or the assessments, and which "to streamline the teaching" were cut out from the module, since the session with the collections were "less teaching and… more an exploration, I guess a kind of nice things to have". The same interviewee went on to say, however, that this was in part due to the module having been developed by someone else, and inherited by them, and that:

> ***"(…) when I set up a new module… those kinds of questions [about the materiality of the book] can be core to it from the start."***

This suggests then that there is a need for collections staff and academic colleagues to work more closely together in the early stages of course and module development, in order to understand the possibilities not only for teaching with collections – but also for including them in assessment and assignments, and genuinely embedding them throughout teaching and learning. In the early stages of the pandemic, the timing and requirements of curriculum approval may have prevented many from making significant changes to modes of assessment, but where there has been creativity and collaboration in how teaching and learning are assessed, those examples point to new possibilities for the post-pandemic future.

Frequency	Survey sent out via UMIS members, with respondents only in Scotland, of whom the majority were academic staff	Survey open to global responses, of whom the majority were collections staff
Most used	Essay, review, or report	Essay, review, or report
	Presentation, poster, or blog	Exam
	Study, analysis, or detailed presentation of one object or artwork	Worksheet or exercise, including transcription
	Worksheet or exercise, including transcription	Continuous assessment
	Discussion or group work	Presentation, poster, or blog
	Creative work or writing	Audio or video
	Exam	Study, analysis, or detailed presentation of one object or artwork
Least used	Exhibition or display-style labels, or interpretation of one or more objects	Exhibition or display-style labels, or interpretation of one or more objects
	Audio or video	Discussion or group work
	Continuous assessment	Creative work or writing

Table 9. Assessment and assignments survey responses, segmented by location and respondent type, with the frequency of usage from most to least frequently-used.

CONCLUSIONS AND RECOMMENDATIONS

This report analyses data collected in 2021 about the experiences of collections and academic staff during the Covid-19 pandemic. Since it was completed, there has been a return to onsite teaching, but this does not limit the value of the data collected to a snapshot of that time – the value of digital and digitised collections has not diminished, nor has the potential for a combination of onsite and online delivery. Learning from experiences when there was a compulsion to provide teaching online is relevant not only to wider discussions about the potential for collections in Higher Education, and the potential for digitisation to unlock the possibilities of museum and archive collections; it is also relevant to conversations about pedagogy and the future of teaching and learning in a context where digital tools and technologies continue to increase in importance.

Figure 20. Collections store at the Hunterian Collections Centre at Kelvin Hall, University of Glasgow.

Reflecting on changes since the end of the research phase and subsequent developments, several key aspects have been identified by the project team. Student preferences for teaching and learning, and institutional preferences were not always aligned. We were learning together with the students during the pandemic – can we continue in that spirit? Likewise, digital poverty and sustainability were identified as important issues during the project, but options were often limited due to the pressure to deliver. They are clearly even more significant issues now.

It was clear during our study that respondents often felt quite isolated, creating

their own approaches and resources. However, without the urgency caused by the Covid pandemic, institutional and sectoral policies and funding have since become more significant, and sector agendas have moved on. There is an opportunity – a need – for sector bodies to provide leadership and advocacy to ensure that funding and support continues to be directed where they are most effective and most needed, and that the potential of our digitised collections to support teaching and learning is unlocked and delivered.

> ***"How can we continue using technology to inform or enhance in-person visits to the museum? What new skills, new technologies do we need to acquire... to amplify the live, in-person encounter with the art."***

Collections

The ability for organisations to shift to online learning with digital objects was greatly influenced by their work in this field prior to the pandemic. Those with experience, expertise and capacity for digitisation could adapt more quickly, as they had staffing and infrastructure already in place. However, this advantage became less significant as the pandemic continued, and fast-tracking of digital skills training and the acquisition of digital tools and resources meant that as the pandemic progressed there was less differentiation.

Collection resources that were used for online teaching tended to be from either the teachers' own institution, or from large and well-known organisations and repositories. There was increased awareness of the digital and digitised collections held by cultural heritage organisations, but despite the possibility of using digitised collections from anywhere, there was no significant increase in the variety of collections accessed and used for teaching and learning.

Learners' access to technology was a limiting factor in how collections-based teaching could be delivered with a lack of hardware or access to highspeed internet negatively impacting on a student's ability to access content and participate in online sessions. The choice of software and mode of delivery should

therefore be considered to ensure equality of access and learning experience for all participants, and access to hardware considered and addressed. If this is done, then the ability to access collections from anywhere and at any time has the potential to support greater access to collections-based learning.

Alongside the importance, and challenges, of discoverability and accessibility, there were issues around image and metadata quality, licensing and interoperability which limited the use of digitised collections for teaching and learning. Ensuring interoperability between platforms, including through the use of the International Image Interoperability Framework (IIIF), can make it much easier for teachers to combine material from different sources in their teaching. The growth in open licensing, such as Creative Commons, could also make it easier for people to more consistently draw from other collections. However, it is noteworthy that this issue, although discussed in the sector, was not raised in our research, so it would benefit from further investigation.

Key Recommendations

- Support and funding for the development and use of digital collections by a wide range of institutions – not just those that are already digitised and with a high profile.
- Investigate more fully the technical and other issues affecting students' ability to access and use digitised collections, and to participate in collections-based learning online.
- Commit to interoperability and sharing of resources, both through the use of standards such as IIIF, but also through more open licensing such as Creative Commons CC-BY that set the use of images for learning ahead of potential income generation.

Skills

The ability to find and evaluate relevant digital resources from museums, archives and libraries, and the ability to use technologies to develop and deliver teaching activities greatly impacted on the types of materials used and the types of collection-based teaching activities undertaken during the Covid-19 pandemic. Individuals who already had experience, knowledge and understanding of collections, digital resources, and approaches to learning and teaching generally developed innovative and creative strategies and solutions. Others who were less experienced in these areas, unfortunately struggled during the pandemic to develop the necessary skills and knowledge at speed and to apply it to their work.

Most Higher Education libraries offer information literacy training for staff and students, focussing on finding, evaluating and using published library materials. It would be beneficial to develop and deliver equivalent training relating to digitised collections, and to pedagogical approaches to teaching with digitised collections, within and beyond their institution.

Approaches to object-based learning changed as a result of the shift to online delivery, while removing the 'aura' of working with an original object highlighted how object-based learning can develop skills including observation, analysis, and critical and creative thinking. The materiality of objects remains vital in some contexts, but working with digitised collections can also facilitate working with larger groups to closely analyse material through the use of high-resolution surrogates. This, then, prompts consideration of the ways in which collections could become relevant to, and used in teaching of, a wider range of subjects and skills than has traditionally been the case.

The shift to online teaching and learning resulted in the development of new approaches, but it did not in most cases lead to changes in the assignments set. There were good reasons for this, given that changing the assessment type for a module generally requires an in-house validation process to be completed. However, bringing the lessons learned from teaching with digital technology to the assessment process would be beneficial. Asking students to produce podcasts, videos, blogs, and other online resources, will not only develop research, critical thinking, and communication skills, but will also develop digital skills. This also has

the potential to develop collaboration and problem-solving skills, which are vital to employability as well as to academic success. Moreover, assignment forms and formats beyond the essay can reduce the risk of plagiarism and discourage the use of generative AI tools where those are inappropriate, especially when working with less well-known collections and objects.

Key Recommendations

- Develop and deliver training for staff and students on how to find and use digitised museum and archive collections, as a complement to the information literacy programmes already offered.
- Support digital skills development for staff and students and identify curriculum-based opportunities to apply these skills, broadening out the range of subjects to which teaching with collections is relevant.
- Set new types of assignments to not only assess the skills and knowledge acquired by the students, but to also develop transferrable skills and employability.

Collaboration

During the pandemic, operational barriers were often reduced, and organisations were able more rapidly to develop new collaborations and new approaches to deliver teaching online. In general, hybrid delivery was more challenging than blended delivery. It also tended to be more resource-intensive, especially in terms of staffing requirements and time for preparation and delivery.

The most successful approaches to teaching with digitised collections were generally the result of collaboration between collections staff and teaching staff,

based on a mutual understanding of each others' roles and expertise, and drawing on complementary skills and expertise. However, the contribution of collections and collections specialists to teaching was not routinely recognised and credited, and this should change.

The appetite of museum and archive staff to share experiences, good practise, and innovation through this research project was notable – and this should continue.. Modest funding and internal awards and recognition can deliver significant impact, and in a number of examples in this study where this support was available, it enabled sector-leading practice to be developed.

Key Recommendations

- Recognise and credit the contributions of collections and digitisation specialists to teaching and learning, and advocate for partnership-based approaches to working with academic staff.
- Incentivise and support the development of innovative and collaborative practise through funding and recognition, including cross-departmental and cross-institutional skill-sharing and development opportunities.

What next?

While the surveys and interviews captured the practices and opinions of a range of people, as a partially self-selecting approach, there is likely a bias towards the leading edge and the innovators. Nonetheless, this approach identified a wide variety of practice in a range of contexts that include some for whom digital poverty was a significant factor or who lacked confidence, and others with excellent technological and organisational support and extensive prior experience of online teaching and the use of digital collections. Countering this to some extent, the workshops drew together a wider range of people, identifying themes which

were then explored in the interviews to give a more rounded picture. Nonetheless, there remains a significant bias in our findings towards those who were enthusiastic about the opportunities, rather than the larger number of people who remain to be convinced.

A follow-on study would be very valuable, particularly to investigate the impact and experiences of the return to face-to-face teaching and the 'new normal'. As institutions emphasise the value of in-person learning, what support will be in place for digitisation and the use of on-line resources? It would be particularly interesting to return to some of the interviewees in the present study. At the same time, as responses to the survey were lower than expected, especially among UK universities outwith Scotland, a survey of the wider sector would also be valuable. It is likely that a simpler – and shorter – survey would be more effective in capturing the range of practice.

Given the timing and constraints of the project, it was also only able to focus on the experiences of teachers and collection custodians, with the experiences of students only considered if they were available to the research team through course evaluation exercises and informal comment. A more systematic investigation of student experiences would therefore be an extremely important follow-on study. This should consider students at different levels and across the rhythm of the academic year. Student preferences for teaching and learning are not always aligned with those of institutions.

One of the key aspects of learning during the pandemic was that everyone – teachers, students, curators, collection managers, information professionals - were learning together. Can we continue in that spirit, sharing aims, accepting false starts and continually evaluate different approaches?

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The core project team consisted of:
- Dr Lisa Collinson, University of Aberdeen
- Neil Curtis, University of Aberdeen
- Dr Catherine Eagleton, University of St Andrews
- Professor Maria Economou, University of Glasgow
- Dr Kamila Oles, University of St Andrews
- Susannah Waters, The Glasgow School of Art

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An inspirational teacher, Johanna's innovation is highlighted in the University of Glasgow case study.

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IMAGES AND FIGURES

Images taken by members of the core project team are not individually credited to them, but images taken by others are where relevant.

Cover: NMC/0639 Earthenware Salt Pot © The Glasgow School of Art, Archives and Collections
Figure 1. Assorted Busts on Gray Stand, Pixabay (CC0), https://www.pexels.com/.
Figure 2. Newspaper headlines relating to the transition from in-person to online Higher Education.
Figure 3. Geographic spread of responses to the survey open to all: Australia, Belgium, Brazil, Canada, Germany, Italy, Japan, Malaysia, Mexico, New Zealand, Poland, Romania, South Africa, Spain, United Kingdom, United States. Source: AHRC/UMIS Online teaching with digitised collections.
Figure 4. Hybrid Museum Studies object study class at the University of Glasgow delivered synchronously with some students and staff onsite and others online.
Figure 5. Qualtrics survey screens, gathering quantitative and qualitative data on online teaching and learning with digitised collections in higher education contexts.
Figure 6. A screenshot of Padlet from one of the breakout groups in the DCDC 2021 workshop 'Online teaching and learning with digitised collections within higher education contexts', where participants shared their insights on the impact of the COVID-19 pandemic and strategies for navigating challenges looking backward.
Figure 7. Gorilla skull (BPM 25511) in Exhibit Tool © University of St Andrews Libraries and Museums.
Figure 8. The British Library @britishlibrary (15 October 2021) https://twitter.com/britishlibrary/status/1448985664528297986?s=20&t=oN9XbU7zH5BmSDbSM2TVx.
Figure 9. In previous years students undertook visits to museum and archive collections © Stephen Keane, The Glasgow School of Art.
Figure 10. Preparing for a Virtual Museum Visit in 2020: Students engaged in pre-recorded videos and online tasks before exploring collections online.
Figure 11. Image from object handling video showing staff photos from Scott-Lithgow shipbuilding collection (GD323/13/10/4) captured with ceiling-mounted camera at the University of Glasgow Archives and Special Collections' Virtual

Collections Classroom for Digital Cultural Heritage course, Museum Studies MSc © University of Glasgow.

Figure 12. The technical setup of the Virtual Classroom at Archives and Special Collections, University of Glasgow © Jo Tinkler, Learning Spaces Specialist, University of Glasgow.

Figure 13. Students' exhibition 'Toil and Trouble: Witchcraft in Scotland', University of Aberdeen.

Figure 14. Online students' exhibition 'Safekeeping: protecting what is valued', University of Aberdeen.

Figure 15. Digitisation of an international collection of chair designs, University of Dundee © Matthew Jarron.

Figure 16. Digital tools for teaching with Manuscripts, based on IIIF and Universal Viewer, University of St Andrews.

Figure 17. Use of Zoom poll at University of Glasgow Archives and Special Collections' Virtual Collections Classroom for Records and Evidence course, Information Management and Preservation MSc © Johanna Green, University of Glasgow.

Figure 18. November 2020, Digital Scholarship Centre in the Centre for Research Collections, University of Edinburgh © Richard Oosterhoff.

Figure 19. Digital Cultural Heritage class during Covid, Feb 2021, University of Glasgow. In the Quarantine Challenge activity shown, students are asked to recreate an artwork with objects in their home and/or people in their Zoom breakout room © Franziska Mucha.

Figure 20. Collections store at the Hunterian Collections Centre at Kelvin Hall, University of Glasgow.

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